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(54) **ELECTRICALLY CONTROLLED LOCK FOR A BICYCLE**

(57) An electronically controlled lock for a bicycle is provided, comprising a drive motor, a lock body and a lock pin spring, wherein one end of the top of the lock body is provided with a lead-out sleeve, the end of the top of the lock body remote from the lead-out sleeve is provided with a lock pin, one side of the interior of the lock body is provided with a torsion spring, a drive motor is mounted on a side of the interior of the lock body near the torsion spring, a lock pin positioning block is provided on the lock pin near the interior of the lock body, the lock pin spring is mounted on the lock pin near a lower side

of the lock pin positioning block, a gasket is provided at a connection between the lock pin positioning block and the lock pin spring, a control slider is provided in the interior of the lock body near a lower side of the drive motor, a cam is mounted on a lower end of the drive motor, left and right ends of the cam are each provided with a stroke switch, a front surface of the lock body is provided with a lock cover, screws are provided at connections between the lock cover and the lock body, and the drive motor is electrically connected to an external power.

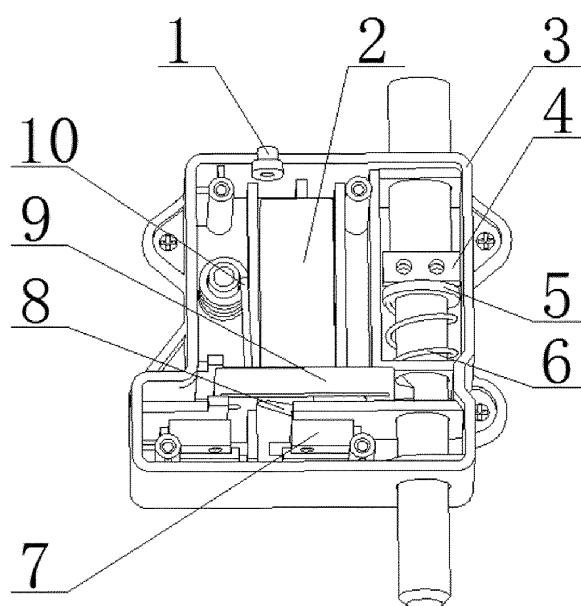


FIG. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to the field of electrically controlled locks, and in particular, to electrically controlled locks for bicycles.

BACKGROUND OF THE INVENTION

[0002] The electrically controlled lock is a mechanical lock means controlled by a relay. A series of products with different structures, including an electrical plug-in lock (anode lock), a cathode lock (electric strike), a magnetic lock, an electrically controlled lock, etc., have been formed. The terminal of the electrically controlled lock is generally an electromagnet controlling a simple mechanical means to open and close a door. Actions of the electromagnet are performed through a series of commands. When control fails, firstly, the voltage fed into the electromagnet is measured and a door open or close command is input (with an electromagnetic card or password) simultaneously to see whether there is a change in the voltage. If there exists such a change in the voltage, but the electromagnet fails to perform any action, it can be determined that the fault is present in the electromagnetic control part. In this case, the electromagnetic control part should be repaired or replaced. The fault is present in the control part otherwise.

[0003] Common bicycle locks are poorly secure and are liable to be damaged. These bicycle locks are also disadvantageous in terms of ease of use and nowhere to place the lock body when not in use as well as difficulty to be locked via press. To this end, the present invention provides a electrically controlled lock for a bicycle.

SUMMARY OF THE INVENTION

[0004] The object of the invention is to provide an electrically controlled lock for a bicycle to overcome the above problems in the prior art that the existing bicycle locks are poorly secure, liable to be damaged and hard to use by users, and the lock body has no place to be placed when not in use, or it is difficult for the lock body to be pressed and thus locked in use.

[0005] To achieve the above object, an electronically controlled lock for a bicycle is provided, comprising a drive motor, a lock body and a lock pin spring, wherein, one end of the top of the lock body is provided with a lead-out sleeve, the end of the top of the lock body remote from the lead-out sleeve is provided with a lock pin, one side of the interior of the lock body is provided with a torsion spring, a drive motor is mounted on the side of the interior of the lock body near the torsion spring, a lock pin positioning block is provided on the lock pin near the interior of the lock body, the lock pin spring is mounted on the lock pin near a lower side of the lock pin positioning block, a gasket is provided at a connection between the

lock pin positioning block and the lock pin spring, a control slider is provided in the interior of the lock body near a lower side of the drive motor, a cam is mounted on a lower end of the drive motor, left and right ends of the cam are each provided with a stroke switch, a front surface of the lock body is provided with a lock cover, screws are provided at connections between the lock cover and the lock body, and the drive motor is electrically connected to an external power.

[0006] Preferably, the lock cover is fixed to the lock body through the screws.

[0007] Preferably, the lock body is fixed to the bicycle through the screws.

[0008] Preferably, two stroke switches are provided and disposed on left and right ends of the lower side of the cam.

[0009] Preferably, eight screws are provided and disposed at connections between the lock body and the lock cover, and connections between the lock body and the bicycle.

[0010] Compared to the prior art, the present invention should have the following advantages. Manual operation is replaced with mechanical operation by means of the drive motor, avoiding inconveniences caused by the manual operation; meanwhile, the lock body can be fixed to the bicycle through screws, avoiding removal of the lock body when not in use; and the drive motor avoids inconveniences caused by unlocking a lock used for a long term and makes the lock unlocked less laborious.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is a schematic view of an embodiment of an electrically controlled lock for a bicycle according to the present invention;

FIG. 2 is a schematic view showing an external structure of the electrically controlled lock for a bicycle.

DETAILED DESCRIPTION OF THE INVENTION

[0012] Embodiments of the present invention will be described below in a clear and complete manner with reference to the drawings. Obviously, the embodiments below are only a part, but not all, of the embodiments. All other embodiments obtained by those of ordinary skill in the art based on the embodiments of the present invention without creative efforts shall fall within the protection scope of the present invention.

[0013] As shown in FIGS. 1 and 2, the present invention provides an electronically controlled lock for a bicycle, including a drive motor 2, a lock body 3 and a lock pin spring 6. One end of the top of the lock body 3 is provided with a lead-out sleeve 1, and the end of the top of the lock body 3 remote from the lead-out sleeve 1 is provided with a lock pin 12. One side of the interior of the lock body 3 is provided with a torsion spring 10, and a

drive motor 2 is mounted on a side of the interior of the lock body 3 near the torsion spring 10. A lock pin positioning block 4 is provided on the lock pin 11 near the interior of the lock body 3. The lock pin spring 6 is mounted on the lock pin 11 near a lower side of the lock pin positioning block 4. A gasket 5 is provided at a connection between the lock pin positioning block 4 and the lock pin spring 6. A control slider 9 is provided in the interior of the lock body 3 near a lower side of the drive motor 2. A cam 8 is mounted on a lower end of the drive motor 2. Left and right ends of the cam 8 are each provided with a stroke switch 7. A front surface of the lock body 3 is provided with a lock cover 12, and screws 13 are provided at connections between the lock cover 12 and the lock body 3. The drive motor 2 is electrically connected to an external power.

[0014] To facilitate the connection of the lock cover 12 and the lock body 3, in this embodiment, the lock cover 12 is preferably fixed to the lock body 3 through the screws 13.

[0015] To facilitate the connection of the lock body 3 and the bicycle, in this embodiment, the lock body 3 is preferably fixed to the bicycle through the screws 13.

[0016] To facilitate control, in this embodiment, two stroke switches 7 are provided and disposed on left and right ends of the lower side of the cam 7.

[0017] To facilitate mounting of the lock body 3, preferably, eight screws 13 are provided in this embodiment and disposed at connections between the lock body 3 and the lock cover 12, and connections between the lock body 3 and the bicycle.

[0018] The drive motor 2 of the invention is electrically connected to an internal power of the bicycle. The drive motor utilizes a principle of electricity generating magnetism and can convert electrical power to mechanical power, thereby providing kinetic energy to the lock body so as to avoid manual operation for the lock body.

[0019] Work principle and operation steps for the electrically controlled lock for a bicycle of the present invention are now described. When the drive motor 2 is rotated towards the left, the cam 8 connected to the drive motor 2 is rotated accordingly, thereby achieving horizontal movement of the control slider 8 to withdraw the control slider 9 from a lock pin locking slot. The lock pin 11 is moved upwards under the elastic force of the lock pin spring 6 and thus unlocked. The drive motor 2 is rotated a little further, and the control slider 9 thus actuates the left stroke switch 7. After the stroke switch 7 is actuated, the system gets information indicating that the lock has been unlocked, and the cam 8 is reversely rotated about 80 degrees by the drive motor 2 simultaneously. Then, the drive motor 2 is stopped, and the unlock operation is completed. When the lock is needed to be locked, upper and lower openings of the bicycle are aligned, and the lock pin 11 is then pressed downward. When the lock pin 11 is pressed into place, the control slider 9 may be moved towards the right into the locking slot of the lock pin 11 under a force of the torsion spring 10. The bicycle

is thus locked, and the control slider 9 touches the right stroke switch 7 simultaneously, thereby the system automatically receiving information indicating that the bicycle has been locked.

[0020] Although embodiments of the present invention have been shown and described, it is be understood by those of ordinary skill in the art that various changes, modifications, substitutions and alterations may be made herein without departing from the spirit and scope of the invention as defined in the appended claims and their equivalents.

REFERENCE LIST

[0021]

- | | |
|----|----------------------------|
| 1 | Lead-out sleeve |
| 2 | Drive motor |
| 3 | Lock body |
| 4 | Lock pin positioning block |
| 5 | Gasket |
| 6 | Lock pin spring |
| 7 | Stroke switch |
| 8 | Cam |
| 9 | Control slider |
| 10 | Torsion spring |
| 11 | Lock pin |
| 12 | Lock cover |
| 13 | Screw |

Claims

1. An electronically controlled lock for a bicycle, comprising a drive motor (2), a lock body (3) and a lock pin spring (6), **characterized in that** one end of the top of the lock body (3) is provided with a lead-out sleeve (1), the end of the top of the lock body (3) remote from the lead-out sleeve (1) is provided with a lock pin (11), one side of the interior of the lock body (3) is provided with a torsion spring (10), a drive motor (2) is mounted on a side of the interior of the lock body (3) near the torsion spring (10), a lock pin positioning block (4) is provided on the lock pin (11) near the interior of the lock body (3), the lock pin spring (6) is mounted on the lock pin (11) near a lower side of the lock pin positioning block (4), a gasket (5) is provided at a connection between the lock pin positioning block (4) and the lock pin spring (6), a control slider (9) is provided in the interior of the lock body (3) near a lower side of the drive motor (2), a cam (8) is mounted on a lower end of the drive motor (2), Left and right ends of the cam (8) are each provided with a stroke switch (7), a front surface of the lock body (3) is provided with a lock cover (12), screws (13) are provided at connections between the lock cover (12) and the lock body (3), and the drive motor (2) is electrically connected to an exter-

nal power.

2. The electronically controlled lock for a bicycle of claim 1, wherein the lock cover (12) is fixed to the lock body (3) through the screws (13). 5
3. The electronically controlled lock for a bicycle of claim 1, wherein the lock body (3) is fixed to the bicycle through the screws (13). 10
4. The electronically controlled lock for a bicycle of claim 1, wherein two stroke switches (7) are provided and disposed on left and right ends of the lower side of the cam (8). 15
5. The electronically controlled lock for a bicycle of claim 1, wherein eight screws (13) are provided and disposed at connections between the lock body (3) and the lock cover (12), and connections between the lock body (3) and the bicycle. 20
6. The electronically controlled lock for a bicycle of claim 1, wherein the drive motor (2) is electrically connected to an internal power of the bicycle, utilizes a principle of electricity generating magnetism and converts electrical power to mechanical power. 25
7. The electronically controlled lock for a bicycle of claim 1, wherein, when the drive motor (2) is rotated towards the left, the cam (8) connected to the drive motor (2) is rotated accordingly, thereby achieving horizontal movement of the control slider (9) to withdraw the control slider (9) from a lock pin locking slot; the lock pin (11) is moved upwards under the elastic force of the lock pin spring (6) and thus unlocked; 30
the drive motor (2) is rotated a little further, and the control slider (9) thus actuates the left stroke switch (7); after the stroke switch (7) is actuated, the system gets information indicating that the lock has been unlocked, and the cam is reversely rotated about 80 35
degrees by the drive motor (2) simultaneously; then, the drive motor (2) is stopped, and the unlock operation is completed; wherein, when the lock is needed to be locked, upper and lower openings of the bicycle are aligned, and the lock pin (11) is then pressed 40
downward; when the lock pin (11) is pressed into place, the control slider (9) is moved towards the right into the locking slot of the lock pin (11) under a force of the torsion spring (10); the bicycle is thus 45
locked, and the control slider (9) touches the right stroke switch (7) simultaneously, thereby the system automatically receiving information indicating that the bicycle has been locked. 50

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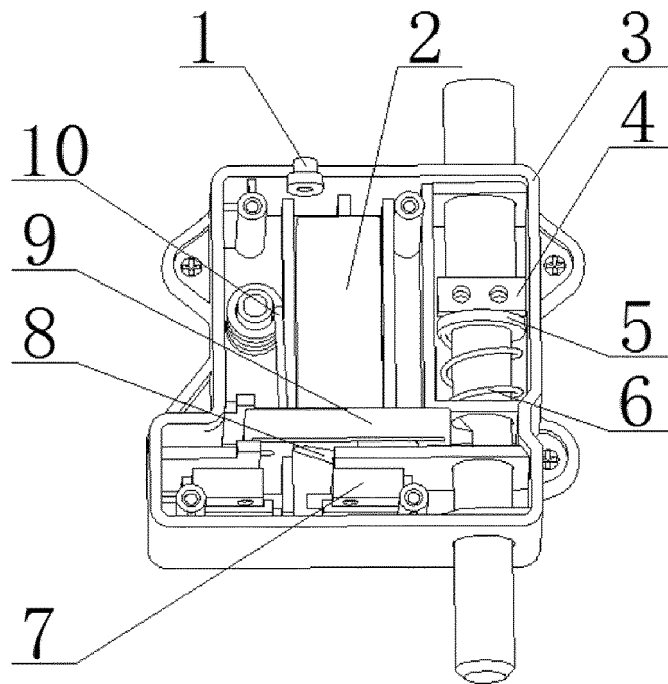


FIG. 1

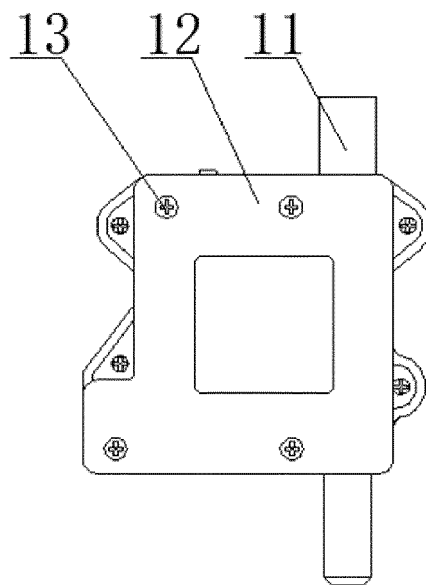


FIG. 2



EUROPEAN SEARCH REPORT

Application Number
EP 17 16 6829

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 204 876 880 U (YANTAI TRI CIRCLE SCIENCE & TECHNOLOGY CO LTD) 16 December 2015 (2015-12-16) * the whole document *	1-7	INV. E05B81/04 E05B47/00 G07C9/00
A	EP 0 334 396 A2 (WINKHAUS FA AUGUST [DE]) 27 September 1989 (1989-09-27) * the whole document *	1	
A	EP 2 261 446 A1 (MASTER LOCK CO [US]) 15 December 2010 (2010-12-15) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B G07C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 October 2017	Examiner Baeza Féllez, Lluís
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 17 16 6829

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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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19-10-2017

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82