

[54] LOCKING MECHANISM

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[58] Field of Search 70/14, 15, 18, 54, 55, 70/56, 58, 225, 226, 233, 234, 259, 260, 463; 292/DIG. 56, DIG. 57, DIG. 58

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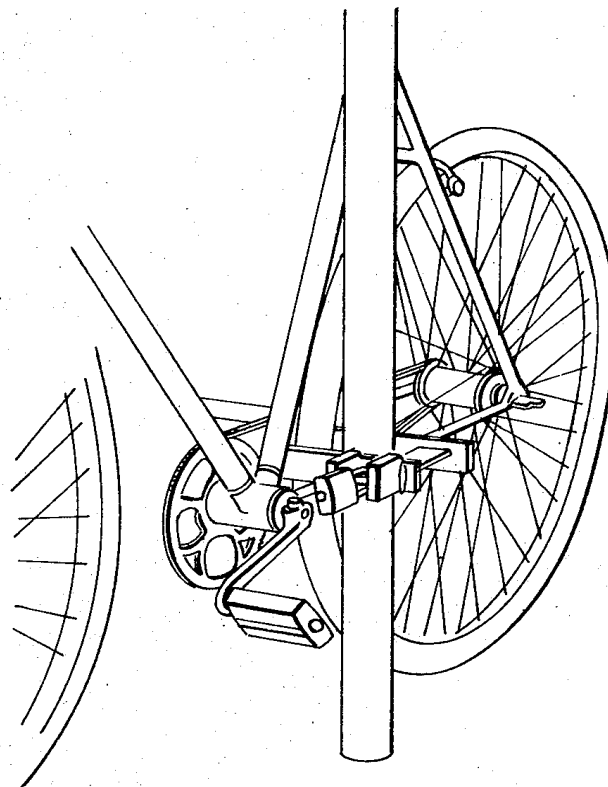
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[57]

ABSTRACT

A U-shaped shackle, preferably of hardened steel, is provided with a movable bolt adapted to extend between the legs of the shackle and lock therewith by means of a padlock. The ends of the legs are formed with slot openings in register with one another to receive the bolt. The bolt is formed with a shoulder at one end and an opening near the opposite end. The padlock hasp is passed through the opening at the opposite end of the bolt to lock the bolt across the legs of the shackle. Rigid walls are formed about the slot on the end of one leg of the shackle to partially enclose the end of the bolt which is formed with the opening to protect the padlock against being forced, cut or otherwise tampered with. The lock is useful particularly as an anti-theft device for bicycles.

6 Claims, 6 Drawing Figures



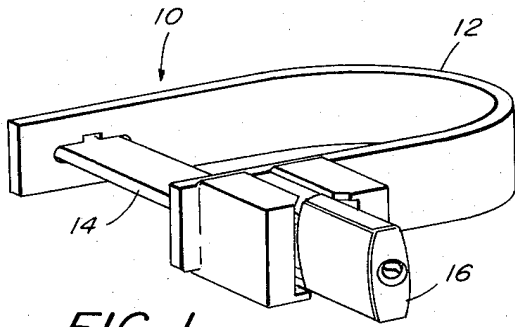


FIG. 1

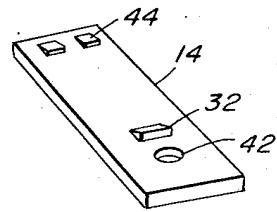


FIG. 2

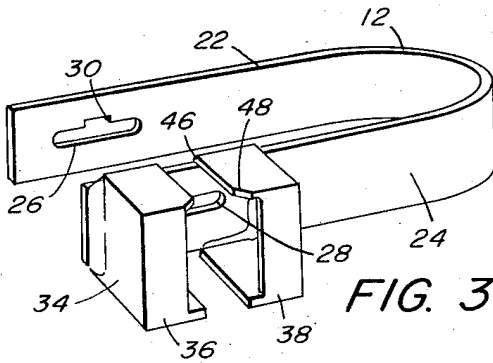


FIG. 3

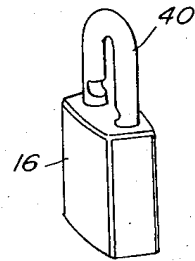


FIG. 4

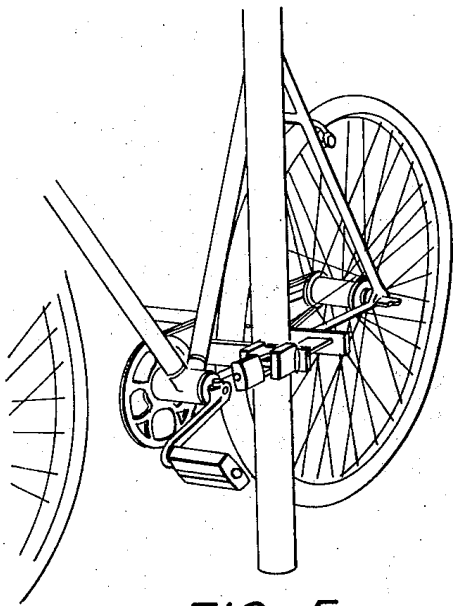


FIG. 5

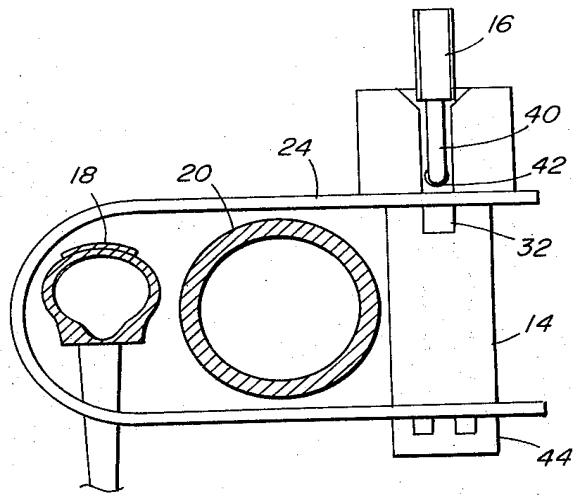


FIG. 6

LOCKING MECHANISM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to locking devices and more particularly is directed towards a simple, low cost locking device of extremely rugged construction and particularly suited for use in cooperation with conventional padlocks to prevent the theft of bicycles or the unauthorized use or theft of other equipment or property.

2. Description of the Prior Art

With the growing popularity of bicycles, motorbikes, motorcycles and the like, the incidence of theft of this equipment has also risen. Bicycles are particularly attractive to thieves for the reasons that, as stolen goods, they are difficult to trace and recover, they are easily disassembled into their component parts for resale and generally are easily taken even by inexperienced thieves. While many owners lock their bikes when the bikes are left unattended, the lock currently available for this purpose generally offer little resistance to a thief equipped with a bolt cutter, for example. Most locks of this type usually involve padlocks or wire ropes or chains secured by padlocks. All of these locking devices yield quite readily to a bolt cutter or hacksaw and thus are generally ineffective against a determined thief.

Accordingly, it is an object of the present invention to provide a locking mechanism for use with a conventional padlock in protecting such things as bicycles or the like by preventing the destruction of the locking the or the padlock.

SUMMARY OF THE INVENTION

This invention features a locking device comprising a U-shaped shackle and a bolt, both fabricated preferably of hardened heavy steel stock, and shackle being formed with aligned slots adjacent the end of each leg to receive the bolt which may be passed therethrough. One end of the bolt is formed with a shoulder to serve as a stop, the opposite end being formed with an opening to receive the hasp of a padlock thereby locking the bolt at both ends between the legs of the shackle. One of the shackle legs is formed with walls defining a socket for the padlock whereby, with the padlock in place, the hasp of the padlock is substantially inaccessible to a bolt cutter or a similar tool.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in perspective of a locking mechanism made according to the invention,

FIG. 2 is a view in perspective of the bolt portion of the lock,

FIG. 3 is a view in perspective of the shackle portion of the lock,

FIG. 4 is a perspective view of a conventional padlock used with the locking mechanism,

FIG. 5 is a perspective view showing the locking device as used with a bicycle, and,

FIG. 6 is a detailed enlarged sectional view of the lock in place.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, the reference charac-

ter 10 generally indicates a locking mechanism which, in the preferred embodiment, is comprised of a U-shaped shackle 12 and a bolt 14 lockable across the open end of the shackle by means of a conventional padlock 16. In practice, the hasp and the bolt are fabricated from a hard, tough material, preferably case hardened, cold rolled steel stock, typically 1¼ inch thick by 1½ inches in width. Obviously different sized stock and/or fully oil hardened tool steel or other material having similar characteristics may be used to advantage. When used as a bicycle lock, the shackle 12 typically has a length of perhaps eight or nine inches, the legs being spaced apart approximately 3½ inches. These dimensions are sufficient to accommodate a bicycle wheel 18 and a post 20, as suggested in FIGS. 5 and 6. The parts may be plated to prevent rusting and the shackle and the bolt preferably are covered with a layer of resilient material such as rubber, vinyl plastic or the like to prevent the lock parts from scratching finished surfaces of the bike or the like.

The shackle 12 is formed with two parallel legs 22 and 24 generally co-extensive with one another and each formed with a slot opening 26 and 28, respectively, to receive the bolt 14 inserted therethrough. Each of the slots 26 and 28 has a width slightly greater than the bolt and the slot 26 is also formed with a cut-away portion 30 to accommodate a boss 32 on the bolt 14, the function of which will be described below.

At the end of the leg 24 and on the outer face thereof is formed a boxed enclosure 34. The enclosure 34 in the illustrated embodiment is formed by short sections of channel pieces 36 and 38 welded to the outer face of the end of the leg 24 in slightly spaced opposing relation with one channel piece at each end of the slot 28 to form a relatively deep socket or recess substantially enclosing the padlock 16 when its hasp 40 engages the end of the bolt 14 through an opening 42 formed in the end thereof. The outer ends of the pieces 36 and 38 may be partially boxed to further restrict access. The bolt 14, as best shown in FIG. 2, is also formed with a pair of shoulder stops 44 at the opposite end thereof which cooperates with the leg 22 to prevent the bolt from passing entirely through the slot 26. Alternatively, the end of the bolt may be bent at a right angle to form a stop. The length of the bolt 14 is such that the end with the opening 42 extends a short distance through the slot 28 so that the opening 42 just clears the other side of the leg 24 when the bolt is in place, as best shown in FIG. 6. The hasp of the padlock passes through the opening to lock the bolt in position against retraction.

The boss 32, which is formed or welded on the bolt 14, prevents the bolt from being pushed through the slot 28 by forcing together the legs of the shackle in an attempt to move the padlock clear of the enclosure 34. Thus, even if sufficient force could be brought to bear to close the shackle legs, the boss 32 would prevent displacement of the bolt. The cutaway portion 30 of the slot 26 allows the boss 32 to pass through the slot when the bolt is being withdrawn from the shackle after the padlock is unlocked and removed. The configuration also prevents the bolt from being inserted backwards. Other measures may be taken to prevent displacement of the bolt by compression of the legs. For example, an apertured plate may be welded along the long edge of the slot 28 and parallel to the bolt so that the padlock may be secured both through the end of the bolt and

through the apertured plate. Alternatively, a stop in the form of a wall may be welded across the outer end of the boxed enclosure to butt against the extreme end of the bolt when in position.

The channel pieces 36 and 38 typically extend out from the leg 24 approximately two inches and form a clearance 46 of peraps 3/4 inch between opposing edges of the channel pieces to permit the shackle 40 of the padlock to be inserted through the opening 42. The clearance is sufficiently restricted to effectively prevent access by various tools such as bolt cutters or the like. Preferably the opposing outer corners on one side of the channel pieces are beveled at 48 to permit the body of the padlock to be manipulated when engaging and disengaging the hasp but not permitting the lock to be so twisted within the recess as to expose the hasp to access by a bolt cutter or similar tool. In practice, the space between the opening 42 in the end of the bolt 14 substantially corresponds with the length of a standard hasp of a padlock so that, once locked in position, the padlock cannot be twisted or otherwise manipulated to expose the hasp to a tool.

When used as a bicycle lock, the shackle 12 is passed around the rear wheel of the bike, preferably at a point between the wheel stays, and around a post 20 with the leg 22 of the shackle passing between the wheel spokes. The bolt 14 is then passed through the leg slots and the padlock secured. The lock may be varied in size as well as shape and may be used for locking other types of vehicles, for securing machines against unauthorized use or for a variety of other locking applications.

Having thus described the invention, what I claim and desire to obtain by Letters Patent of the United States is:

1. A locking apparatus for use with a standard pad-

- lock having a hasp comprising in combination,
 - a. a shackle having a pair of legs, and
 - b. a bolt adapted to span said legs,
 - c. one end of said bolt lockably engaging one of said legs and the opposite end of said bolt being formed with an opening adapted to receive said hasp,
 - d. the other of said shackle legs being formed with an integral and deeply recessed socket having an opening therein to receive said opposite end of said bolt,
 - e. said socket dimensioned to snugly accommodate said padlock when said padlock is locked onto said bolt whereby said hasp is rendered effectively inaccessible, and,
 - f. stop means on said bolt for limiting movement of said bolt through said shackle leg.

2. A locking apparatus according to claim 1 wherein said shackle and bolt are fabricated from hard, rigid metal stock.

3. A locking apparatus according to claim 1 wherein said shackle is U-shaped and said socket includes a pair of slightly spaced and opposite facing channel sections fixed perpendicularly to said other leg.

4. A locking apparatus according to claim 3 wherein said one shackle leg is formed with an opening to receive said bolt and said one end of said bolt is formed with a shoulder stop for limiting movement of said bolt therethrough.

5. A locking apparatus according to claim 1 wherein said means includes a boss on said bolt adapted to bear against said other leg.

6. A locking apparatus according to claim 1 wherein said shackle and bolt are covered by a resilient stratum.

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