LOCKING DEVICE, FIXING SEAT AND ELECTRIC VEHICLE

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to and benefits of Chinese Patent Application Serial No. 201611041220.4 filed on November 21, 2016, the entire content of which is incorporated herein by reference.

FIELD

The present disclosure relates to a technical field of electric vehicles, and more particularly to a locking structure for locking a battery of an electric vehicle to the electric vehicle, and a fixing seat and an electric vehicle using such a locking device.

BACKGROUND

A battery of an existing electric vehicle is generally installed in a fixed way or in a replaceable type. The fixed battery is usually fixed to the vehicle, and the vehicle is directly charged during charging. The replaceable battery is usually installed in a movable manner, and the battery can be removed at any time for replacement or for charging and then be installed to the vehicle body after replacement or charging.

At present, a battery may be replaced by a manual operation or an automatic operation. Either way, the battery is mounted to a chassis of the electric vehicle, and the installed battery needs to be locked to the vehicle body. Due to a relatively large weight of the battery, a structure using multiple locking positions to lock simultaneously is employed, but an existing locking structure fails to meet requirements in terms of speed and automation.

SUMMARY

The present disclosure aims to provide a locking device that can automatically unlock a plurality of battery pack locking positions at the same time, and a fixing seat and an electric vehicle using the locking device.

A locking device according to an embodiment includes: a lock base configured to provide a locking position, and including a lock body having a surface provided with a lock groove recessed towards the inside of the lock body, the lock body being provided with a lock tongue groove and a lock tongue movably mounted in the lock tongue groove, and the lock tongue groove being communicated with the lock groove; and a lock connecting rod movably connected with the lock base through the lock tongue, and including a rod member configured to drive the lock tongue to move under the action of an external force.

A locking device according to an embodiment includes: a lock base configured to provide a

What is claimed is:

1. A locking device, comprising:

a lock base configured to provide a locking position, and comprising a lock body having a surface provided with a lock groove recessed towards the inside of the lock body, the lock body being provided with a lock tongue groove and a lock tongue movably mounted in the lock tongue groove, and the lock tongue groove being communicated with the lock groove; and

a lock connecting rod movably connected with the lock base through the lock tongue, and comprising a rod member configured to drive the lock tongue to move under the action of an external force.

2. The locking device according to claim 1, further comprising:

a lock shaft comprising a shaft seat and a shaft rod, the shaft rod being perpendicularly arranged to a surface of the shaft seat, and the shaft rod being configured to be inserted into the lock groove of the lock base to perform locking.

3. The locking device according to claim 1 or 2, wherein the lock groove extends along the surface of the lock body, and has a first end provided with an opening leading to the outside of the lock body, and a second end away from the opening and provided with an elastic pad and an elastic pad mounting hole; the elastic pad mounting hole is arranged in a side wall of the second end of the lock groove, and the elastic pad is inserted into the elastic pad mounting hole through a pillar protruding from a surface of the elastic pad.

4. The locking device according to any one of claims 2 to 3, wherein the rod member is provided with a through hole configured to be connected with the lock tongue, the shaft seat is provided with a plurality of fixing holes in a surface of the shaft seat, and the shaft seat is mounted to a surface of a component to be locked through the fixing holes.

5. The locking device according to any one of claims 1 to 4, wherein the rod member is provided with an unlocking block on a side facing the lock base, the unlocking block is configured as an arc protrusion formed outwardly by the rod member, and the unlocking block has a top configured as an inner arc groove recessed towards the rod member.

6. The locking device according to claim 5, wherein a spring pull tab is fixed on a side of the rod member facing the unlocking block, and an exposed end of the spring pull tab is provided with a hooking hole.

7. The locking device according to any one of claims 3 to 6, wherein the lock tongue is connected with the lock base and the lock connecting rod through a shaft, separately, the lock tongue is provided with a stop block on a side adjacent to the lock groove, the stop block is configured to close the opening, and the lock connecting rod drives the lock tongue to close or open the opening under the action of the external force.

8. The locking device according to any one of claims 2 to 7, wherein the shaft rod has a first end movably connected with or integrated with the shaft seat, and a second end away from the shaft seat and provided with a concave positioning hole, and a positioning component is mounted in the positioning hole.

9. The locking device according to any one of claims 2 to 8, wherein a sleeve is fitted over an outer surface of the shaft rod and slidably connected with the shaft rod, the shaft rod has two ends provided with a retaining ring or a retaining flange separately, and the retaining ring or the retaining flange is configured to limit a position of the sleeve.

10. The locking device according to any one of claims 2 to 9, wherein the lock body is provided with a lock shaft sensing hole in communication with the lock groove.

11. The locking device according to any one of claims 1 to 10, wherein the rod member is provided with a positioning steel magnet, and the positioning steel magnet is configured to generate induction with an external magnetic force detecting device to indicate a current position of the rod member.

12. The locking device according to claim 9, wherein the retaining flange that protrudes outwardly is provided at an end of the shaft rod close to the shaft seat and has a diameter larger than a diameter of the shaft rod, and the retaining ring is provided at an end of the shaft rod away from the shaft seat and is configured to prevent the sleeve from coming off.

13. The locking device according to claim 3, wherein the pillar is configured as a tensioning structure with an opening, and can be clamped automatically after being inserted into the elastic pad mounting hole.

14. The locking device according to claim 4, wherein the shaft seat is configured to be circular or triangular, and three to four fixing holes are provided and symmetrically distributed around the center of the shaft seat.

15. A fixing seat for a battery of an electric vehicle, configured to be mounted to a vehicle body of the electric vehicle to fix the battery, and comprising an electrical connector and a locking device according to any one of claims 1 to 14, wherein the electrical connector and the locking device are arranged on a side of the fixing seat opposite to the battery, the electrical connector is used for electrical connection between the battery and the vehicle body, and the locking device is used to lock the battery to the vehicle body.

16. The fixing seat according to claim 15, further comprising a sensing device and a signal transmission unit, the sensing device being configured to detect a position of the battery relative to the locking device, and the signal transmission unit communicating with the sensing device and being configured to communicate with an external battery moving device.

17. The fixing seat according to claim 15 or 16, further comprising a plurality of support devices, the support devices being arranged on a side of the fixing seat facing the battery and configured to support the battery.

18. The fixing seat according to claim 17, wherein each of the support devices is provided with a support groove, and a lower surface of the support groove is substantially in the same plane as a lower surface of the lock groove.

19. An electric vehicle, comprising a power battery and a fixing seat configured to install the power battery, the fixing seat being mounted to a vehicle body, wherein the electric vehicle further comprises a locking device according to any one of claims 2 to 14, a lock shaft of the locking device is mounted to an outer lateral surface of the power battery through a fixing hole of a shaft seat, a lock base and a lock connecting rod of the locking device are mounted to an inner lateral surface of the fixing seat opposite to the power battery, a lock groove in a surface of the lock base is arranged corresponding to the lock shaft on the outer lateral surface of the power battery, and the lock connecting rod is located above the lock base.

20. The electric vehicle according to claim 19, wherein the inner lateral surface of the fixing seat is located below the lock connecting rod and is further provided with an elastic component, and the elastic component has a first end fixedly connected with the fixing seat and a second end connected to a hooking hole in a side of the lock connecting rod.