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BICYCLE RACK

Abstract

This application relates to a bicycle rack. The bicycle rack includes a column, a wheel fixing mechanism including a first locking member, a second locking member, and a locking assembly. The wheel fixing mechanism also includes a base and a wheel holder mounted on the base. The locking assembly has a first locking position that engages with the first locking member, and a second locking position that engages with the second locking member. When the locking assembly is in the first locking position, the first locking member contacts the wheel holder, causing the wheel holder to be in a clamping state. When the locking assembly is in the second locking position, the first locking member is separated from the locking assembly, placing the wheel holder in a released state, while the locking assembly engages with the second locking member.

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Background/Summary

PRIORITY APPLICATION

[0001] This application claims the benefit of priority to CN application Ser. No. 20/241,0178342.6, filed Feb. 8, 2024, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The disclosure relates to the technical field of bicycles, and particularly relates to bicycle racks.

BACKGROUND

[0003] At present, with the strong promotion of environmentally friendly and low-carbon travel, along with the heavy traffic of both people and vehicles on the roads, bicycles have become a very convenient mode of transport for short distances due to their lightweight and compact design. Furthermore, in many countries worldwide, more and more people are embracing cycling as a popular sport. Typically, bicycles are stored in garages or indoors, and to save space, wall-mounted storage is often preferred. However, most wall-mounted bicycle racks currently available on the market are not user-friendly for less strong users. Users are required to exert significant effort to lift the entire bicycle and hang it on the wall, or to lift the front wheel and secure it to the wall, making the process difficult and inconvenient.

SUMMARY

[0004] Embodiments of the disclosure provide bicycle racks that address issues of difficult placement and inconvenient operation found in existing wall-mounted bicycle racks.

[0005] Some embodiments of the disclosure provide a bicycle rack. The bike rack can includes a column; a wheel fixing mechanism that includes a base, a wheel holder mounted on the base, and a first locking member, wherein the base is movably arranged along a linear or vertical direction on the column, and the wheel holder has a clamping state for securing the wheel and a released state for loosening the wheel; a second locking member, installed at the bottom of the column and positioned along the movement path of the base; and a locking assembly, mounted on the base, wherein the locking assembly has a first locking position that engages with the first locking member and a second locking position that engages with the second locking member. In some embodiments, when the locking assembly is in the first locking position, the first locking member contacts the wheel holder, causing the wheel holder to be in the clamping state, and when the locking assembly is in the second locking position, the first locking member is separated from the locking assembly, placing the wheel holder in the released state, while the locking assembly engages with the second locking member.

[0006] Further, in some embodiments, the locking assembly includes a locking element that is rotatably mounted on the base, allowing the locking assembly to switch between the first locking position and the second locking position.

[0007] Further, in some embodiments, the locking element is provided with a first hook on the side facing the first locking member, and a second hook on the opposite side. When the locking assembly is in the first locking position, the first hook engages with the first locking member, while the second hook is disengaged from the second locking member. When the locking assembly is in the second locking position, the second hook engages with the second locking member, while the first hook is disengaged from the first locking member.

[0008] Further, in some embodiments, the first locking member is equipped with a cylindrical first locking pin, and the first hook is designed to engage with the first locking pin. The second locking member is equipped with a cylindrical second locking pin, and the second hook is designed to engage with the second locking pin.

[0009] Further, in some embodiments, the first hook includes a first slope and a first hook portion.

The first slope engages with the end of the first locking member that is near the second locking member, providing a force that causes the locking element to rotate toward the side of the first locking member. The first hook portion abuts the end of the first locking member near the second locking member, thereby maintaining the locking assembly in the first locking position; and/or the second hook includes a second slope and a second hook portion. The second slope engages with the second locking member, providing a force that causes the locking element to rotate toward the side of the second locking member. The second hook portion abuts the end of the second locking member, thereby maintaining the locking assembly in the second locking position.

[0010] Further, in some embodiments, the locking element comprises a first locking plate segment and a second locking plate segment, which are configured as separate components. The first lock plate includes a third hook portion, while the second lock plate includes a fourth hook portion. When the third hook portion engages with the end of the first locking member that is near the second locking member, the fourth hook portion is disengaged from the second locking member. Conversely, when the third hook portion is disengaged from the end of the first locking member that is near the second locking member, the fourth hook portion engages with the second locking member.

[0011] Further, in some embodiments, the first locking plate segment also includes a first stop portion, with the third hook portion and the first stop portion positioned at opposite ends of the first locking plate segment. The second locking plate segment includes a second stop portion, with the fourth hook portion and the second stop portion positioned at opposite ends of the second locking plate segment. When the first stop portion contacts the second locking member, the locking assembly switches from the second locking position to the first locking position. Conversely, when the second stop portion contacts the end of the first locking member that is near the second locking member, the locking assembly switches from the first locking position to the second locking position.

[0012] Further, in some embodiments, the wheel placement assembly also includes a wheel pressing plate, which is rotatably mounted on the base. The wheel pressing plate is located on the side of the first locking member that faces away from the base. The wheel pressing plate is constructed to apply pressure to the first locking member toward the base under external force, thereby ensuring that the locking assembly remains in the first locking position. One end of the wheel pressing plate, which is distant from the locking assembly, is equipped with a stop block. The stop block has a stop position that engages with the column and a disengaged position that separates from the column.

[0013] Further, in some embodiments, the wheel holder includes a first clamping jaw and a second clamping jaw that are oppositely arranged on the base. Both the first clamping jaw and the second clamping jaw are capable of rotating toward or away from each other. Each end of the first clamping jaw and the second grasping claw that faces the base is equipped with a protrusion. When the locking assembly is in the first locking position, the first locking member abuts against the protrusion, thereby maintaining the wheel holder in a clamping state.

[0014] Further, in some embodiments, the wheel holder also includes two mounting bases and two first elastic members. Both mounting bases are installed on the base, with the first clamping jaw rotatably mounted on one of the mounting bases and the second clamping jaw rotatably mounted on the other mounting base. The two first elastic members are correspondingly arranged with the two mounting bases, and two first elastic members correspond to the two mounting bases one-to-one, and each first elastic member enables the associated clamping jaw to have a tendency to move in a direction away from the other clamping jaw.

[0015] Further, in some embodiments, the base is provided with a channel at the end facing the second locking member, and the locking assembly is located at one end of the channel, while the other end of the channel has an opening that faces the second locking member. The second locking member enters the channel through this opening.

[0016] Further, in some embodiments, the bicycle rack further includes a second elastic member, and one end of the second elastic member is connected to the top of the column, while the other end is connected to the base.
[0017] In the prior art, the assembly includes a column, a wheel fixing mechanism, a second locking member, and a locking assembly. The column is fixedly installed on the wall. When it is necessary to place the bicycle on the bicycle rack, the front or rear wheel of the bicycle is pushed into the wheel fixing mechanism. The locking assembly transitions from the second locking position to the first locking position, and the wheel holder switches from a disengaged state to a clamping state, thereby securing the front or rear wheel of the bicycle. The base then moves in the direction away from the second locking member, causing the bicycle to move with the base in the same direction. This allows the bicycle to be easily secured vertically against the wall. When removing the bicycle, the user pulls down on the bicycle and presses down on the bicycle wheel that is held by the wheel holder, causing the base to move toward the second locking member. At the same time, the locking assembly transitions from the first locking position to the second locking position, preventing further movement of the base. The wheel holder switches from a clamping state to a disengaged state, allowing the bicycle to be easily removed.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0018] Drawings of the description as a constituent part of the disclosure are used to provide further understanding of the disclosure. The illustrative examples of the disclosure and the descriptions thereof are used to explain the disclosure, and are not intended to be unduly limiting. In the drawings:
[0019] FIG. **1** is a schematic structural diagram of an embodiment of a bicycle rack according to the disclosure;
[0020] FIG. **2** is a schematic structural diagram of an exploded view of an embodiment of a bicycle rack according to the disclosure;
[0021] FIG. **3** is a schematic structural diagram of a wheel fixing mechanism of an embodiment of a bicycle rack according to the disclosure;
[0022] FIG. **4** is a schematic partial structural diagram of a wheel fixing mechanism of an embodiment of a bicycle rack according to the disclosure;
[0023] FIG. **5** is a schematic structural diagram of a locking assembly of an embodiment of a bicycle rack according to the disclosure;
[0024] FIG. **6** is a schematic structural diagram of a locking assembly shown in an engaged configuration with a second locking pin;
[0025] FIG. **7** is a schematic structural diagram of a locking assembly shown in a disengaged configuration with a second locking pin;
[0026] FIG. **8** is a schematic structural diagram of a locking assembly shown in an engaged configuration with a first locking pin;
[0027] FIG. **9** is a schematic structural diagram of a locking assembly of another embodiment of a bicycle rack according to the disclosure;
[0028] FIG. **10** is a schematic structural diagram of a locking assembly of another embodiment of a bicycle rack according to the disclosure from another perspective; and
[0029] FIG. **11** is a schematic partial structural diagram of an embodiment of a bicycle rack according to the disclosure.
[0030] The above figures include the following reference numerals: column **10**; upper fixing plate **11**; wheel fixing mechanism **20**; base **21**; channel **211**; wheel holder **22**; first clamping jaw **221**; second clamping jaw **222**; protrusion **223**; mounting base **224**; first elastic member **225**; first

locking member **23**; lock rod **231**; first lock pin **232**; guide plate **24**; connecting plate **25**; support plate **26**; roller **27**; lower fixing plate **28**; wheel pressing plate base **29**; second locking member **30**; second lock base **31**; second lock pin **32**; locking assembly **40**; first locking base **41**; locking element **42**; first hook **43**; first slope **431**; first hook portion **432**; second hook **44**; second slope **441**; second hook portion **442**; first locking plate segment **45**; third hook portion **451**; first stop portion **452**; second locking plate segment **46**; fourth hook portion **461**; second stop portion **462**; first pivot **47**; second pivot **48**; wheel pressing plate **50**; stop block **51**; second elastic member **60**; first torsion spring **70**; second torsion spring **80**.

DETAILED DESCRIPTION

[0031] It should be noted that examples in the disclosure and features in the examples can be combined with one another as will be apparent to those of ordinary skill in the art upon consideration of this disclosure. The disclosure will be described in detail below with reference to the accompanying drawings and the examples, which are intended to illustrate without limiting the principles of the disclosure.

[0032] As shown in FIGS. **1-11**, some embodiments of the disclosure provide a bicycle rack. The bicycle rack includes a column **10**. The bicycle rack also includes a wheel fixing mechanism **20**, which includes a base **21**, a wheel holder **22** mounted on the base **21**, and a first locking member **23**. The base **21** is movably arranged on the column **10** so as to be movable in a linear or vertical direction. The wheel holder **22** is configured such that it is transitionable between a clamping state (e.g., an engaged, locked, or closed state) for securing the wheel of a bicycle, and a released state (e.g., a disengaged, unlocked, or open state) for releasing the wheel. The bicycle rack also includes a second locking member **30** installed at or toward the bottom of the column **10** and positioned along the movement path of the base **21**. The bicycle rack also includes a locking assembly **40** mounted on the base **21**. The locking assembly **40** is configured to transition between a first locking position that engages with the first locking member **23** (when the base is moved vertically upward) and a second locking position that engages with the second locking member **30** (when the base is moved vertically downward). When the locking assembly **40** is in the first locking position, the first locking member **23** contacts the wheel holder **22**, causing the wheel holder **22** to transition into and be retained or secured in the clamping state. When the locking assembly **40** is in the second locking position, the first locking member **23** is separated from the locking assembly **40**, causing the wheel holder **22** to transition to the released state, while the locking assembly **40** engages with the second locking member **30**.

[0033] In the illustrated embodiment, the column **10** is shown in an installed configuration, for example, where the column **10** is fixedly installed on the wall such that the column **10** extends linearly in a generally vertical direction. In the initial state (e.g., before a bicycle is secured to the bike rack), the locking assembly **40** is in the second locking position. In this initial state, the wheel fixing mechanism **20** is located at the bottom of the column **10**, and the wheel holder **22** is in the released state (e.g., ready to receive a wheel of the bicycle). When it is desired to place the bicycle in the bicycle rack, the front or rear wheel of the bicycle is pushed into the wheel fixing mechanism **20**. Through interaction with the wheel, the locking assembly **40** is caused to transition from the second locking position to the first locking position, and the wheel holder **22** is caused to transition from the released or disengaged state to the clamping state, thereby securing the front or rear wheel of the bicycle within the wheel holder **22**. The locking assembly **40** then disengages from the second locking member **30**, and the base **21** moves in a direction away from the second locking member **30** (e.g., linearly upward along the column). The bicycle moves along with the base **21** in the same direction, thus easily securing the bicycle vertically onto the wall. When removing the bicycle from the bike rack, the user pulls down the bicycle while pressing down on the bicycle wheel that is clamped by the wheel holder **22**, causing the base **21** to move towards the second locking member **30** (e.g., linearly downward along the column). When the base **21** moves downward, the locking assembly **40** is caused to transition from the first locking position to the

second locking position, preventing further movement of the base **21**. The wheel holder **22** is also caused to transition from the clamping state to the released state, allowing the bicycle to be removed.

[0034] As shown in FIGS. **1**-**11**, in some embodiments of the disclosure, the locking assembly **40** includes a locking element **42** that is rotatably installed on the base **21**, allowing the locking assembly **40** to switch between the first locking position and the second locking position (see, e.g., FIGS. **5**-**8**). With this arrangement (e.g., rotatable installation on the base **21**), the locking assembly **40** can effectively switch between the first locking position and the second locking position (e.g., rotation in one direction and rotation in the other direction).

[0035] As shown in FIGS. **1**-**8**, in some embodiments of the disclosure, the locking element **42** is provided with a first hook **43** on the side facing the first locking member **23**, and a second hook **44** on the opposite side (see, e.g., FIGS. **5** and **6**). When the locking assembly **40** is in the first locking position, the first hook **43** engages with the first locking member **23**, while the second hook **44** is disengaged from the second locking member **30**. When the locking assembly **40** is in the second locking position, the second hook **44** engages with the second locking member **30**, and the first hook **43** is disengaged from the first locking member **23**.

[0036] In the illustrated embodiment, the first hook **43** and the second hook **44** are set at an angle a, as shown, for example, in FIG. **6**. The locking element **42** is rotatable toward the side of the first locking member **23**, allowing the first hook **43** to engage with the first locking member **23**, thereby retaining the locking assembly **40** in the first locking position. The locking element **42** is also rotatable toward the side of the second locking member **30**, allowing the second hook **44** to engage with the second locking member **30**, thus retaining the locking assembly **40** in the second locking position.

[0037] As shown in FIGS. **1**-**8**, in some embodiments of the disclosure, the first locking member **23** is equipped with a cylindrical first lock pin **232** (see, e.g., FIG. **4**), and the first hook **43** is designed to engage with the first lock pin **232** (see, e.g., FIGS. **5**-**8**), and the second locking member **30** is equipped with a cylindrical second lock pin **32**, and the second hook **44** is designed to engage with the second lock pin **32**.

[0038] In the illustrated embodiment, the first hook **43** is configured to form a hooking engagement with the cylindrical first lock pin **232**, enabling the locking assembly **40** to securely lock with the first locking member **23**, thereby allowing the locking assembly **40** to stably remain in the first locking position (see FIGS. **7**-**8**). The second hook **44** is configured to form a hooking engagement with the cylindrical second lock pin **32**, enabling the locking assembly **40** to securely lock with the second locking member **30**, allowing the locking assembly **40** to stably remain in the second locking position (see FIG. **6**). Through the above arrangement, the overall structural stability can be enhanced.

[0039] As shown in FIG. **11**, the second locking member **30** also includes a second lock base **31**. Two ends of the second lock base **31** extend away from each other (e.g., outwardly away from the column **10**), which can be used to support the bicycle wheel. For example, the bicycle wheel can be initially received between the two ends of the second lock base **31**.

[0040] As shown in FIGS. **1**-**8**, in one embodiment of the disclosure, the first hook **43** includes a first slope (or angled portion) **431** (see FIG. **7**) and a first hook portion **432** (see FIG. **8**). The first slope **431** can be positioned and configured to engage with the end of the first locking member **23** near the second locking member **30**, providing a force that rotates the locking element **42** toward the side where the first locking member **23** is located. For example, contact between the first slope **431** and the end of the first locking member **23** can cause the locking assembly **40** to rotate to the first locking position. The first hook portion **432** can be configured to contact the end of the first locking member **23** near the second locking member **30**, keeping the locking assembly **40** in the first locking position. Additionally, or alternatively, the second hook **44** includes a second slope **441** and a second hook portion **442**. The second slope **441** can be configured to engage with the

second locking member **30**, providing a force that rotates the locking element **42** toward the side where the second locking member **30** is located. The second hook portion **442** contacts the end of the second locking member **30**, keeping the locking assembly **40** in the second locking position.
[0041] In the illustrated embodiment, the first slope **431** engages with the end of the first locking member **23** near the second locking member **30**, providing a force that rotates the locking element **42** toward the side where the first locking member **23** is located. After the locking element **42** rotates to a certain angle, the first hook portion **432** contacts the end of the first locking member **23** near the second locking member **30**, allowing the locking assembly **40** to remain in the first locking position. As described above, the rotation of the locking element **42** and its locking with the first locking member **23** are both achieved through the structure of the first hook **43** itself, without the need for additional driving mechanisms. This simplifies the overall structure of the bicycle rack. Similarly, the rotation of the locking element **42** and its locking with the second locking member **30** are achieved through the structure of the second hook **44**, without the need for additional driving mechanisms. This further simplifies the overall structure of the bicycle rack.
[0042] As shown in FIGS. **1** to **8**, in the illustrated embodiment, the first locking member **23** can further include a first locking base **41** and a first pivot **47** (see, e.g., FIG. **5**). The first locking base **41** is mounted on the base **21**, and the first pivot **47** is installed on the first locking base **41** (see, e.g., FIG. **4**). The locking element **42** is mounted on the first locking base **41** through the first pivot **47**, allowing it to rotate relative to the first locking base **41** toward the side of the first locking member **23** or the side of the second locking member **30**. The bottom surfaces of the first hook portion **432** and the second hook portion **442** are extended until they intersect, forming an angle a (see FIG. **6**). The range of angle a can be between 60° and 85°. The above arrangement ensures that when the first hook portion **432** is engaged with the first locking member **23**, the second hook portion **442** is disengaged from the second locking member **30**. When the second hook portion **442** is engaged with the second locking member **30**, the first hook portion **432** is disengaged from the first locking member **23**. This arrangement can facilitate the smooth transition of the locking assembly **40** between the first locking position and the second locking position.
[0043] FIGS. **9-11** illustrate an alternative version of the locking element **42** that can be used, for example, with the bike rack illustrated in FIGS. **1-4**. In the illustrated embodiment of FIGS. **9-11**, the locking element **42** includes a split first locking plate segment **45** and a second locking plate segment **46**. The first locking plate segment **45** includes a third hook portion **451**, and the second locking plate segment **46** includes a fourth hook portion **461**. When the third hook portion **451** engages with the end of the first locking member **23** that is near the second locking member **30**, the fourth hook portion **461** disengages from the second locking member **30**. When the third hook portion **451** is disengaged from the end of the first locking member **23** near the second locking member **30**, the fourth hook portion **461** engages with the second locking member **30**.
[0044] In the illustrated embodiment of FIGS. **9-11**, through the coordinated interaction between the first locking plate segment **45** and the second locking plate segment **46**, the locking assembly **40** can switch between the first locking position and the second locking position. Additionally, since the first locking plate segment **45** and the second locking plate segment **46** are separately arranged, if one of them is damaged, it does not affect the operation of the other. Only the damaged locking plate segment needs to be replaced or repaired.
[0045] Referring to the illustrated embodiment of FIGS. **9-11**, the first locking plate segment **45** also includes a first stop portion **452**, with the third hook portion **451** and the first stop portion **452** positioned at opposite ends of the first locking plate segment **45**. The second locking plate segment **46** includes a second stop portion **462**, with the fourth hook portion **461** and the second stop portion **462** located at opposite ends of the second locking plate segment **46**. When the first stop portion **452** abuts against the second locking member **30**, the locking assembly **40** switches from the second locking position to the first locking position. When the second stop portion **462** abuts against the end of the first locking member **23** that is close to the second locking member **30**, the

locking assembly **40** switches from the first locking position to the second locking position.
[0046] In the illustrated embodiment of FIGS. **9-11**, when the first stop portion **452** abuts against the second locking member **30**, under the abutting engagement of the two, the first locking plate segment **45** rotates toward the side where the first locking member **23** is located. During this rotation, the third hook portion **451** engages with the end of the first locking member **23** that is close to the second locking member **30**, thereby switching the locking assembly **40** from the second locking position to the first locking position. Similarly, when the second stop portion **462** abuts against the end of the first locking member **23** that is close to the second locking member **30**, under the abutting engagement of the two, the second locking plate segment **46** rotates toward the side where the second locking member **30** is located. During this rotation, the fourth hook portion **461** engages with the second locking member **30**, thereby switching the locking assembly **40** from the first locking position to the second locking position. The interaction between the first locking plate segment **45** and the second locking plate segment **46** prevents the third hook portion **451** from engaging with the end of the first locking member **23** that is close to the second locking member **30** while the fourth hook portion **461** engages with the second locking member **30**, thereby improving the stability of the product.
[0047] Referring to FIGS. **1-11**, in the illustrated embodiment, the wheel fixing mechanism **20** further includes a wheel pressing plate **50** (see, for example, FIG. **4**). The wheel pressing plate **50** is rotatably or pivotally connected to the base **21** and the pivot point is for the wheel pressing plate **50** positioned on the base **21** on a side of the wheel pressing plate **50** that is opposite to the first locking member **23**. The wheel pressing plate **50** is designed to apply external force to press the first locking member **23** toward the base **21**, thereby ensuring that the locking assembly **40** remains in the first locking position. One end of the wheel pressing plate **50**, which is far from the locking assembly **40**, is equipped with a stop block **51**. The stop block **51** has a stop position that engages with (e.g., contacts) the column **10** and a disengaged position that separates the stop block **51** from the column **10**. In some embodiments, when the stop block **51** is engaged with the column **10** it helps to slow the movement of the base **21** along the column.
[0048] When it is necessary to place the bicycle on the bicycle rack, the front or rear wheel of the bicycle is pushed into the wheel fixing mechanism **20**. At this point, the front or rear wheel contacts the wheel pressing plate **50**, causing the wheel pressing plate **50** to rotate and press the first locking member **23** toward the base **21**. This causes the first locking member **23** to engage or lock with the locking assembly **40** on the base **21**, allowing the locking assembly **40** to transition from the second locking position to the first locking position. As a result, the wheel holder **22** transitions from a released state to a clamping state, securely holding the front or rear wheel of the bicycle that has been inserted into the wheel fixing mechanism **20**. Subsequently, the base **21** moves in a direction away from the second locking member **30**, causing the bicycle to move along with the base **21** (e.g., in an upward direction), easily securing the bicycle vertically against the wall.
[0049] In the illustrated embodiment, the wheel pressing plate **50** is equipped with a stop block **51** at an end thereof that is opposite the locking assembly **40**. When the locking assembly **40** is in the second locking position, the stop block **51** is in the stop position, which limits the movement of the base **21**, preventing it from moving away from the second locking member **30**. Conversely, when the locking assembly **40** is in the first locking position, the stop block **51** is in the release position, allowing the base **21** to be free and enabling it to move the bicycle away from the second locking member **30** to secure the bicycle on the wall.
[0050] Referring to FIGS. **1-11**, in some embodiments of the disclosure, the wheel fixing mechanism **20** also includes a torsion spring **52** and a wheel pressing plate base **29**. The wheel pressing plate **50** and the torsion spring **52** are mounted on the wheel pressing plate base **29**. The stop block **51** is located at an end of the wheel pressing plate **50** that is opposite the locking assembly **40**. Under the action of the torsion spring **52**, the end of the wheel pressing plate **50** is biased away from the locking assembly **40**. When the bicycle wheel does not contact the wheel

pressing plate **50**, the bottom end of the wheel pressing plate rotates away from the base **21** and the top end of the wheel pressing plate **50** rotates towards the base **21** due to the torsion spring's force, causing the stop block **51** (positioned one the top end of the wheel pressing plate **50**) to contact with the column **10**. This results in the stop block **51** being in the stop position, locking the base **21** in its current position and preventing it from moving away from the second locking member **30**, thus ensuring safety. When the bicycle wheel presses against the wheel pressing plate **50**, the bottom end of the wheel pressing plate **50** rotates towards the base **21** and the top end of the wheel pressing plate **50** rotates away from the base **21**, allowing the stop block **51** to disengage from the column **10**, allowing the base **21** free to move up and down.

[0051] Referring to FIGS. **1-11**, in the illustrated embodiment, the wheel holder **22** includes a first clamping jaw **221** and a second clamping jaw **222** arranged oppositely on the base **21** (see, e.g., FIG. **4**). Both the first clamping jaw **221** and the second clamping jaw **222** are configured such that they can rotate or pivot towards or away from each other. Each end of the first clamping jaw **221** and the second clamping jaw **222** that faces the base **21** is equipped with a protrusion **223**. When the locking assembly **40** is in the first locking position, the first locking member **23** contacts the protrusion **223**, ensuring that the wheel holder **22** is in a clamping state.

[0052] In the illustrated embodiment, when the locking assembly **40** is in the first locking position, the first locking member **23** abuts against the protrusions **223** on the first clamping jaw **221** and the second clamping jaw **222**. The first locking member **23** press the protrusions **223**, causing the first clamping jaw **221** and the second clamping jaw **222** to rotate towards each other, thereby maintaining the wheel holder **22** in a clamping state and effectively clamping or the bicycle wheel between the first and second clamping jaws **221**, **22**.

[0053] Referring to FIGS. **1-11** (and in particular FIG. **4**), in some embodiments, the wheel holder **22** further includes two mounting bases **224** and two first elastic members **225** (e.g., torsion springs). The two mounting bases **224** are mounted on the base **21**, with the first clamping jaw **221** rotatably installed on one mounting base **224**, and the second clamping jaw **222** rotatably installed on the other mounting base **224**. The two first elastic members **225** correspond to the two mounting bases **224**, and each first elastic member **225** enables the associated clamping jaw to have a tendency to move (e.g., be biased) in a direction away from the other clamping jaw.

[0054] Through the above arrangement, the first clamping jaw **221** has a tendency or bias to move away from the second clamping jaw **222**, and the second clamping jaw **222** has a tendency or bias to move away from the first clamping jaw **221**, thereby creating a gap between the free ends of first clamping jaw **221** and the second clamping jaw **222** for the bicycle wheel to pass through.

[0055] Referring to FIGS. **1-11**, in the illustrated embodiment, the first locking member **23** also includes a lock arm **231**, with the first lock pin **232** mounted on the lock arm **231**. When the locking assembly **40** is in the first locking position, the lock arm **231** contacts the protrusion **223**. Since the first elastic member **225** can push the associated clamping jaw to move away from the other clamping jaw, the protrusion **223** applies a compressive force to the lock arm **231**, allowing the first lock pin **232** to press against the first hook portion **432**, keeping the wheel holder **22** in a clamping state.

[0056] It is noted that the number of wheel holders **22** can be adjusted based on practical needs.

[0057] In some embodiments, the first elastic member **225** is a torsion spring.

[0058] Referring to FIGS. **1-11**, in some embodiments, a channel **211** (see FIG. **4**) is provided at the end of the base **21** facing the second locking member **30**. The locking assembly **40** is located at one end of the channel **211**, while the other end of the channel **211** has an opening facing the second locking member **30**. The second locking member **30** can enter the channel **211** through this opening (e.g., as the base moves downwardly along the column).

[0059] In these embodiments, the second locking member **30** can enter the channel **211** through the opening and lock with the locking assembly **40** at one end of the channel **211**.

[0060] Referring to FIGS. **1-11**, in some embodiments, the bicycle rack also includes a second

elastic member **60** (see FIG. **2**), with one end of the second elastic member **60** connected to the top of the column **10** and the other end connected to the base **21**.

[0061] In the illustrated embodiment, the second elastic member **60** is positioned between the column **10** and the base **21**. When the locking assembly **40** is in the second locking position, the second elastic member **60** is stretched. Because the second locking member **30** is fixedly installed on the column **10**, the base **21** is held in place by the locking assembly's **40** locking engagement with the second locking member **30**, preventing it from being pulled away from the second locking member **30** by the second elastic member **60**. Conversely, when the locking assembly **40** is in the first locking position, it disengages from the second locking member **30** and locks with the first locking member **23**. At this point, the base **21** can move away from the second locking member **30** under the elastic restoring force of the second elastic member **60**, allowing the base **21** to carry the bicycle away from the second locking member **30** and secure it on the wall.

[0062] In some embodiment of the disclosure, the second elastic member **60** is a tension spring.

[0063] Referring to FIGS. **1-11**, in the illustrated, the top of the column **10** is fitted with an upper fixing plate **11** (see FIG. **2**), and the bottom of the base **21** is fitted with a lower fixing plate **28** (see FIG. **4**). One end of the second elastic member **60** is connected to the upper fixing plate **11**, while the other end connects to the lower fixing plate **28**.

[0064] Referring to FIGS. **1-11**, in some embodiments, rollers **27** (see FIG. **3**) are positioned on both sides of the base **21** along the first direction, allowing the base **21** to slide smoothly on the column **10**.

[0065] Referring to FIGS. **1-11**, in some embodiments, guide plates **24** (see FIG. **3**) are also provided on both sides of the base **21** along the first direction, facilitating the entry of the wheel.

[0066] Referring to FIGS. **1-11**, in some embodiments, connecting plates **25** are provided on both sides of the base **21** along the first direction, with two connecting plates **25** located at the bottom of the base **21**. The wheel fixing mechanism **20** also includes a support plate **26**, with one end hinged to the two connecting plates **25**. The support plate **26** can include a V-shaped structure, ensuring that the bicycle wheel remains centered on the support plate **26** for improved stability.

[0067] Referring to FIGS. **1-4** and FIGS. **9-11**, in the illustrated embodiment, the locking assembly **40** also includes a first torsion spring **70**, a second torsion spring **80**, a first lock base **41**, and a second pivot **48** (see, e.g., FIG. **10**). Both the first torsion spring **70** and the second torsion spring **80** are mounted on the second pivot **48**. The first locking plate segment **45** tends to rotate counterclockwise under the action of the first torsion spring **70** (as shown in FIG. **9**), while the second locking plate segment **46** tends to rotate counterclockwise under the action of the second torsion spring **80** (as shown in FIG. **9**).

[0068] It can be seen from the above description that the embodiments of the disclosure achieve the following technical effects: in the prior art, the assembly includes a column, a wheel fixing mechanism, a second locking member, and a locking assembly. The column is fixedly installed on the wall. When it is necessary to place the bicycle on the bicycle rack, the front or rear wheel of the bicycle is pushed into the wheel fixing mechanism. The locking assembly transitions from the second locking position to the first locking position, and the wheel holder switches from a disengaged state to a clamping state, thereby securing the front or rear wheel of the bicycle. The base then moves in the direction away from the second locking member, causing the bicycle to move with the base in the same direction. This allows the bicycle to be easily secured vertically against the wall. When removing the bicycle, the user pulls down on the bicycle and presses down on the bicycle wheel that is held by the wheel holder, causing the base to move toward the second locking member. Synchronously, the locking assembly transitions from the first locking position to the second locking position, preventing further movement of the base. The wheel holder switches from a clamping state to a disengaged state, allowing the bicycle to be easily removed.

[0069] The embodiments described above are only part of the embodiments of the present disclosure and not all of them. Based on the embodiments of the present disclosure, all other

embodiments obtained by those skilled in the art without creative efforts should fall within the scope of protection of the present disclosure.
[0070] It is important to note that the terminology used herein is to describe particular embodiments only and is not intended to limit the exemplary embodiments of the present application. As used herein, unless the context clearly indicates otherwise, the singular form is intended to include the plural form as well. Furthermore, it should be understood that when the terms “comprise” and/or “include” are used in this specification, they indicate the presence of features, steps, operations, devices, components, and/or combinations thereof.
[0071] What is described above are some embodiments of the disclosure and are not intended to limit the disclosure, and those skilled in the art can make various modifications and changes to the disclosure. Any modifications, equivalent substitutions, improvements, etc. within the spirit and principles of the disclosure are intended to fall within the protection scope of the disclosure.

Claims

1. A bicycle rack, comprising: a column; a wheel fixing mechanism comprising a base, a wheel holder mounted on the base, and a first locking member, wherein the base is movably arranged on the column for movement in a linear direction, and wherein the wheel holder is configured to provide a clamping state for securing a wheel of a bicycle and a released state for unclamping the wheel; a second locking member positioned on the column at a position along a movement path of the base; and a locking assembly mounted on the base and having a first locking position that engages with the first locking member and a second locking position that engages with the second locking member, wherein: in the first locking position, the first locking member contacts the wheel holder, causing the wheel holder to be in the clamping state, and in the second locking position, the first locking member is separated from the locking assembly, causing the wheel holder to be in the released state, while the locking assembly engages with the second locking member.
2. The bicycle rack as claimed in claim 1, wherein the locking assembly comprises a locking element that is rotatably arranged on the base, the locking element allowing the locking assembly to transition between the first locking position and the second locking position.
3. The bicycle rack as claimed in claim 2, wherein: the locking element comprises a first hook on a side facing the first locking member and a second hook on an opposite side of the locking element, in the first locking position, the first hook engages with the first locking member, while the second hook is disengaged from the second locking member, and in the second locking position, the second hook engages with the second locking member, while the first hook is disengaged from the first locking member.
4. The bicycle rack as claimed in claim 3, wherein: the first locking member comprises a cylindrical first lock pin, and the first hook is configured to engage with the first lock pin, and the second locking member comprises a cylindrical second lock pin, and the second hook is configured to engage with the second lock pin.
5. The bicycle rack as claimed in claim 3, wherein at least one of: the first hook includes a first slope and a first hook portion, the first slope configured to engage with an end of the first locking member that is adjacent to the second locking member to provide a force that causes the locking element to rotate toward a side of the first locking member, and the first hook portion abuts an end of the first locking member that is near the second locking member, thereby maintaining the locking assembly in the first locking position; or the second hook includes a second slope and a second hook portion, and the second slope is configured to engage with the second locking member to provide a force that causes the locking element to rotate toward a side of the second locking member, and the second hook portion abuts an end of the second locking member, thereby maintaining the locking assembly in the second locking position.
6. The bicycle rack as claimed in claim 2, wherein: the locking element comprises a first locking

plate segment and a second locking plate segment, which are spaced apart, the first locking plate segment comprises a third hook portion, the second locking plate segment comprises a fourth hook portion, when the third hook portion engages with an end of the first locking member that is near the second locking member, the fourth hook portion is disengaged from the second locking member, and when the third hook portion is disengaged from the end of the first locking member that is near the second locking member, the fourth hook portion engages with the second locking member.

7. The bicycle rack as claimed in claim 6, wherein: the first locking plate segment further comprises a first stop portion, the third hook portion and the first stop portion are located at opposite ends of the first locking plate segment, and the second locking plate segment also comprises a second stop portion, with the fourth hook portion and the second stop portion located at opposite ends of the second locking plate segment, when the first stop portion abuts the second locking member, the locking assembly switches from the second locking position to the first locking position, and when the second stop portion abuts the end of the first locking member that is near the second locking member, the locking assembly switches from the first locking position to the second locking position.

8. The bicycle rack as claimed in claim 1, wherein the wheel fixing mechanism further comprises a wheel pressing plate rotatably mounted on the base, wherein the wheel pressing plate is positioned on a side of the first locking member that faces away from the base, and the wheel pressing plate is configured to apply external force to press the first locking member toward the base, thereby placing the locking assembly in the first locking position, and an end of the wheel pressing plate that is farther from the locking assembly is comprises a stop block, the stop block having: a stop position where the stop block engages with the column, and a disengaged position, where the stop block is separated from the column.

9. The bicycle rack as claimed in claim 1, wherein the wheel holder comprises a first clamping jaw and a second clamping jaw, which are positioned oppositely on the base, wherein both the first clamping jaw and the second clamping jaw can rotate toward or away from each other, and each of the first clamping jaw and the second clamping jaw has a protrusion at an end facing the base, and when the locking assembly is in the first locking position, the first locking member abuts the protrusions, causing the wheel holder to be in the clamping state.

10. The bicycle rack as claimed in claim 9, wherein the wheel holder further comprises two mounting bases and two first elastic members, and both mounting bases are installed on the base, and the first clamping jaw is rotatably mounted on one of the mounting bases and the second clamping jaw is rotatably mounted on the other mounting base, and the two first elastic members correspond to the two mounting bases one-to-one, and each first elastic member enables the associated clamping jaw to have a tendency to move in a direction away from the other clamping jaw.

11. The bicycle rack as claimed in claim 1, wherein the base is provided with a channel at an end facing the second locking member, and the locking assembly is located at one end of the channel and the other end of the channel has an opening that faces the second locking member, and the second locking member enters the channel through this opening.

12. The bicycle rack as claimed in claim 1, wherein the bicycle rack further includes an elastic member connected on one end to a top of the column and on the other end is connected to the base, wherein the elastic member provides a force that pulls the base along the column in a direction towards the top of the column.

13. A bicycle rack, comprising: a column; a wheel fixing mechanism that comprises a base, a wheel holder mounted on the base, and a first locking member, wherein the base is movably arranged on the column in a linear or vertical direction, and the wheel holder is transitionable between a clamping state for securing the wheel and a released state for unclamping the wheel; a second locking member positioned toward one end the column along a movement path of the base; and a

locking assembly, wherein the locking assembly couples with the base, wherein: when the base slides in proximity to the second locking member, the locking assembly engages with the second locking member, and the wheel holder is opened, and wherein, and when a wheel presses the first locking member, the locking assembly is disengaged from the second locking member and combined with first locking member, and the wheel holder is closed to hold the wheel.

14. The bicycle rack as claimed in claim 13, wherein the locking assembly rotationally couples with the base.

15. A bicycle rack, comprising: a column; a wheel fixing mechanism includes a base, a wheel holder mounted on the base, and a first locking member, wherein a first end of the first locking member is rotatably connected to a top of the base, and the base is movably arranged on the column, and the wheel holder is configured to transition between a closed state and an open state; a locking assembly installed on the base; a second locking member, which is installed near a lower end of the column and is located on a moving path of the base, wherein, when the base slides into proximity to the second locking member, the locking assembly can be combined with the second locking member to restrain the base to a lower position; and wherein when a wheel is pressed against the first locking member, the second end of the first locking member can be rotated to combine with the locking assembly, and the locking assembly is disengaged from the second locking member also causing the first locking member to act on the wheel holder to close the wheel holder to hold the wheel.

16. The bicycle rack as claimed in claim 15, further comprising an elastic member, wherein a first end of the elastic member is connected to the column, and second end of the elastic member is connected to the base, the elastic member providing a force that causes the base to slide along the column.