(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 014 339 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
04.08.2010 Bulletin 2010/31

(51) Int Cl.:
A63B 69/16 *(2006.01)*

(21) Application number: **07425384.0**

(22) Date of filing: **20.06.2007**

(54) **Cycling training device for application on bicycles**

Fahrrad-Übungsgerät zum Gebrauch bei Fahrrädern

Appareil d'entraînement au cyclisme à utiliser avec un vélo

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

(43) Date of publication of application:
14.01.2009 Bulletin 2009/03

(73) Proprietor: **PORTER di Lincetto Orietta**
35143 Padova (IT)

(72) Inventor: **Guido, Davide, c/o PORTER di Lincetto Orietta**
35143 Padova (IT)

(74) Representative: **Vinci, Marcello**
Ufficio Veneto Brevetti
Via Sorio 116
35141 Padova (IT)

(56) References cited:
EP-A- 1 364 681
DE-A1- 3 302 305
FR-A1- 2 775 191
US-A- 5 480 366

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 014 339 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The present patent relates to training equipment and devices, and particularly concerns a new cycling training device.

[0002] In many sporting disciplines, such as cycling, numerous training sessions are needed to achieve adequate levels of preparation.

[0003] Cycling is among the most popular sporting disciplines at all levels, for amateurs, as an occasional pastime, for cycling tourism and right up to various competitive levels.

[0004] It is not always possible to do cycle training on the road because:

- the roads are increasingly occupied by all kinds of traffic, including motorcycles, motorcars, and heavy goods vehicles that make it increasingly difficult for cyclists to use them;
- the roads are not always in ideal conditions and the surface may be damaged, with loose stones, holes and humps, that can make cyclists fall and place them at risk of injury;
- when the weather is fine, it is a pleasure to go cycling, but in the rain and other adverse weather conditions, or in the evenings, it is often very unpleasant and even hazardous to cycle on the roads;
- it becomes essential for cyclists to study and follow a route with the fewest possible road intersections to avoid them having to stop frequently and to enable them to maintain a constant speed.

[0005] For all these reasons, intensive cycling training is often done at indoor tracks and enclosed circuits.

[0006] Training at indoor tracks and circuits is expensive, however, and accessible only to a few athletes at one time. Moreover, such indoor tracks and circuits are in short supply and this means that athletes are obliged to travel more or less far and with more or less difficulty to and from the indoor track or circuit with their bicycles loaded on or in their cars.

[0007] There are known types of stationary cycling trainer for simulating a cycling action, which are without wheels and placed on a stand. These stationary trainers are ideal for exercising purposes, especially for the lower limbs, but they are hardly suitable for cycle training.

[0008] In fact, due to the reciprocal arrangement of the saddle, pedals and handlebar, stationary cycling trainers involve a riding position that is not like the position of a person riding a road or racing bicycle, and that is certainly different from the typical riding position on the bicycles used by athletes in races, be they amateurs or professionals.

[0009] Moreover, stationary cycling trainers have a gearing system that does not reproduce the mechanical features of a real bicycle or of any given bicycle subsequently used for racing.

[0010] EP 1364681 relates to a bicycle trainer including a bicycle without wheels and a frame supporting the bicycle, said frame comprising a rotary body coupled to the drive unit of the bicycle, a flywheel and a load resistance generating unit, which imparts load resistance to torque to said flywheel.

[0011] US 5480366 relates to a bicycle trainer including a stand for supporting the rear of a bicycle and a chain resistance device providing resistance and work absorption, said chain resistance device being mounted in axis with the hub.

[0012] To overcome all the above-mentioned drawbacks, a new cycle training device for use with a bicycle has been studied and carried out.

[0013] One object of the new trainer device is to enable cycle training indoors without having to gain access to installations with cycle tracks or circuits.

[0014] Another object of the new cycle trainer device is to enable training at home, irrespective of the weather conditions.

[0015] A further object of the new cycle trainer device is to enable training in conditions as similar as possible to those of a cycling race, or at least to those of training sessions on the road, because cyclists can ride their own racing bicycles.

[0016] Another object of the new device is to enable training with the cyclist's usual or preferred saddle-pedal-handlebar arrangement.

[0017] Another object of the new device is to enable cycle training with the opportunity to vary the gear ratio of the pedalling action.

[0018] These and other direct and complementary objects are achieved by the new cycle trainer device applicable to a bicycle, the main component parts of which comprise a folding supporting element, a hub with a set of cogs of decreasing diameter lying side by side, a wheel with a sprocket, a chain or other connection element between a cog on the hub and the sprocket in the wheel.

[0019] When opened, the supporting element acquires a shape suitable for supporting all said parts and for ensuring stability in the various directions.

[0020] Preferably, said supporting element consists of two uprights forming an inverted V-shaped stand with a hinge near or at the tip of said inverted V-shaped stand, and with two supporting feet attached to its lower ends.

[0021] The hinge between said uprights forming the inverted V-shaped stand is designed to enable the two uprights to come together in a generally parallel position, i.e. said hinge has an axis of rotation at right angles to the plane formed by said two uprights.

[0022] Said hub and cogs are supported on a suitable seat attached above said tip of the inverted V-shaped stand formed by the two uprights.

[0023] In particular, said seat and said hub are arranged so that said hub has an axis of rotation parallel to the axis of rotation of the hinge between said two uprights.

[0024] On one side of said hub there is a chain wheel of diameter similar to that of the toothed wheels of the

pedals and a set of cogs of decreasing diameter lying side by side, like the set of cogs on the rear wheel of a bicycle.

[0025] A supporting crossbar pointing generally upwards and away from the hinge between said two uprights is removably attached to one of the two supporting uprights.

[0026] The free end of said supporting crossbar is fitted at one end with a seat for the revolving connection of said wheel. In particular, said seat and said wheel are arranged so that their axis of rotation lies parallel to the axis of rotation of said hub and cogs.

[0027] The wheel is complete with a sprocket and can be fitted with braking means.

[0028] The wheel and the hub with the cogs are mounted on the supporting element so that, when the rear fork of a bicycle is inserted and fixed to said hub, the cogs of said hub come to be on the same side as the rear derailleur gear of said bicycle, and so that said wheel comes to be on the side of the bicycle opposite to said hub.

[0029] It is preferable for the chain wheel on the hub that transmits the movement to the wheel, and consequently to the sprocket in the wheel, to be on the same side of the hub as the cogs.

[0030] Provision is also made to enable the removal and repositioning both of the hub with the cogs and of the wheel so that the cogs on the hub are on the opposite side, i.e. on whichever side the user prefers.

[0031] The connection between the sprocket in the wheel and the chain wheel on the hub is preferably achieved by means of a cycling chain of known type.

[0032] A guard is provided for protection and safety, covering the wheel and the chain. Said guard is removable to give access to the area of the hub.

[0033] The new cycle trainer device is very straightforward to use: users simply have to release the rear wheel from their bicycles and hook the rear fork of their bicycles onto the hub of the new device, engaging the bicycle chain on the chain wheel of said hub on the new device. With a few turns of the wheel, the rear derailleur gear of the bicycle and the chain become adjusted on one of the cogs on the hub.

[0034] At the end of the training session, or at a later time, the cyclist can release the bicycle from the new device and reinstall the normal rear wheel on the rear fork of the bicycle.

[0035] The new device can be dismantled and/or folded so as to occupy less space: the guard can be removed and dismantled, then the two supporting uprights are folded into a generally parallel position.

[0036] The overall dimensions of the device can also be further reduced by removing the wheel and dismantling the wheel-supporting crossbar from the uprights of the supporting element.

[0037] Aerodynamic braking elements can be applied to the wheel to generate a greater resistance to the rotation of the wheel that increases as the rotation speed of said wheel increases.

[0038] The characteristics of the new cycling training device for application on bicycles will be highlighted in greater detail in the description below with reference to the attached drawings, which are provided as non-limiting examples.

[0039] Figure 1 schematically represents a side view of the new device, while Figure 2 shows an example of the new device in use with a bicycle (B).

[0040] The supporting element (S) consists of two uprights (S1, S2) arranged so as to form an inverted V-shaped stand and hinged near or at the tip of said inverted V-shaped stand.

[0041] The lower ends of said uprights (S1, S2) are fitted with two supporting feet (S4).

[0042] A hub (M) with cogs (Dc, Dr) is installed on a seat fixed above said tip of the V-shaped stand formed by the two uprights (S1, S2).

[0043] In particular, said seat and said hub (M) are arranged so that the axis of rotation of said hub (M) lies parallel to the axis of rotation of the hinge between said two uprights (S1, S2).

[0044] On one side of said hub (M) there is a chain wheel (Dr), of diameter similar to that of the toothed wheel for the pedals, and a set of cogs (Dc) lying side by side with decreasing diameters, similar to the set of cogs on the rear wheel of a bicycle.

[0045] A supporting crossbar (T) facing generally upwards and away from the hinge between said two uprights (S1, S2) is removably attached (Z) to one of the two uprights (S1) on the supporting element (S).

[0046] The free end of said supporting crossbar (T) is fitted with a seat for the revolving connection of said wheel (R). In particular, said seat and said wheel (R) are arranged with their axis of rotation lying parallel to the axis of rotation of said hub (M) and cogs (Dr, Dc).

[0047] The wheel (R) is fitted with a sprocket (Rp) at its axis or hub of rotation and can also comprise aerodynamic braking elements (F).

[0048] The wheel (R) and the hub (M) and cogs (Dr, Dc) are installed on the supporting element (S) so that, when the rear fork (Bf) of a bicycle (B) is inserted and fixed to said hub (M), the cogs (Dc) on said hub (M) come to be on the same side as the rear derailleur gear of said bicycle (B), and so that said wheel (R) is on the opposite side of the bicycle (B) from said hub (M).

[0049] It is preferable for the chain wheel (Dr) on the hub (M) that is used to transmit the movement to the wheel (R), and consequently to the sprocket (Rp) in the wheel (R), to be on the same side of the hub (M) as the cogs (Dc).

[0050] Provision is also made to enable the removal and repositioning of both the hub (M) with cogs (Dr, Dc) and of the wheel (R) so that the cogs (Dc) on the hub (M) relating to the derailleur gear of the bicycle (B) are on the opposite side, i.e. on whichever side is preferred.

[0051] The connection between the sprocket (Rp) in the wheel (R) and the chain wheel (Dr) on the hub (M) is preferably achieved by means of a bicycle chain (C) of

known type.

[0052] A protection and safety guard (P) is provided over the wheel (R) and the chain (C). Said guard (P) is removable to give access to the area of the hub (M) and to the corresponding cogs (Dc, Dr). Provision is made for said guard (P) to have openings (Pa) - covered by a metal mesh, for instance - to allow for air circulation and to enable a general visual control of the wheel (R).

[0053] To use the new device, users/athletes release the rear wheel from their bicycle (B) and hook the rear fork of the bicycle (B) onto the hub (M) of the new device, engaging the chain (Bc) of the bicycle (B) on the cogs (Dc) on said hub (M).

[0054] The initial arrangement of said chain (Bc) on the cogs (Dc) of the hub (M) is obtained simply by performing a few turns of the pedal and operating the rear derailleur gear of the bicycle (B) a few times.

[0055] The arrangement of the new cycle trainer device and of the user's bicycle (B) when the device is in use is illustrated in Figure 2.

[0056] At this point, the athlete can sit on his/her bicycle (B) and begin training.

[0057] The new cycling training device for application to bicycles offers considerable advantages.

[0058] The new trainer device enables cycling training indoors without having to go to an indoor cycle track or circuit; the cyclists can remain in their own homes to train whatever the weather conditions.

[0059] The new device enables training in conditions as similar as possible to those of a race, or at least of a training session on the road, with the saddle-pedals-handlebar arrangement best suited to the athlete, who can use his or her normal racing bicycle.

[0060] The new device also enables users to train with the opportunity to adjust the gear ratio of their pedalling action.

[0061] The new device enables training with the athlete's own bicycle, or with a bicycle chosen for the purpose and best suited to each individual athlete.

[0062] People with poor vision or blind people can use the new device for training or exercise.

[0063] The new device is also suitable for people who have lost a lower limb, since balance is assured by the supporting element (S), which supports both the new device and the bicycle (B).

[0064] Provision can also be made for the new device to be used for exercising the arms, i.e. instead of the bicycle (B,) a mechanism or device suitable for enabling rotational arm movements can be applied to the hub (M).

[0065] In the light of the previous description and the attached drawings, the following claims are advanced.

Claims

1. A cycling training device for application on bicycles (B) comprising:

- a supporting element (S) complete with a seat for housing a hub (M) suitable for coupling with the rear fork (Bf) of a bicycle (B);
- a hub (M) with several cogs (Dc) lying side by side with decreasing diameters and a further chain wheel (Dr), wherein said cogs (Dc) lying side by side are suitable for coupling with the chain (Bc) of the bicycle (B) connected to said new device;

characterised in that it also comprises:

- a wheel (R) attached to said supporting element (S) in a position opposite the position of the bicycle (B) with respect to said hub (M), wherein a sprocket (Rp) attached parallel and coaxial to said wheel (R) is kinetically connected to the chain wheel (Dr) on said hub (M) by means of a bicycle chain (C);
- aerodynamic braking elements (F) applied to said wheel (R).

2. A cycling training device according to claim 1, **characterised in that** said wheel (R) is a bicycle wheel (R).

3. A cycling training device according to claim 1 or claim 2, **characterised in that** said supporting element (S) comprises two uprights (S1, S2) arranged to form an inverted V-shaped stand and complete at their lower ends with two supporting feet (S4), wherein said uprights (S1, S2) are hinged near or at the tip of said inverted V-shaped stand.

4. A cycling training device according to claim 3, **characterised in that** it has a seat suitable for containing said hub (M) and cogs (Dc, Dr) located above said tip of the V-shaped stand formed by the two uprights (S1, S2), wherein said seat and said hub (M) are arranged so that the axis of rotation of said hub (M) lies at right angles to the plane of said two uprights (S1, S2).

5. A cycling training device according to claim 3, **characterised in that** there is a supporting crossbar (T) on one of the two uprights (S1) forming the supporting element (S), wherein said wheel (R) is fitted to the free end of said supporting crossbar (T), with axis of rotation lying parallel to the axis of rotation of said hub (M).

6. A cycling training device according to claim 5, **characterised in that** said supporting crossbar (T) is removably attached to said upright (S1) of the supporting element (S), and wherein said supporting crossbar (T) is fixed by means of at least one screw (Z) to said upright (S1) on the supporting element (S).

7. A cycling training device according to claim 1, **characterised in that** it comprises a removable perforated protection guard (P) over the wheel (R) and the chain (C) connecting said wheel (R) to said hub (M).

8. A cycling training device according to claim 7, **characterised in that** said guard (P) permits access to the area of the hub (M) and the related cogs (Dc, Dr).

9. A cycling training device according to claim 7 or claim 8, **characterised in that** said guard (P) can be removed and dismantled.

Patentansprüche

1. Eine Radfahrtrainings-Vorrichtung zur Anwendung an Fahrrädern (B), Folgendes umfassend:

   • ein Stützelement (S), komplett mit einer Aufnahme für eine Nabe (M), die geeignet ist, an die hintere Gabel (Bf) eines Fahrrads (B) angekuppelt zu werden;
   • eine Nabe (M) mit mehreren Zähnen (Dc), die nach abnehmendem Durchmesser nebeneinander liegen, und ein weiteres Kettenrad (Dr), wobei besagte, nebeneinander liegende Zähne (Dc) geeignet sind, mit der Kette (Bc) des mit besagter neuer Vorrichtung verbundenen Fahrrads (B) gekuppelt zu werden;

   dadurch gekennzeichnet, dass sie außerdem Folgendes umfasst:

   • ein Rad (R), das in einer bezüglich besagter Nabe (M) in einer der Position des Fahrrads (B) entgegengesetzten Position an dem Stützelement (S) befestigt ist, wobei ein parallel und koaxial an besagtem Rad (R) befestigtes Kettenzahnrad (Rp) kinetisch mittels einer Fahrradkette (C) mit dem Kettenrad (Dr) an besagter Nabe (M) verbunden ist;
   • an besagtem Rad (R) angebrachte, aerodynamische Bremselemente (F).

2. Eine Radfahrtrainings-Vorrichtung gemäß Patentanspruch 1, **dadurch gekennzeichnet, dass** besagtes Rad (R) ein Fahrrad-Rad (R) ist.

3. Eine Radfahrtrainings-Vorrichtung gemäß Patentanspruch 1 oder Patentanspruch 2, **dadurch gekennzeichnet, dass** besagtes Stützelement (S) zwei Ständer (S1, S2) umfasst, die so angeordnet sind, dass eine umgekehrt V-förmige Struktur geformt wird, und an ihren unteren Enden mit zwei Stützfüßen (S4) abschließen, wobei besagte Ständer (S1, S2) in der Nähe oder an der Spitze besagter umgekehrt V-förmigen Struktur angelenkt sind.

4. Eine Radfahrtrainings-Vorrichtung gemäß Patentanspruch 3, **dadurch gekennzeichnet, dass** sie einen Sitz aufweist, der geeignet ist, besagte Nabe (M) und Zähne (Dc, Dr) aufzunehmen, und der sich über der Spitze der durch die beiden Ständer (S1, S2) gebildeten, V-förmigen Struktur befindet, wobei besagter Sitz und besagte Nabe (M) so angeordnet sind, dass die Drehachse besagter Nabe (M) rechtwinklig zur Ebene der beiden besagten Ständer (S1, S2) verläuft.

5. Eine Radfahrtrainings-Vorrichtung gemäß Patentanspruch 3, **dadurch gekennzeichnet, dass** an einem der beiden das Stützelement (S) bildenden Ständer (S1) eine stützende Querstange (T) vorhanden ist, wobei besagtes Rad (R) auf das freie Ende der stützenden Querstange (T) aufgesetzt ist und deren Drehachse parallel zur Drehachse besagter Nabe (M) verläuft.

6. Eine Radfahrtrainings-Vorrichtung gemäß Patentanspruch 5, **dadurch gekennzeichnet, dass** besagte, stützende Querstange (T) abnehmbar an besagtem Ständer (S1) des Stützelements (S) befestigt ist, und wobei besagte Querstange (T) mit wenigstens einer Schraube (Z) an besagtem Ständer (S1) am Stützelement (S) befestigt ist.

7. Eine Radfahrtrainings-Vorrichtung gemäß Patentanspruch 1, **dadurch gekennzeichnet, dass** sie eine abnehmbare, gelochte Schutzabdeckung (P) über dem Rad (R) und der Kette (C) umfasst, welche besagtes Rad (R) mit besagter Nabe (M) verbindet.

8. Eine Radfahrtrainings-Vorrichtung gemäß Patentanspruch 7, **dadurch gekennzeichnet, dass** besagte Abdeckung (P) den Zugang zum Bereich der Nabe (M) und den zugehörigen Zähnen (Dc, Dr) erlaubt.

9. Eine Radfahrtrainings-Vorrichtung gemäß Patentanspruch 7 oder Patentanspruch 8, **dadurch gekennzeichnet, dass** besagte Abdeckung (P) abgenommen und zerlegt werden kann.

Revendications

1. Dispositif pour l'entraînement cycliste pour l'application sur vélos (B) comprenant :

   • un élément de support (S) doté d'un siège pour loger un moyeu (M) apte à s'accoupler avec la fourche arrière (Bf) d'un vélo (B) ;
   • un moyeu (M) avec plusieurs dents (Dc) l'une à côté de l'autre avec diamètres décroissants et

une ultérieure roue de chaîne (Dr), où lesdites dents (Dc) l'une à côté de l'autre sont aptes à s'accoupler avec la chaîne (Bc) du vélo (B) reliée audit dispositif nouveau ;

caractérisé en ce qu'il comprend également :

• une roue (R) appliquée sur ledit élément de support (S) dans une position opposée à la position du vélo (B) par rapport audit moyeu (M), où une roue dentée (Rp) reliée de manière parallèle et coaxiale à ladite roue (R) est cinétiquement reliée à la roue de chaîne (Dr) sur ledit moyeu (M) au moyen d'une chaîne de vélo (C) ;
• des éléments de freinage aérodynamiques (F) appliqués sur ladite roue (R).

2. Dispositif d'entraînement cycliste selon la revendication 1, **caractérisé en ce que** ladite roue (R) est une roue de vélo (R).

3. Dispositif d'entraînement de cycliste selon les revendications 1 ou 2, **caractérisé en ce que** ledit élément de support (S) comprend deux montants (S1, S2) disposés en forme de V renversé et dotés sur leurs extrémités inférieures de deux pieds de support (S4), où lesdits montants (S1, S2) sont unis avec des charnières près ou sur le sommet de ladite forme en V renversé.

4. Dispositif d'entraînement cycliste selon la revendication 3, **caractérisé en ce qu'**il présente un siège apte à contenir ledit moyeu (M) et les dents (Dc, Dr) disposées au-dessus dudit sommet de la forme en V renversé formée par les deux montants (S1, S2), où ledit siège et ledit moyeu (M) sont positionnés de manière à ce que l'axe de rotation dudit moyeu (M) est perpendiculaire par rapport au plan desdits deux montants (S1, S2).

5. Dispositif d'entraînement cycliste selon la revendication 3, **caractérisé en ce qu'**une traverse de support (T) est présente sur un des deux montants (S1) formant l'élément de support (S), où ladite roue (R) est montée sur l'extrémité libre de ladite traverse de support (T), avec l'axe de rotation parallèle à l'axe de rotation dudit moyeu (M).

6. Dispositif d'entraînement cycliste selon la revendication 5, **caractérisé en ce que** ladite traverse de support (T) est reliée de manière amovible audit montant (S1) de l'élément de support (S), et où ladite traverse de support (T) est fixée au moyen d'au moins une vis (Z) audit montant (S1) sur l'élément de support (S).

7. Dispositif d'entraînement cycliste selon la revendication 1, **caractérisé en ce qu'**il comprend une couverture perforée amovible (P) sur la roue (R) et la chaîne (C) reliant ladite roue (R) audit moyeu (M).

8. Dispositif d'entraînement cycliste selon la revendication 7, **caractérisé en ce que** ladite couverture (P) permet d'accéder à la zone du moyen (M) et aux dents correspondantes (Dc, Dr).

9. Dispositif d'entraînement cycliste selon les revendications 7 ou 8, **caractérisé en ce que** ladite couverture (P) peut être enlevée et démontée.

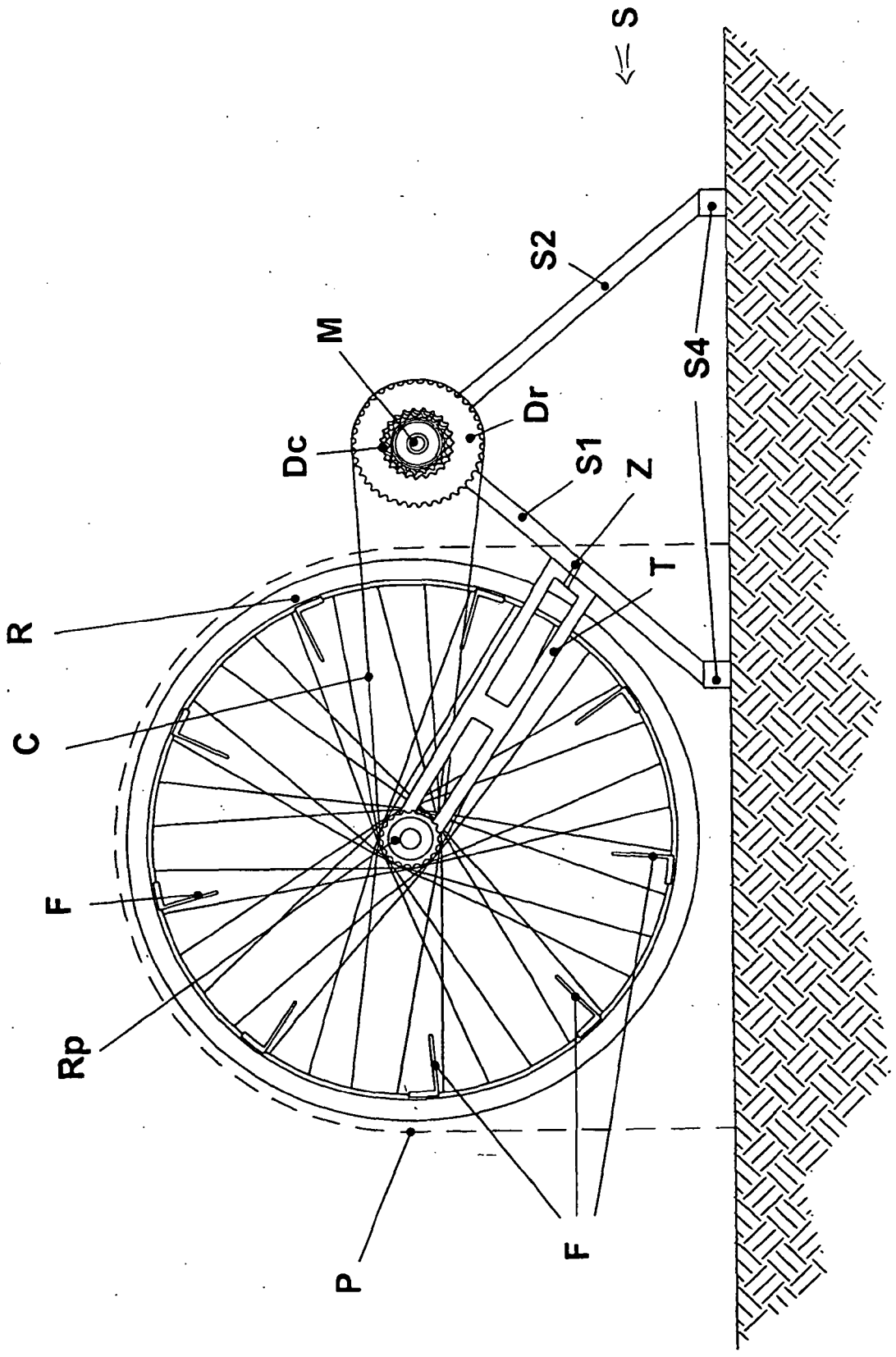


Fig. 1

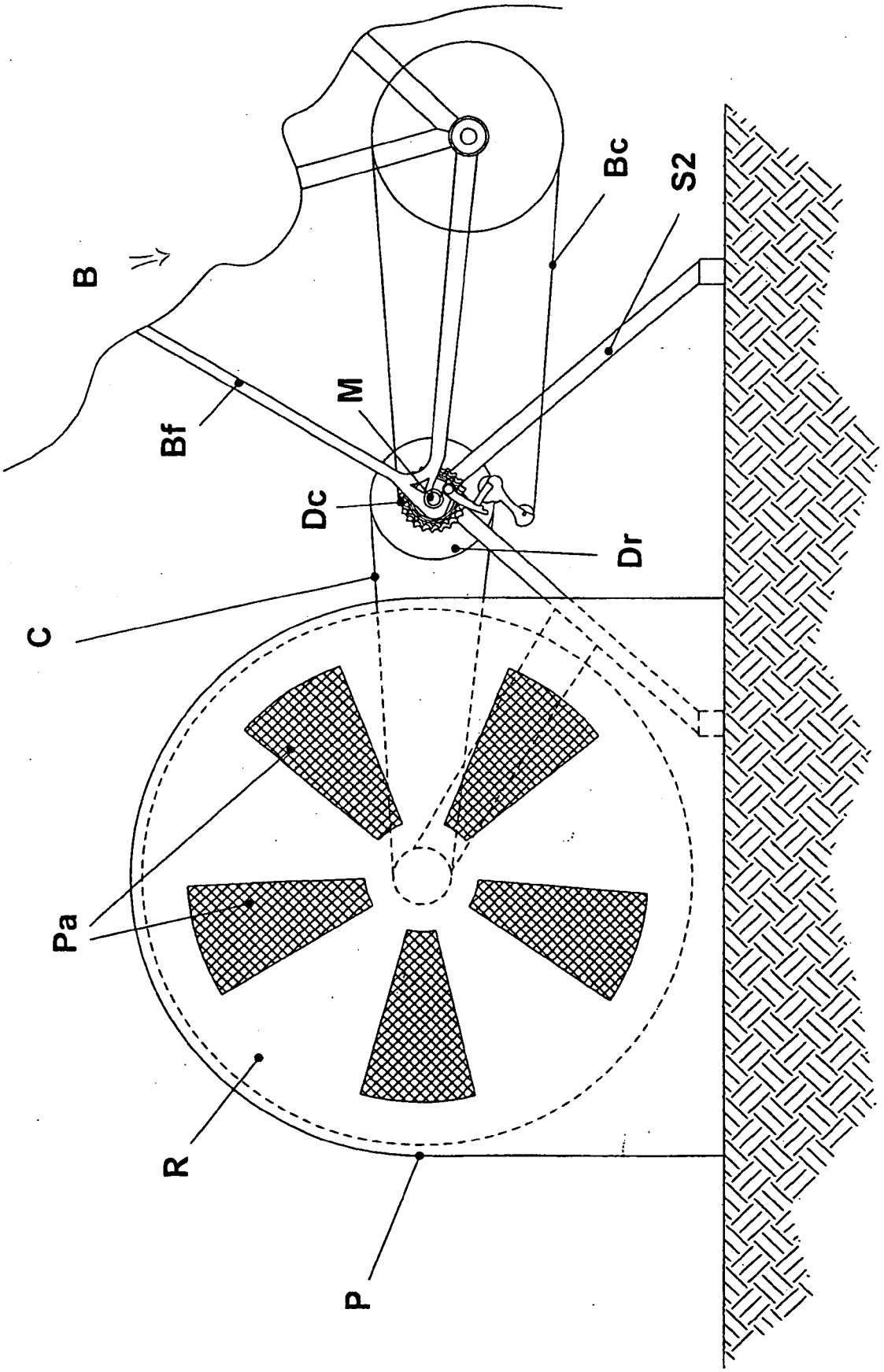


Fig. 2

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1364681 A **[0010]**
- US 5480366 A **[0011]**