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(54) **Pedalling simulating implement with means for adjusting the pedalling effort depending on the inclination**

(57) A pedalling simulating implement, with adjusting means for adjusting the variable effort depending on the inclination, comprises an adjustable braking system coupled to a bearing construction including a seating plane and a handlebar.

To the bearing construction is pivoted a pulley to which is rigidly connected a pair of pedals, the pulley

being kinematically coupled to a flywheel.

This implement is characterized in that it further comprises swinging means adapted to allow the bearing construction to swing with respect to the base of the implement, so as to change the inclination of the implement depending on the pedalling effort applied by the athlete for pedalling.

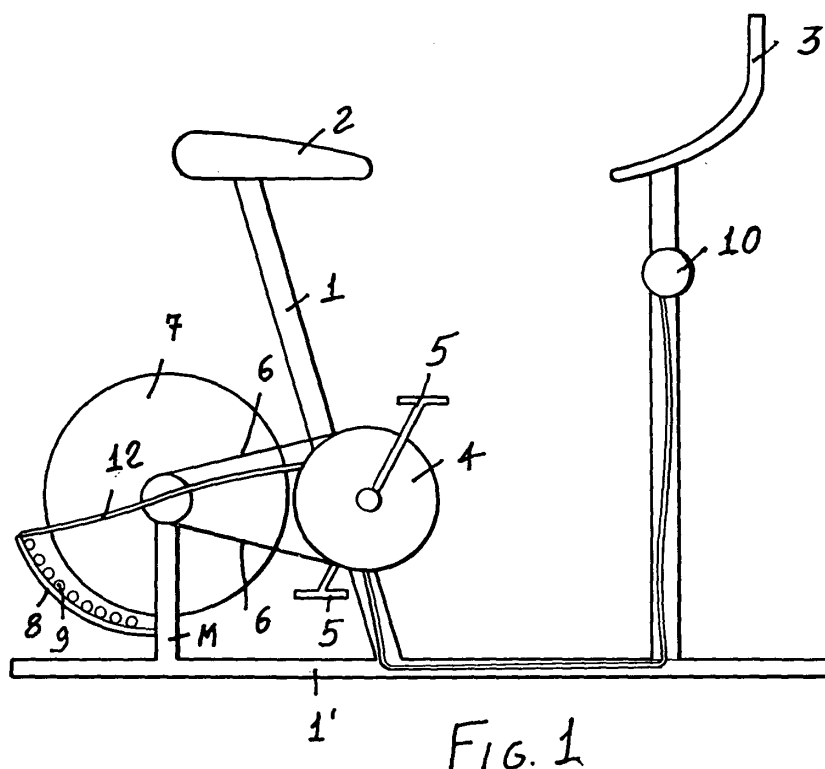


FIG. 1

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a pedalling simulating implement, including adjusting means for adjusting the pedalling effort depending on the inclination.

[0002] As is known, the most part of prior pedalling simulating implements conventionally comprise braking systems, either manually or electromechanically adjusted, designed for simulating the pedalling resistance encountered on positive inclination or uphill grounds.

[0003] The above mentioned braking systems comprise, for example, friction braking, magnetic and electromagnetic braking systems, operating based on friction, magnetic and electromagnetic forces.

[0004] Further prior pedalling simulating devices are designed for swinging along a cross and longitudinal axis to simulate a road pedalling condition.

SUMMARY OF THE INVENTION

[0005] The aim of the present invention is to provide such a pedalling simulating implement which is adapted to simulate a pedalling operation on slanted roads.

[0006] Within the scope of the above mentioned aim, a main object of the invention is to provide such a pedalling simulating device or implement, for providing a pedalling feeling much more realistic than that provided by existing like implements.

[0007] Another object of the invention is to provide such an implement which is very flexible in operation and can be made by already existing methods and systems.

[0008] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a pedalling simulating implement including adjusting means for adjusting the pedalling effort depending on the inclination, said implement comprising an adjustable braking system coupled to a bearing structure including a seating plane and a handlebar.

[0009] To said bearing structure is pivoted a pulley to which is rigidly fixed a pair of pedals, said pulley being moreover kinematically coupled to a flywheel.

[0010] This implement is characterized in that it further comprises swinging means designed for allowing the bearing structure to swing with respect to a base of the implement, thereby an inclination of the implement will change the effort applied by the athlete for driving the pedals.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred,

though not exclusive, embodiment of the invention, which is illustrated by way of an indicative, but not limitative, example in the accompanying drawings, where:

Figure 1 is a side elevation view of a pedalling simulating implement or device;

Figure 2 is a further side elevation view of a pedalling simulating implement, according to a first aspect of the present invention; and

Figure 3 is a further side elevation view of a pedalling simulating implement or device according to a further aspect of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0012] With reference to the number references of the above mentioned figures, figure 1 shows a typical pedalling simulating implement or device, including a magnetic braking system which can be manually adjusted, and comprising a bearing or supporting framework 1 including a seating plane 2 and a handlebar 3.

[0013] To this same structure a pivoting pulley 4, to which pair of pedals 5 are rigidly coupled.

[0014] Said pulley 4 is coupled, through a transmission or driving belt 6, to a flywheel 7.

[0015] The braking system position, as shown by an arch 8 having inner magnets 9 pivoted to the structure 1' at the point M, with respect to the flywheel 7, is adjusted by an adjusting device 10 through a cable 12.

[0016] In the above braking system, the approaching and moving away displacements of the magnets with respect to the outer rim of the flywheel, which is generally made of a ferrous material, and sometimes coated by copper or aluminium, cause the braking load to increase or decrease.

[0017] Figure 2 illustrates, merely by an example, a first embodiment of the present invention, applied to the implement shown in figure 1.

[0018] In this embodiment, the bearing supporting structure 20 is adapted to swing about the implement base 21, on a pivot pin 22, and the inclination of the structure 20 may be adjusted by extending a piston 23, being controlled by a control unit 24.

[0019] The braking system 8, 9, for example of the same type as the above disclosed braking system, is coupled to the implement base 21 by a support element 25.

[0020] The approaching and moving away displacements to/from said flywheel 7 of said braking system, and accordingly the increase or decrease of the braking load, is in this embodiment controlled by inclining the structure 1.

[0021] As in the above disclosed example, this embodiment of the invention can be applied to any pedalling simulating implements, including any desired braking systems, by merely providing different adjusting means for adjusting the inclination of the implement.

[0022] In figure 3, for example, the braking system,

shown by the arch element 8 supporting magnets 9, is coupled to the swinging construction 30, instead of being coupled to the base 21, through a supporting element 31, said arch element being moreover urged by a spring 32, and coupled to the implement base 21 through a tie-rod 33.

[0023] Even in this embodiment, the position of said arch or curved element, with respect to the flywheel 7, will be determined by the inclination of the structure 1 to the implement base 21.

[0024] It has been found that the invention fully achieves the intended aim and objects.

[0025] In fact, the invention provides a pedalling simulating implement which has been specifically designed for simulating, for an implement user, a pedalling on slanted or inclined tracks, while providing a pedalling feeling much more realistic than that provided by prior like devices.

[0026] In fact, the pedalling simulating implement according to the present invention changes the inclination thereof depending on the pedalling effort applied by the athlete or user.

[0027] In particular, the implement according to the present invention changes the frontward-rearward inclination by changing the braking load.

[0028] In particular, by frontward inclining the implement (that is in the handlebar direction), the braking load decreases, thereby providing the athlete with a downhill pedalling feeling.

[0029] On the contrary by rearward inclining the implement, the braking load will increase, thereby simulating an uphill pedalling condition.

[0030] Actually, the inclination of a bike, and the pedalling resistance thereof, would greatly change as the bike running plane is inclined, in particular in pedalling on roads and the like.

[0031] Thus, the invention provides a much more realistic pedalling feeling than that of prior like devices.

[0032] While the inventive concept specifically relates to changing the inclination of the implement depending on the braking load, this concept can be applied by any desired methods and to any desired braking systems and related adjustment means.

[0033] A great advantage of the invention is that it can be applied to any pedalling simulating devices, and any desired braking systems, by providing different adjusting means for adjusting the inclination of the implement.

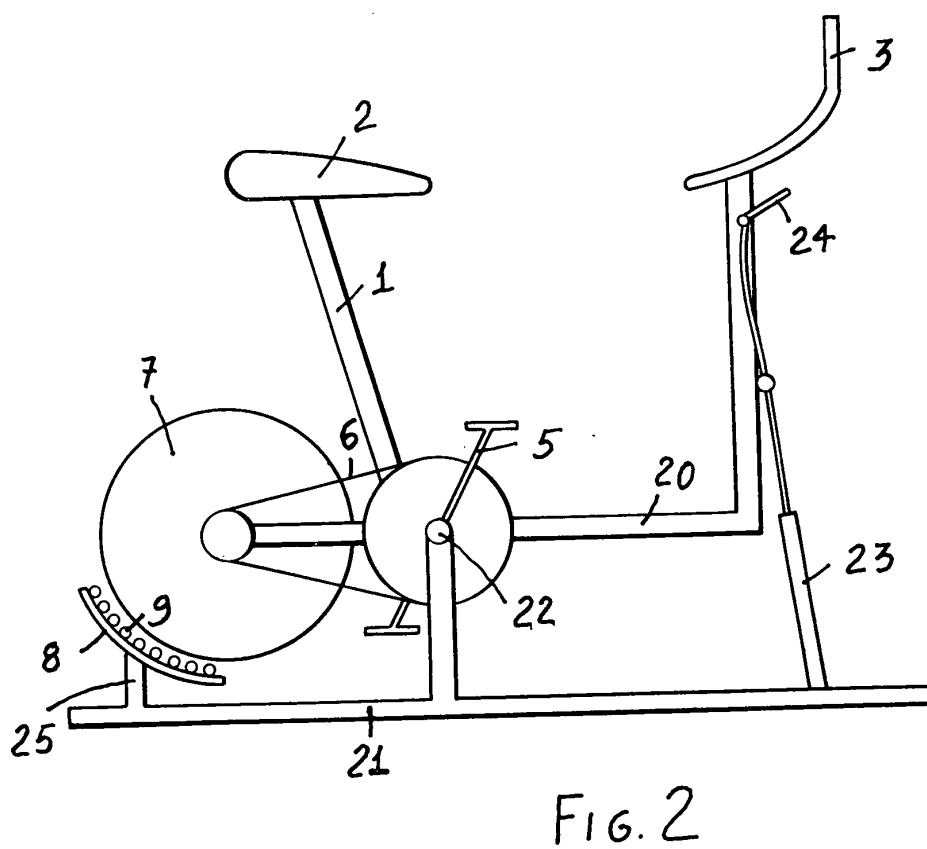
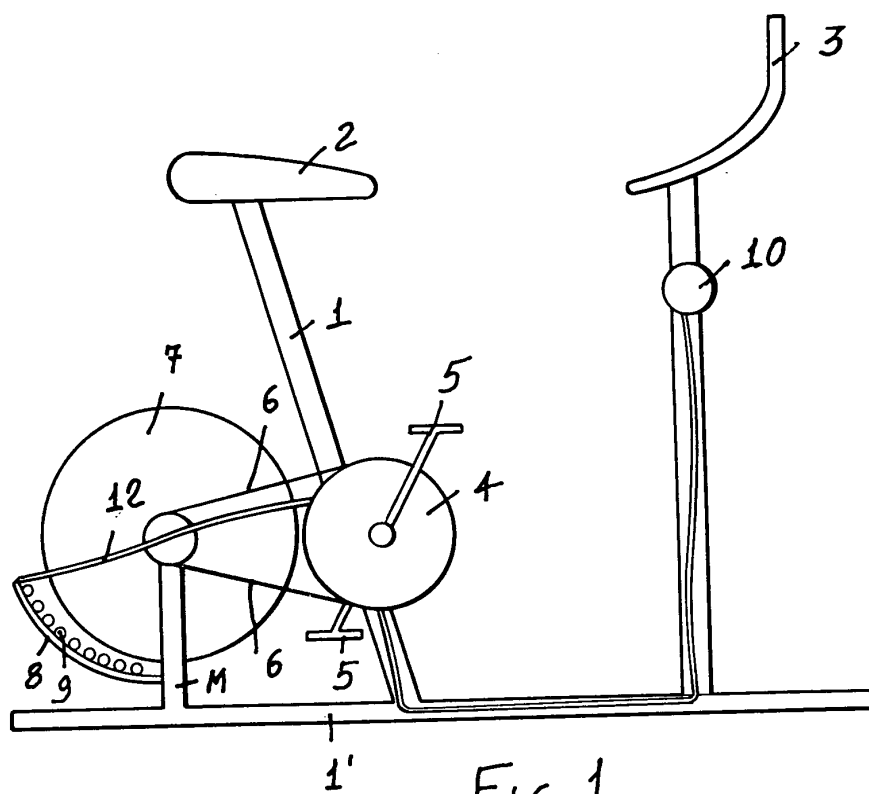
[0034] In practicing the invention, the used materials, as well as the contingent size and shapes of the component elements thereof, can be any, depending on the requirements and status of the art.

braking system coupled to a bearing structure including a seating plane and a handlebar, to said bearing structure being pivoted a pulley to which is rigidly coupled a pair of pedals, said pulley being kinematically connected to a flywheel, **characterized in that** said implement comprises swinging means causing said bearing structure to swing with respect to a base of said implement, thereby adjusting the inclination of said implement depending on the effort applied by an athlete for pedalling.

2. An implement, according to Claim 1, **characterized in that** said swinging means comprise a pivot pin coupling said bearing structure to said base bearing on a floor and that the inclination of said bearing structure is adjusted by extending a piston as controlled by a control unit.
3. An implement, according to Claim 1 or 2, **characterized in that** said braking system is coupled to said base by a supporting element and that the approaching and moving away displacements with respect to the flywheel, and accordingly the increase or decrease of the braking load, depends on the inclination of said bearing structure.
4. An implement, according to one or more of the preceding claims, **characterized in that** said braking system, comprising an arch or curved element covered by magnets, is fixed to said swinging structure, by a support.
5. An implement, according to one or more of the preceding claims, **characterized in that** said arch or curved element is urged by a spring and coupled to said base through a tie-rod, the position of said curved element with respect to said flywheel, being controlled by inclining said bearing structure with respect to said base.
6. An implement, according to one or more of the preceding claims, **characterized in that** said implement comprises one or more of the disclosed and/or illustrated characteristics.

Claims

1. A pedalling simulating implement, including adjusting means for adjusting the pedalling effort depending on the inclination, comprising an adjustable



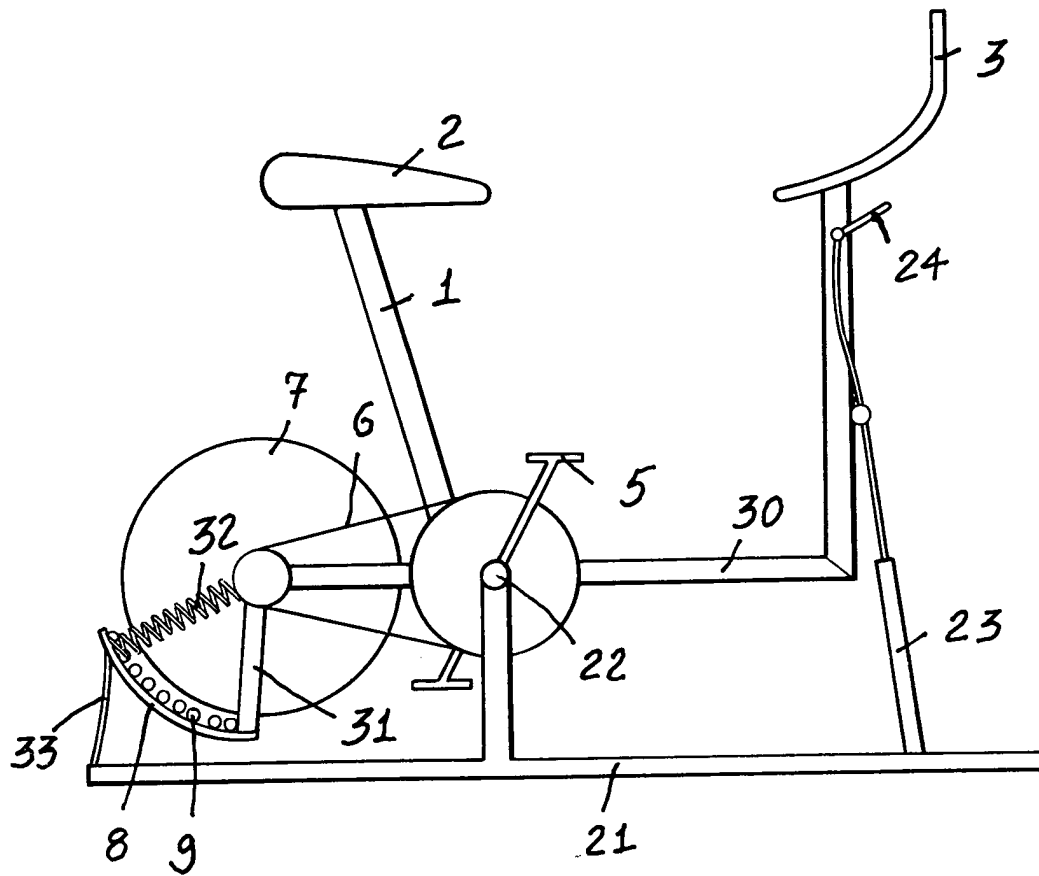


FIG. 3



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PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent Convention EP 03 00 4159
shall be considered, for the purposes of subsequent
proceedings, as the European search report

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 2001/031686 A1 (WARE JOHN SCOTT) 18 October 2001 (2001-10-18)	1-3	A63B22/08 A63B21/22
Y	* the whole document *	4,5	

Y	US 6 095 953 A (LEE MU-YUAN ET AL) 1 August 2000 (2000-08-01)	4,5	
	* the whole document *		

			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A63B
INCOMPLETE SEARCH			
The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims. Claims searched completely : 1-5 Claims searched incompletely : Claims not searched : 6 Reason for the limitation of the search: Rule 29 (6): reference to description or drawings			
Place of search		Date of completion of the search	Examiner
THE HAGUE		25 June 2003	Knoflachner, N
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04C07)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 00 4159

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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25-06-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2001031686 A1	18-10-2001	NONE	
US 6095953 A	01-08-2000	NONE	