

DEVICE FOR SECURING A BICYCLE

FIELD OF INVENTION

The present invention relates to a device for securing a bicycle and in particular,
5 but not exclusively, to a bicycle parking system using the device for securing a
bicycle against theft.

BACKGROUND TO THE INVENTION

The following discussion of the background to the invention is intended to facilitate
10 an understanding of the present invention. However, it should be appreciated that
the discussion is not an acknowledgment or admission that any of the material
referred to was published, known or part of the common general knowledge in any
jurisdiction as at the priority date of the application.

15 It is known that in many countries, cycling is a means of transport for many people.
Increasingly, more public bicycle parking systems are provided in public places
like train or railway stations, bus interchanges, schools, supermarkets, parks and
residential areas for cyclists to park their bicycles. Conventional public bicycle
parking systems typically comprise a frame, which is bolted to the ground, having
20 multiple racks for holding multiple bicycles. Each rack typically has two members
which are spaced apart for receiving a portion of the front wheel of a bicycle
therebetween. Alternatively, such systems may not comprise a frame. Instead,
the racks are mounted directly to a wall.

To park a bicycle using the bicycle parking systems mentioned above, a portion of the front wheel of a bicycle is first placed between the two members of a rack. Subsequently, the bicycle can be attached to the rack by means of a conventional bicycle lock or by a chain or the like provided with locking means such as a padlock, which secures the front wheel to the rack to prevent theft.

However, such bicycle parking systems are not very secure against theft because only the front wheel is secured to the rack while the frame and rear wheel are not secured to the rack. Hence, bicycle thefts still occur in such bicycle parking systems. For example, it is possible for a potential thief to detach the rear wheel of a bicycle parked in such bicycle parking systems as the rear wheel is not being secured to the rack.

DE19623924 discloses a bicycle stand having a locking shackle connected by a pivot to an extendable base frame. The locking shackle is manually or automatically operated by means of a control facility fitted around the frame of the bicycle. It is equipped with a manually operated lock or automatic locking component so that the frame and front and rear wheels are protected against theft. However, the disclosed bicycle stand and in particular the locking shackle has several moving parts which increase the possibility of wear and tear, as well as the maintenance thereof.

DE4317016 discloses a bicycle parking stand for use in public spaces. Unlike the bicycle stand of DE19623924, the bicycle parking stand is a simple structure and consists of one iron bracket of conventional shape, which is anchored to the

ground by two screws. The rear wheel of a bicycle is placed by the stand, and the rear wheel and bicycle frame are secured to it by a conventional heavy-duty bracket lock. Although the rear wheel and the bicycle frame are secured to the stand, the front wheel is not secured to it. Hence, it is still possible for a thief to
5 remove the front wheel of the bicycle.

Therefore, the present invention seeks to provide a device for securing a bicycle that overcomes, or at least alleviates, the above-mentioned problems. In particular, to provide a device which effectively secures the frame, and front and
10 rear wheels of a bicycle, is easy to use and requires minimal or no maintenance.

SUMMARY OF THE INVENTION

In accordance with a first aspect of the present invention, there is provided a device for securing a bicycle to a bicycle parking system comprising:

15 an elongate member having a first portion shaped for securing the front wheel of a bicycle to the bicycle parking system and a first protrusion shaped for receiving a bicycle lock for securing the rear wheel and/or the frame of the bicycle to the bicycle parking system.

20 Preferably, the first protrusion forms a loop with a second portion of the elongate member.

Preferably, the elongate member is shaped in the form of an arc.

25 Preferably, the first portion is shaped in the form of an arc.

Preferably, the first portion comprises a stop for securing the device to the bicycle parking system.

- 5 Preferably, the stop is provided at the free end of the first portion.

Preferably, the first protrusion is provided at a free end of the elongate member.

- 10 Preferably, the first portion is in the form of a second protrusion for securing the front wheel of the bicycle to the bicycle parking system.

Preferably, the second protrusion comprises a stop at its free end for securing the device to the bicycle parking system.

- 15 Preferably, the elongate member further comprises a third protrusion positioned between the first and second protrusions shaped for receiving a bicycle lock for securing the frame to the bicycle parking system.

- 20 Preferably, the first, second and third protrusions extend from the elongate member in the same direction.

Preferably, the third protrusion forms a loop with a third portion of the elongate member.

- 25 ~~Preferably, the second protrusion is provided at one end of the elongate member.~~

Preferably, the first protrusion is provided at the other end of the elongate member.

5 Preferably, there is provided a device for securing a bicycle to a bicycle parking system comprising:

an elongate member having a first protrusion for securing the front wheel of the bicycle to the bicycle parking system, a second protrusion shaped for receiving a bicycle lock for securing the rear wheel of the bicycle to the bicycle parking system, and a third protrusion positioned between the first and second protrusions
10 shaped for receiving a bicycle lock for securing the frame to the bicycle parking system.

Preferably, the first, second and third protrusions extend from the elongate
15 member in the same direction.

Preferably, the first protrusion comprises a stop at its free end for securing the device to the bicycle parking system.

20 Preferably, the second protrusion forms a loop with a first portion of the elongate member.

Preferably, the third protrusion forms a loop with a second portion of the elongate member.

Preferably, the first protrusion is provided at one end of the elongate member.

Preferably, the second protrusion is provided at the other end of the elongate member.

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In accordance with a second aspect of the present invention, there is provided a bicycle parking system comprising:

a rack for receiving at least a portion of the front wheel of a bicycle; and

a device according to the first aspect of the present invention, the device

10 being coupled to the rack for securing the bicycle to the bicycle parking system.

In accordance with a third aspect of the invention, there is provided a bicycle parking system comprising:

a frame;

15 a lower rack for receiving at least a portion of the front wheel of a first bicycle;

an upper rack for receiving a second bicycle, the upper rack being slidably engaged to the frame and the frame for supporting the upper rack;

20 a first device according to the first aspect of the present invention being coupled to the lower rack for securing the first bicycle to the parking system; and

a second device according to the first aspect of the present invention being coupled to the upper rack for securing the second bicycle to the parking system,

wherein the upper rack and the frame are being configured such that the upper rack is movable between a first position, where the upper rack is at an

incline to the lower rack, and a second position, where the upper rack is above and substantially parallel to the lower rack.

In accordance with a fourth aspect of the present invention, there is provided a
5 method for installing a device according to the first aspect of the present invention to a bicycle parking system, comprising:

coupling the device to a portion of a rack of the bicycle parking system via coupling means such that the device is secured to the bicycle parking system.

10 BRIEF DESCRIPTION OF DRAWINGS

The present invention will now be described, by way of illustrative example only, with reference to the accompanying drawings, of which:

FIG. 1 is a perspective view of a device for securing a bicycle to a bicycle parking
15 system in accordance with a first aspect of a first embodiment of the present invention;

FIG. 2 is a perspective view of a portion of a bicycle parking system comprising the device of FIG. 1 in accordance with a second aspect of an embodiment of the
20 present invention;

FIG. 3 is a side elevation of a portion of the bicycle parking system of FIG. 2 with a portion of the front wheel of a bicycle being received in the rack of the bicycle parking system;

FIG. 4A is a perspective view of a portion of the bicycle parking system of FIG. 2 with the rear wheel of a bicycle being received in a portion of the rack of the bicycle parking system and with the first protrusion of the device being passed through the rear wheel;

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FIG. 4B is a perspective view of a portion of the bicycle parking system of FIG. 2 with a conventional bicycle lock being passed through the first protrusion of the device;

10 FIG. 4C is a perspective view of a portion of the bicycle parking system of FIG. 2 with the bicycle lock being passed through the rear wheel of the bicycle;

FIG. 4D is a side elevation of the entire bicycle parking system of FIG. 2 with the bicycle lock being passed through the rear wheel and the frame of the bicycle;

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FIG. 5 is a perspective view of a bicycle parking system of FIG. 2 in accordance with another embodiment of the present invention;

FIG. 6A is a perspective view of a portion of the bicycle parking system of FIG. 5 with the first protrusion of the device being passed through the rear wheel of a bicycle;

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FIG. 6B is a perspective view of the portion of the bicycle parking system of FIG. 5 with a bicycle lock being passed through the rear wheel and the frame of the

25 bicycle;

FIG. 7 is a perspective view of a device for securing a bicycle to a bicycle parking system in accordance with a first aspect of a second embodiment of the present invention;

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FIG. 8 is a perspective view of a bicycle parking system comprising the device of FIG. 7 in accordance with a second aspect of an embodiment of the present invention;

10 FIG. 9 is a perspective view of a bicycle parking system comprising the device of FIG. 7 in accordance with a third aspect of an embodiment of the present invention;

15 FIG. 10 is a perspective view of the bicycle parking system of FIG. 9 when the lower rack is in use;

FIG. 11 is a perspective view of the bicycle parking system of FIG. 9 when a bicycle is secured to the lower rack;

20 FIG. 12 is a perspective view of the bicycle parking system of FIG. 9 when the upper rack is in the first position;

FIG. 13 is a perspective view of the bicycle parking system of FIG. 9 when the upper rack is in use;

FIG. 14 is a perspective view of the bicycle parking system of FIG. 9 when a bicycle is secured to the upper rack;

FIG. 15 is a perspective view of the bicycle parking system of FIG. 9 when the upper rack is in the second position and both the lower and upper racks are in use; and

FIG. 16 is a perspective view of the bicycle parking system of FIG. 9 when the upper rack is in the second position and both the lower and upper racks are in use in accordance with another embodiment of the present invention.

DETAILED DESCRIPTION

FIG. 1 shows a first embodiment of a device 500 for securing a bicycle to a bicycle parking system (not shown) in accordance with a first aspect of the invention. The device 500 comprises an elongate member, typically in the form of a bar 502 which is shaped in the form of an arc. The bar 502 comprises a first portion 504 for securing the front wheel of a bicycle to the bicycle parking system and a first protrusion 506 for securing the rear wheel and the frame of the bicycle to the device 500 and hence the bicycle parking system. The advantage of having the bar 502 shaped in the form of an arc is that only one protrusion, which is the first protrusion 506, is required to secure the front wheel, the rear wheel and the frame of a bicycle to the bicycle parking system, as opposed to multiple protrusions such as one protrusion for securing the front wheel, one protrusion for securing the rear wheel and one protrusion for securing the frame. As such, having the bar 502 shaped in the form of an arc enables the device 500 to be a simple structure which

effectively secures the front wheel, the rear wheel and the frame of a bicycle to the bicycle parking system, and which is easy to use and requires minimal or no maintenance.

- 5 The first portion 504 is provided at one end of the bar 502 and is shaped, typically in the form of an arc, for securing the front wheel of a bicycle to the bicycle parking system. The advantage of having the first portion 504 shaped in the form of an arc is that there is no need for the bar 502 to have another protrusion just for securing the front wheel of a bicycle to the bicycle parking system enabling the device 500
- 10 to be a simple structure which is easy to use and requires minimal or no maintenance. The first portion 504 secures the front wheel of the bicycle to the bicycle parking system by passing through the front wheel. By passing through the front wheel, the first portion 504 also limits the movement of the device 500, thereby preventing removal of the front wheel from the bicycle parking system.
- 15 The first portion 504 comprises a stop 508 at its free end 510 for securing the device 500 to the bicycle parking system. The stop 508 as shown in FIG. 1 is substantially in the form of a rod which is cylindrical in shape. It would be appreciated that the stop 508 can be of a different shape or form such as elliptical, circular, square, rectangular, triangular, polygonal or any other shape, provided
- 20 that the longest length or diameter of the stop 508 is greater than the diameter of the first portion 504.

The first protrusion 506 is provided at a free end of the bar 502, which in this case is at the other end of the bar 502. The first protrusion 506 extends from the bar

25 502 and forms a closed loop with a second portion 512 of the bar 502. The first

protrusion 506 is shaped for receiving a bicycle lock (not shown) for securing the rear wheel and the frame of the bicycle to the device 500 and hence the bicycle parking system. The first protrusion 506, which is in the form of a loop, enables the bicycle lock to pass therethrough. The loop of the first protrusion 506 can be
5 of any shape as long as there is a closed loop formed with the second portion 512 of the bar 502. It would be appreciated that instead of the first protrusion 506 securing both the rear wheel and the frame of the bicycle to the device 500 and hence the system, the first protrusion 506 can also be used to secure only the rear wheel without the frame, or to secure only the frame without the rear wheel.

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In an embodiment where the first protrusion 506 is used to secure only the rear wheel of a bicycle, a bicycle lock is passed through the first protrusion 506 and the rear wheel without passing through the frame thereby forming a loop thus securing the rear wheel to the device 500 and hence the bicycle parking system.

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In an embodiment where the first protrusion 506 is used to secure only the frame of a bicycle, a bicycle lock is passed through the first protrusion 506 and the frame without passing through the rear wheel of the bicycle thereby forming a loop thus securing the frame to the device 500 and hence the bicycle parking system.

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Although the first protrusion 506 can be used to secure only the rear wheel without the frame, or to secure only the frame without the rear wheel, it is advantageous to use the first protrusion 506 to secure both the rear wheel and the frame so that the three main parts of a bicycle, namely, the front wheel, the rear wheel and the

25 frame, will effectively be secured to the device 500 and hence the bicycle parking

system preventing theft of the whole bicycle or parts of the bicycle such as the front and rear wheels.

Advantageously, the first portion 504 and the first protrusion 506 secure the front wheel, the rear wheel and the frame of the bicycle to the bicycle parking system. In this way, the whole bicycle or the front and/or rear wheels would be protected against theft. Hence, the device 500 is able to effectively secure the bicycle to the bicycle parking system. The device 500 can also be used with a variety of bicycle sizes.

Furthermore, as the device 500 does not have any moving parts, the device 500 is easy to manufacture and the possibility of wear and tear and the need for maintenance are also minimised.

With reference to FIG. 2, an embodiment of the device 500 for securing a bicycle (not shown) to a bicycle parking system 514 in accordance with a second aspect of the second aspect of the invention is described hereinafter. FIG. 2 is a perspective view of a portion of the bicycle parking system 514 comprising the device 500. The bicycle parking system 514 also comprises a rack 516 which is anchored to the ground.

The rack 516 can receive the entire bicycle. It would be appreciated that the rack 516 can also be structured in a manner such that at least a portion of the front wheel of the bicycle is being received in the rack 516 instead of the entire bicycle being received in the rack 516. For example, in an embodiment where the rack

516 is structured to receive at least a portion of the front wheel of the bicycle instead of the entire bicycle, it would be understood that the remaining parts of the bicycle which are not being received in the rack 516 will be in contact with the surface that the rack 516 is being anchored to, such as the ground.

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The rack 516 comprises coupling means, such as a first plate 518 and a second plate 520, each of which is fixed to a portion of the rack 516, for coupling the device 500 to the rack 516. In other words, the device 500 is installed in the bicycle parking system 514 via the coupling means. It would be appreciated that
10 the coupling means is not limited to the first plate 518 and the second plate 520 as shown in FIG. 2, but can be of any form such as in the form of a first bar and a second bar fixed to a portion of the rack 516, as long as the coupling means is able to couple the device 500 to the rack 516.

15 The first plate 518 is fixed to a first portion 522 of the rack 516 and the second plate 520 is fixed to a second portion 524 of the rack 516. The first plate 518 is substantially parallel to the second plate 520 and is fixed to the rack 516 such that the plates 518, 520 are spaced apart with a face 526 of the first plate 518 facing a face 528 of the second plate 520. The first plate 518 comprises a through hole
20 530 for receiving at least a part of the first portion 504 of the bar 502 and the second plate 520 comprises a through hole 532 for receiving at least the stop 508.

The through hole 530 of the first plate 518 is circular and has a diameter that is greater than the diameter of the first portion 504 but lesser than the length of the
25 stop 508. In this way, the first portion 504 is free to move to and fro through the

through hole 530 without the device 500 being removed from the rack 516 during movement thereof. This is because the stop 508 having a length that is greater than the diameter of the through hole 530 would engage the face 526 of the first plate 518 instead of passing through the through hole 530 when an attempt is
5 made to remove the device 500 from the rack 516. Advantageously, the device 500 is secured to the rack 516. The device 500 being coupled to the rack 516 is for securing the bicycle to the rack 516 and hence to the bicycle parking system 514. It would be appreciated that the through hole 530 can be of any shape such as a square, a triangle, a rectangle, a polygon, an elliptical shape or any other
10 shape, provided that the longest length or diameter of the through hole 530 is lesser than that of the stop 508.

The through hole 532 of the second plate 520 corresponds with the shape of the stop 508 allowing at least the stop 508 to pass therethrough. Once the stop 508
15 has passed through the through hole 532, the first portion 504 can be displaced in a manner such that the stop 508 engages a face 534, which is the face opposite the face 528 of the second plate 520. The face 534 of the second plate 520 prevents the stop 508 from being displaced out from the through hole 532 when the stop 508 is engaged with the face 534. The feature of the second plate 520
20 together with the through hole 532 facilitates the securing of the front wheel of the bicycle to the bicycle parking system 514 by helping to minimise, limit or restrict the movement of the device 500 when the bicycle is secured to the device 500 by a bicycle lock, which in turn facilitates the prevention of the removal of the front wheel from the bicycle parking system 514. It would be appreciated that the

through hole 532 can be of any shape provided that the through hole 532 can receive the stop 508 therethrough.

Although it is advantageous for the coupling means to comprise the second plate 520 as described above, it would be appreciated that having coupling means which comprise only of the first plate 518 is sufficient to couple the device 500 to the rack 516.

The rack 516 further comprises a housing 536 coupled to the first plate 518. In the embodiment shown in FIG. 2, the housing 536 is substantially cylindrical in shape and defines a channel 538 in which the diameter of the channel 538 corresponds with the diameter of the through hole 530 of the first plate 518. The housing 536 is for supporting at least the first portion 504 of the bar 502. The housing 536 also limits the movement of the device 500 which facilitates the prevention of the removal of the front wheel from the bicycle parking system 514.

FIG. 3 shows a side elevation of a portion of the rack 516 when a portion of the front wheel 540 of a bicycle (not shown) is received in the rack 516. As shown in FIG. 3 the first portion 504 is passed through the front wheel 540 of the bicycle and through the through hole 532 of the second plate 520, with the first portion 504 and hence the stop 508 being displaced in a manner such that the stop 508 engages the face 534 of the second plate 520. In this way, the front wheel 540 is effectively secured to the rack 516 and hence the bicycle parking system 514.

A series of figures, FIGS. 4A to 4D, show how the first protrusion 506 is being used to secure the rear wheel 542 and the frame 544 of a bicycle 546 to the bicycle parking system 514. FIG. 4A, shows a perspective view of a portion of the rear wheel 542 of the bicycle 546 being received in a portion of the rack 516, with the first protrusion 506 being passed through the rear wheel 542. Next in FIG. 4B, a conventional bicycle lock 548 being passed through the first protrusion 506 of the device 500 is shown. Subsequently, the bicycle lock 548 is being passed through the rear wheel 542 in the direction labelled by the arrow B in FIG. 4C. The bicycle lock 548 is being passed through the rear wheel 542 via the space that is found between any two bicycle spokes. Next, the bicycle lock 548 is passed through the frame 544 of the bicycle 546 as shown in FIG. 4D, and to thereby form a loop. As such, the bicycle 546 is secured to the rack 516 and the bicycle parking system 514 by securing the bicycle 546 to the device 500. Advantageously, the device 500 effectively secures the front wheel 540, the rear wheel 542 and the frame 544 of the bicycle 546 to the bicycle parking system 514.

With reference to FIG. 5, there is described a bicycle parking system 514' with all the features of the bicycle parking system 514 described above except for the housing 536 and the device 500 in accordance with another embodiment of the invention. In this embodiment, the bicycle parking system 514' similarly comprises a rack 516', which comprises a first plate 518' fixed to a first portion 522' of the rack 516' and a second plate 520' fixed to a second portion 524' of the rack 516'. The rack 516' in this embodiment is for receiving at least a portion of the front wheel of a bicycle and not the entire bicycle like in the rack 516. The first plate 518' similarly has a face 526' and a through hole 530 and the second plate 520'

similarly has a face 528', a face 534' and a through hole 532'. As mentioned above, the rack 516' does not comprise the feature of the housing 536 as found in the rack 516.

5 Instead of comprising the device 500, the bicycle parking system 514' comprises a device 600 which is coupled to the rack 516' as shown in FIG. 5. Similar to the device 500, the device 600 comprises an elongate member typically in the form of a bar 602. The bar 602 similarly comprises a first portion 604 and a first protrusion 606. However, the bar 602 in this embodiment is substantially straight instead of
10 shaped in the form of an arc as in the device 500. The first portion 604 is provided at one end of the bar 602 and is arranged substantially perpendicular to the bar 602 for securing the front wheel of a bicycle to the bicycle parking system 514'. Similar to the first portion 504 of the device 500, the first portion 604 also comprises a stop 608 at its free end 610 for securing the device 600 to the bicycle
15 parking system 514'.

Similar to the first protrusion 506 of the device 500, the first protrusion 606 is provided at the other end of the bar 602 and is in the form of a closed loop. The first protrusion 606 is shaped for receiving a bicycle lock (not shown) for securing
20 the rear wheel and/or the frame of the bicycle to the device 600 and hence the bicycle parking system 514'.

Although the rack 516' does not receive the entire bicycle like in the rack 516, it would be appreciated that the bicycle parking system 514' can also comprise a
25 base (not shown) onto which the rack 516' is fixed, with the base being anchored

to the ground instead of the rack 516' being anchored to the ground. In an embodiment where the bicycle parking system 514' comprises the base, it would be understood that only the portion of the front wheel that is received in the rack 516' will be in contact with the base and the remaining parts of the bicycle which are not being received in the rack 516' will be in contact with the surface that the rack 516' is being anchored to, such as the ground. It would be appreciated that the rack 516' can also be structured in a manner such that the rack 516' can receive the entire bicycle instead of only a portion of the front wheel of the bicycle.

FIGS. 6A and 6B show how the first protrusion 606 is being used to secure the rear wheel 542 and the frame 544 of the bicycle 546 to the bicycle parking system 514'. Firstly, a portion of the rear wheel 542 of the bicycle 546 is being received in a portion of the rack 516' (not shown). Next, the first protrusion 606 is being passed through the rear wheel 542 via the space that is found between any two bicycle spokes of the rear wheel 542 as shown in FIG. 5A. Subsequently, a conventional bicycle lock 550 is being passed through the first protrusion 606 of the device 600, the rear wheel 542 of the bicycle 546 via the space between the two bicycle spokes and the frame 544 of the bicycle 546 to thereby form a loop as shown in FIG. 6B. As such, the bicycle 546 is secured to the rack 516' and the bicycle parking system 514' by securing the bicycle 546 to the device 600. Advantageously, the device 600 effectively secures the front wheel 540, the rear wheel 542 and the frame 544 of the bicycle 546 to the bicycle parking system 514'.

It would be appreciated that the device 600 can also be coupled to the rack 514 and that the device 500 can also be coupled to the rack 514'.

Apart from the use of the conventional bicycle lock 548 or the bicycle lock 550, it would be appreciated that other kinds of locks such as a chain or the like provide with locking means such as a padlock can also be used to secure the rear wheel
5 542 and the frame 544 of the bicycle 546 to the device 500 or to the device 600.

It would be appreciated that the device 500 can similarly be used to secure a bicycle which is parked in a reverse manner (not shown). In other words, instead of a portion of the front wheel of the bicycle being received in a portion of the rack
10 516, a portion of the rear wheel can be received in the portion of the rack 516. In such a situation, the first portion 504 is passed through the rear wheel of the bicycle and the first protrusion 506 is passed through the front wheel of the bicycle. A conventional bicycle lock is then passed through the front wheel via the space that is found between any two bicycle spokes and through the frame of the
15 bicycle to thereby form a loop. As such the bicycle, although parked in a reverse manner, can also be secured to the rack 516 and the bicycle parking system 514 by securing the bicycle to the device 500.

It would be further appreciated that the device 600 and the rack 516' can also be
20 used to secure a bicycle which is parked in a reverse manner in a fashion as described above.

FIG. 7 shows a second embodiment of a device 10 for securing a bicycle to a bicycle parking system (not shown) in accordance with a first aspect of the
25 invention. Similar to the device 500, the device 10 comprises an elongate

member, typically in the form of a bar 12. The bar 12 comprises a first protrusion 14, a second protrusion 16 and a third protrusion 18 positioned between the first protrusion 14 and the second protrusion 16. In this second embodiment, the device 10 differs from the device 500 of the first embodiment in that the first portion 504 of the device 500 is now in the form of a protrusion or second protrusion, which corresponds to the first protrusion 14 of the device 10. The second protrusion 16 of the device 10 corresponds to the first protrusion 506 of the device 500. The device 10 also differs from the device 500 in that the device 10 comprises the third protrusion 18, which is not found in the device 500 of the first embodiment.

The first protrusion 14 is provided at one end of the bar 12. The first protrusion 14 extends from the bar 12 and is for securing the front wheel of the bicycle to the bicycle parking system. The first protrusion 14 secures the front wheel to the bicycle parking system by passing through the front wheel. The first protrusion 14 also limits the movement of the device 10, thereby preventing removal of the front wheel from the bicycle parking system. The first protrusion 14 comprises a stop 20 at its free end 22 for securing the device 10 to the bicycle parking system. The stop 20 as shown in FIG. 7 is substantially round and has a diameter that is greater than the diameter or width of the first protrusion 14. It would be appreciated that the stop 20 can be of a different shape such as a square, a rectangle, a triangle or a polygon.

The second protrusion 16 is provided at the other end of the bar 12. The second protrusion 16 extends from the bar 12 and forms a loop with a first portion 24 of

the bar 12. The second protrusion 16 is shaped for receiving a bicycle lock (not shown) for securing the rear wheel of the bicycle to the device 10 and hence the bicycle parking system. The shape of the second protrusion 16, which is in the form of the loop, enables the bicycle lock to pass therethrough.

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As described above, the third protrusion 18 is positioned between the first protrusion 14 and the second protrusion 16. The third protrusion 18 extends from the bar 12 and forms a loop with a second portion 26 of the bar 12. The third protrusion 18 is shaped for receiving the bicycle lock for securing the frame to the device 10 and hence the bicycle parking system. The shape of the third protrusion 18, which is in the form of the loop, enables the bicycle lock to pass therethrough.

Advantageously, the first, second and third protrusions 14, 16, 18 secure the front wheel, the rear wheel and the frame of the bicycle, respectively, to the bicycle parking system. In this way, the whole bicycle or the front and/or rear wheels would be protected against theft. Hence, the device 10 is able to effectively secure the bicycle to the bicycle parking system. The device 10 can also be used with a variety of bicycles sizes.

Advantageously, the first, second and third protrusions 14, 16, 18 extend from the bar 12 in the same direction as shown in FIG. 7 for easy handling of the device 10 when the device 10 is coupled to the bicycle parking system and is in use.

Furthermore, as the device 10 does not have any moving parts, the device 10 is easy to manufacture and the possibility of wear and tear and the need for maintenance are also minimised.

5 FIG. 8 shows an embodiment of the device 10 for securing a bicycle (not shown) to a bicycle parking system 200 in accordance with a second aspect of the invention. The bicycle parking system 200 comprises the device 10 and a rack 202 which is anchored to the ground. The rack 202 is for receiving at least a portion of the front wheel of the bicycle.

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The rack 202 comprises coupling means, such as a first bar 204 and a second bar 206 which are fixed to a portion of the rack 202, for coupling the device 10 to the rack 202. It would be appreciated that the coupling means is not limited to the first bar 204 and the second bar 206, but can be of any form such as in the form of the
15 first plate 518 and the second plate 520 as described in the first embodiment above, as long as the coupling means is able to couple the device 10 to the rack 202.

The first bar 204 is substantially parallel to the second bar 206 and are fixed to the
20 rack 202 such that an opening 208 is defined between the first bar 204 and the second bar 206. The opening 208 is for receiving the first protrusion 14 of the device 10. The width of the opening 208 should not be wider than the diameter or the width of the stop 20. In this way, the first protrusion 14 is free to move along the length and width of the opening 208 without the device 10 being removed from
25 the rack 202 during movement thereof. This is because the stop 20, having a

diameter or width that is greater than the width of the opening 208, would engage the first and second bars 204, 206 instead of passing through the opening 208 when an attempt is made to remove the device 10 from the rack 202. Advantageously, the device 10 is secured to the rack 202. The device 10 being
5 coupled to the rack 202 is for securing the bicycle to the rack 202 and hence to the bicycle parking system 200.

FIG. 9 shows an embodiment of the device 10 for securing a bicycle (not shown) to a bicycle parking system 300 in accordance with a third aspect of the invention.

10 The bicycle parking system 300 comprises the device 10, a second device 10', a frame 302 having a base 304, a lower rack 306 and an upper rack 308. The base 304 is anchored to the ground which in turn anchors the entire bicycle parking system 300 to the ground. The lower rack 306 is fixed to the base 304 and is for receiving at least a portion of the front wheel of the bicycle to be secured to the
15 lower rack 306.

The frame 302 further comprises a vertical support 310 and a platform 312. The vertical support 310 is attached to the base 304 at one end and is attached to the platform 312 at its other end. The vertical support 310 is for supporting the
20 platform 312. As shown in FIG. 9, the vertical support 310 and the platform 312 together form an inverted L shape structure. The vertical support 310 comprises reinforcing means such as in the form of a plank 314, for providing extra support to support the platform 312. One end of the plank 314 is fixed to the vertical support 310 and the other end is fixed to the platform 312. As a result, the platform 312

has two points of support, namely the support provided by the vertical support 310 and the extra support provided by the plank 314.

The platform 312 is for supporting the upper rack 308 and the upper rack 308 is
5 slidably engaged to the platform 312. The upper rack 308 is for receiving a second bicycle to be secured to the upper rack 308. The upper rack 308 and the platform 312 are configured such that the upper rack 308 is movable between a first position, where the upper rack 308 is at an incline to the lower rack 306, and a second position where the upper rack 308 is above and substantially parallel to the
10 lower rack 306. The upper rack 308 comprises a wheel 316 at the base of one end of the upper rack 308 which comes into contact with the ground when the upper rack 308 is moved to the first position. The wheel 316 is for supporting the upper rack 308 when the upper rack 308 is in the first position, and also for preventing damage of this end of the upper rack 308.

15 The lower rack 306 comprises coupling means just like the first bar 204 and the second bar 206 as described in the bicycle parking system 200 above, for coupling the device 10 to the lower rack 306. The upper rack 308 comprises a similar coupling means for coupling the second device 10' to the upper rack 308. Similar
20 to the device 10, the second device 10' also comprises a bar 12' having a first protrusion 14', a second protrusion 16' and a third protrusion 18' positioned between the first protrusion 14' and the second protrusion 16'. The first protrusion 14' also comprises a stop 20' at its free end 22'. Advantageously, the device 10 and the second device 10' are secured to the lower rack 306 and upper rack 308,

25 respectively.

The device 10 being coupled to the lower rack 306 is for securing the first bicycle to the lower rack 306 and hence to the bicycle parking system 300. Similarly, the second device 10' being coupled to the upper rack 308 is for securing the second
5 bicycle to the upper rack 308 and hence to the bicycle parking system 300.

Advantageously, the lower and upper racks 306, 308 enable the bicycle parking system 300 to be a double tier system, which allows for two bicycles to be parked and secured at any one time. This provides the advantage of overcoming space
10 constraints.

FIG. 10 shows the lower rack 306 of the bicycle parking system 300 when in use. Before a portion of the front wheel of a bicycle 400 can be received in the lower rack 306, the device 10 is moved in a direction as shown in FIG. 10 by an arrow
15 labelled A. The device 10 is moved in this direction till the stop 20 of the first protrusion 14 engages the coupling means. This ensures that the path for entry of the front wheel of the bicycle 400 is not obstructed and allows the front wheel of the bicycle 400 to be pushed into the lower rack 306, which otherwise would not have been possible due to the obstruction of the path for entry by the first
20 protrusion 14. After the device 10 is being moved and the path for entry is clear, the bicycle 400 is pushed into the lower rack 306 till the bicycle 400 comes to a stop and is parked.

Thereafter, the device 10 is moved in a direction opposite to the direction labelled
25 by the arrow A in FIG. 10, toward the parked bicycle 400 such that the first

protrusion 14 goes through the front wheel of the bicycle 400, the second protrusion 16 goes through the rear wheel of the bicycle 400 and the third protrusion 18 is positioned between the front wheel and the frame of the bicycle 400, as shown in FIG. 11. Next, a conventional bicycle lock 318 is passed through
5 the second protrusion 16, the third protrusion 18, the rear wheel and the frame of the bicycle 400 thereby forming a loop. As such, the bicycle 400 is secured to the lower rack 306 and the bicycle parking system 300 by securing the bicycle 400 to the device 10. Advantageously, the device 10 effectively secures the front wheel, the frame and the rear wheel of the bicycle 400 to the bicycle parking system 300.

10 Apart from the use of the conventional bicycle lock 318, it would be appreciated that other kinds of locks such as a chain or the like provided with locking means such as a padlock can also be used to secure the frame and the rear wheel of the bicycle 400 to the device 10.

15 When the upper rack 308 of the bicycle parking system 300 is not in use, the upper rack 308 is in the second position where the upper rack 308 is above and substantially parallel to the lower rack 306 as shown in FIGS. 9, 10 and 11. In order to use the upper rack 308 for securing a bicycle, the upper rack 308 is first
20 moved to the first position as shown in FIG. 12. As described above, the first position is where the upper rack 308 is at an incline to the lower rack 306 and where the wheel 316 comes into contact with the ground. To move the upper rack 308 from the second position to the first position, the upper rack 308 is slid along the platform 312 in a direction away from the platform 312 till the upper rack 308

25 can no longer move in this direction. Next, the upper rack 308 is moved in a

direction toward the ground till the wheel 316 is in contact with the ground thereby arriving at the first position where the upper rack 308 is at an incline to the lower rack 306.

5 Thereafter, similar to the lower rack 306, before a bicycle can be received in the upper rack 308, the second device 10' is moved in a direction as shown in FIG. 12 by an arrow labelled A'. The second device 10' is moved in this direction till the stop 20' of the first protrusion 14' engages the coupling means. This ensures that the path for entry of the bicycle is not obstructed and allows the bicycle to be
10 pushed into the upper rack 308, which otherwise would not have been possible due to the obstruction of the path for entry by the first protrusion 14'.

After the device 10' is being moved and the path for entry is clear, a bicycle can then be pushed into the upper rack 308. FIG. 13 shows a second bicycle 700
15 being pushed into the upper rack 308. The front wheel of the bicycle 700 is first lifted off the ground and placed into a portion of the upper rack 308.

Next, the bicycle 700 is pushed up the inclined upper rack 308 till the rear wheel of the bicycle 700 is also received in the upper rack 308 as shown in FIG. 14. As
20 such, the whole bicycle 700 is received and parked in the upper rack 308.

Thereafter, the device 10' is moved in a direction opposite to the direction labelled by the arrow A' in FIG. 12, toward the bicycle 700 such that the first protrusion 14' goes through the front wheel of the bicycle 700, the second protrusion 16' goes
25 through the rear wheel of the bicycle 700 and the third protrusion 18' is positioned

between the front wheel and the frame of the bicycle 700, as shown in FIG. 14. Next, a conventional bicycle lock 320 is passed through the second protrusion 16', the third protrusion 18', the rear wheel and the frame of the bicycle 700 thereby forming a loop. As such, the bicycle 700 is secured to the upper rack 308 and the
5 bicycle parking system 300 by securing the bicycle 700 to the device 10'. Advantageously, the device 10' effectively secures the front wheel, the frame and the rear wheel of the bicycle 700 to the bicycle parking system 300.

Apart from the use of the conventional bicycle lock 320, it would be appreciated
10 that other kinds of locks such as a chain or the like provided with locking means such as a padlock can also be used to secure the frame and the rear wheel of the bicycle 700 to the device 10'.

After the bicycle lock 320 is in place and the bicycle 700 is secured to the upper
15 rack 308, the upper rack 308 with the bicycle 700 therein is moved from the first position back to the second position where the upper rack 308 is above and substantially parallel to the lower rack 306 as shown in FIG. 15. To move the upper rack 308 from the first position to the second position, the upper rack 308 is moved in a direction away from the ground till the upper rack 308 is horizontally
20 aligned with the platform 312. Next, the upper rack 308 is slid along the platform 312 in a direction toward the vertical support 310 till the upper rack 308 can no longer move in this direction to arrive at the second position.

Advantageously, the bicycle parking system 300 overcomes space constraints by enabling two bicycles to be parked and secured at any one time as opposed to only one bicycle.

- 5 It would be appreciated that instead of having the device 10 being coupled to the lower rack 306 of the bicycle parking system 300, the device 600 or the device 500 (not shown) can also be coupled to the lower rack 306 via coupling means just like the first bar 204 and the second bar 206, the first plate 518 and the second plate 520 or like the first plate 518' and the second plate 520' as shown in FIG. 16.
- 10 Furthermore, a second device 600' similar to the device 600 or a second device (not shown) similar to the device 500 can also be coupled to the upper rack 308 via similar coupling means instead of the device 10'. In this configuration where the device 600 and the second device 600' or the device 500 and the second device similar to the device 500 (not shown) are being coupled to the bicycle
- 15 parking system 300, it would be appreciated that the same can be used to secure two bicycles by means of bicycle locks 552, 554 in the same manner as described above where the device 10 and the device 10' are being coupled to the bicycle parking system 300.
- 20 Each of the device 10, the device 600 and the device 500 can also be retrofitted to or installed in existing bicycle parking systems such as conventional bicycle parking systems which typically comprise a rack for receiving a portion of the front wheel of a bicycle. In such conventional bicycle parking systems, the bicycle is secured to the rack by means of a bicycle lock passing through the front wheel of
- 25 the bicycle and the rack thereby forming a loop.

The device 10 is retrofitted to such systems by attaching two bars, such as the first bar 204 and the second bar 206 which defines the opening 208 therebetween for receiving the first protrusion 14 of the device 10, to a portion of the rack. On the other hand, the device 600 or the device 500 is retrofitted to such systems by attaching two plates, such as the first plate 518' and the second plate 520' or the first plate 518 and the second plate 520 to a portion of the rack. In this way, each of the devices 10, 600 and 500 can be thus secured to such conventional bicycle parking systems. A secured connection between the two bars and the rack or the two plates and the rack is formed by means such as welding or gluing the bars or plates onto the rack.

Alternatively, each of the device 10, the device 600 and the device 500 can be attached to the rack by means of a locking mechanism (not shown) that would allow the device 10, the device 600 or the device 500 to be locked to and removed from any such conventional bicycle parking systems. Advantageously, each of the device 10, the device 600 and the device 500 is transportable from one conventional bicycle parking system to another conventional bicycle parking system.

Although the foregoing invention has been described in some detail by way of illustration and example, and with regard to one or more embodiments, for the purposes of clarity of understanding, it is readily apparent to those of ordinary skill in the art in light of the teachings of this invention that certain changes, variations

and modifications may be made thereto without departing from the spirit or scope of the invention as described in the appended claims.

It would be further appreciated that although the invention covers individual
5 embodiments, it also includes combinations of the embodiments discussed. For
example, the features described in one embodiment is not being mutually
exclusive to a feature described in another embodiment, and may be combined to
form yet further embodiments of the invention.

CLAIMS

1. A device for securing a bicycle to a bicycle parking system comprising:

an elongate member having a first portion shaped for securing the front wheel of a bicycle to the bicycle parking system and a first protrusion shaped for receiving a bicycle lock for securing the rear wheel and/or the frame of the bicycle to the bicycle parking system.

2. A device according to claim 1, wherein the first protrusion forms a loop with a second portion of the elongate member.

3. A device according to any preceding claim, wherein the elongate member is shaped in the form of an arc.

4. A device according to any preceding claim, wherein the first portion is shaped in the form of an arc.

5. A device according to any preceding claim, wherein the first portion comprises a stop for securing the device to the bicycle parking system.

6. A device according to claim 5, wherein the stop is provided at the free end of the first portion.

7. A device according to any preceding claim, wherein the first protrusion is provided at a free end of the elongate member.

8. A device according to any of claims 1 to 3, wherein the first portion is in the form of a second protrusion for securing the front wheel of the bicycle to the bicycle parking system.

5 9. A device according to claim 8, wherein the second protrusion comprises a stop at its free end for securing the device to the bicycle parking system.

10. A device according to any of claims 8 and 9, wherein the elongate member further comprises a third protrusion positioned between the first and second
10 protrusions shaped for receiving a bicycle lock for securing the frame to the bicycle parking system.

11. A device according to claim 10, wherein the first, second and third protrusions extend from the elongate member in the same direction.

15 12. A device according to any of claims 10 and 11, wherein the third protrusion forms a loop with a third portion of the elongate member.

13. A device according to any of claims 8 to 12, wherein the second protrusion
20 is provided at one end of the elongate member.

14. A device according to claim 13, wherein the first protrusion is provided at the other end of the elongate member.

15. A bicycle parking system comprising:

a rack for receiving at least a portion of the front wheel of a bicycle;

and

a device according to any preceding claim, the device being coupled

5 to the rack for securing the bicycle to the bicycle parking system.

16. A bicycle parking system comprising:

a frame;

a lower rack for receiving at least a portion of the front wheel of a first

10 bicycle;

an upper rack for receiving a second bicycle, the upper rack being
slidably engaged to the frame and the frame for supporting the upper rack;

a first device according to any of claims 1 to 14 being coupled to the
lower rack for securing the first bicycle to the parking system; and

15 a second device according to any of claims 1 to 14 being coupled to
the upper rack for securing the second bicycle to the parking system,

wherein the upper rack and the frame are being configured such that
the upper rack is movable between a first position, where the upper rack is
at an incline to the lower rack, and a second position, where the upper rack
20 is above and substantially parallel to the lower rack.

17. A method for installing a device according to any of claims 1 to 14 to a
bicycle parking system, comprising:

coupling the device to a portion of a rack of the bicycle parking system via coupling means such that the device is secured to the bicycle parking system.