

U-frame Padlocks

Field of Invention

[001] The present invention relates to U-frame padlock configurations. In particular, these U-frame padlocks are suitable for fixing onto an eye bracket on a gate at a doorway; to prevent obstruction at the doorway, some of these U-frame padlocks are made with swivel or moveable bodies.

Background

[002] Padlocks are widely used for securing gates or clasps to associated staples. Known padlocks have U-shaped shackles or U-shaped bodies with sliding lock bolts. For use on a gate at a doorway, a padlock is often attached to the gate with a chain; the padlock hanging on the chain often scratches the paint or finish on the gate and associated door. It is thus desirable to provide a padlock that can be mounted directly onto a fisheye bracket at a gate and yet allows an associated moving leaf of the gate to operate; by mounting the padlock directly at the point of use, damage to surface finishes at the gate, brackets and door can be minimised.

[003] The closest known padlock is described in EP publication 1001121 by Houghton. This padlock has a swivel body (1,2) which swivel axis is parallel to a slide axis of a locking bolt (8). However, this padlock does not allow it to be mounted onto a fisheye bracket on a leaf of a gate and yet allowing a moveable leaf of the gate to operate.

[004] It can thus be seen that there exists a need for another type of padlock that is suitable for mounting onto a gate or stationary bracket yet allowing an associated moveable part to operate without obstruction.

Summary

[005] The following presents a simplified summary to provide a basic understanding of the present invention. This summary is not an extensive overview of the invention, and is not intended to identify key features of the invention. Rather, it is to present some of the

inventive concepts of this invention in a generalised form as a prelude to the detailed description that is to follow.

[006] The present invention seeks to provide U-frame padlocks. A U-frame padlock may have a locking bolt slidable across an opening of a U-frame body or a U-shackle bolt with a slidable lock cylinder housing. A threaded bush supports the locking bolt or U-shackle bolt, and allows the U-frame padlock to be attached to an eye bracket on a gate. To prevent obstruction to a passageway through the gate, the U-frame body is made of two parts that can swivel relative to each other. Preferably, the swivel axis is substantially perpendicular to a longitudinal slide axis of the locking bolt; in other embodiments, these axes are additionally offset from each other. Similarly, the slidable housing of the U-shackle padlock can be moved to prevent obstruction at the gate passageway.

[007] In one embodiment, the present invention provides a U-frame padlock comprising: a U-frame body; a locking bolt operable to extend across an opening of the U-frame body; and a threaded bush disposed coaxially with the locking bolt to support and to secure an associated arm of the U-frame body onto an eye bracket at a point of use.

[008] Preferably, the U-frame body comprises an L-shaped swivel body and a mounting body that are connectable by a swivel pin, with a swivel axis of the swivel pin being substantially perpendicular to a longitudinal axis of the locking bolt.

[009] Preferably, the L-shaped swivel body is made up of two jointed parts, which are secured together by a securing pin. Preferably, the L-shaped swivel body includes a lock cylinder body and a lower body. The lower body, lock cylinder body and/or the mounting body may be made up of stacked case hardened metal plates.

[0010] Preferably, an arm of the L-shaped swivel body is configured as a pivot plate; with another cooperating pivot plate, the swivel body is pivotable relative to the mounting body.

[0011] In another embodiment, the U-frame body includes an L-shaped body and a mounting body that are connectable by a swivel pin, with a swivel axis of the swivel pin being substantially perpendicular to but offset from a longitudinal axis of the locking bolt.

[0012] Preferably, the U-frame padlock includes a case hardened armour disposed over the L-shaped swivel body, mounting body and/or lock cylinder housing.

[0013] In another embodiment, the U-frame body comprises a swivel body and a mounting body that are connectable by an elongate bar, with a swivel axis between the swivel body and the mounting body being along a longitudinal axis of the elongate bar.

[0014] Preferably, a proximal end of the locking bolt has an annular groove to engage with a cooperating lock catch located in the other arm of the U-frame body.

[0015] In another embodiment, a U-frame padlock is provided. The U-frame padlock comprises: a U-shackle bolt; a threaded bush disposed coaxially with a first arm of the U-shackle bolt; a mounting body disposed coaxially with the first arm of the U-shackle bolt in cooperation with the threaded bush; and lock cylinder housing. A spacing between the threaded bush and the mounting body is provided to allow the padlock to be mounted onto an eye bracket at a point of use and the lock cylinder body is slidable on a second arm of the U-shackle bolt to an unobstructed position. A proximal end of the U-shackle bolt has a groove to cooperate with a lock catch when the padlock is locked. Preferably, an ejector plug is provided in cooperation with the lock catch.

[0016] Preferably, the lock cylinder mechanism is connected to cam surface, which can be turned by a manual key to drive a cam follower formed on a rotary lock catch. The rotary lock catch is alternately actuated to lock or unlock by a motor, which communicates wirelessly with an application operating in an electronic device (including a smartphone).

[0017] Preferably, the locking bolt and annular groove, U-shackle bolt and groove, and lock catches are case hardened.

Brief Description of the Drawings

[0018] This invention will be described by way of non-limiting embodiments of the present invention, with reference to the accompanying drawings, in which:

[0019] FIG. 1A illustrates a U-frame padlock according to an embodiment of the present invention; FIGs. 1B and 1C illustrate variations of a lock bush; FIGs. 1D-1E illustrate mounting of the U-frame padlock on a bracket of a gate; and FIGs. 1F-1G illustrate mounting a soft case on part of the U-frame padlock;

[0020] FIG. 2A illustrates a U-frame padlock according to another embodiment of the present invention; FIG. 2B illustrates an exploded view of the U-frame padlock shown in FIG. 2A; FIGs. 2C-2F illustrate mounting of the U-frame padlock shown in FIG. 2A on a bracket of a gate;

[0021] FIG. 3A illustrates a U-frame padlock according to another embodiment; FIG. 3B illustrates an exploded view of a swivel body of the U-frame padlock shown in FG. 3A;

[0022] FIG. 4A illustrates an exploded view of a U-frame padlock being made of a stack of metal plates according to another embodiment; FIGs. 4B-4D illustrate mounting of the U-frame padlock shown in FIG. 4A on a bracket of a gate;

[0023] FIGs. 5A-5C illustrate a U-frame padlock according to another embodiment;

[0024] FIGs. 6A-6C illustrate a U-frame padlock made of two pivot plates according to another embodiment;

[0025] FIG. 7 illustrates a U-frame padlock using a case hardened armour to protect its body according to another embodiment;

[0026] FIGs. 8A-8C and 8D-8G illustrate U-frame padlocks according to other embodiments using case hardened armours;

[0027] FIGs. 9A-9C illustrate a U-frame padlock according to another embodiment of the present invention;

[0028] FIG. 10 illustrates an exploded view showing use of hardened pins inserted into the body of the above U-frame padlock;

[0029] FIGs. 11A-11F illustrate a U-shackle padlock according to yet another embodiment of the present invention; and

[0030] FIGs. 12A-12G illustrate a U-frame padlock with a motor and a cam for wireless locking and unlocking, together with a manual lock cylinder mechanism.

Detailed Description

[0031] One or more specific and alternative embodiments of the present invention will now be described with reference to the attached drawings. It shall be apparent to one skilled in the art, however, that this invention may be practised without such specific details. Some of the details may not be described at length so as not to obscure the invention. For ease of reference, common reference numerals or series of numerals will be used throughout the figures when referring to the same or similar features common to the figures.

[0032] FIG. 1A shows a U-frame padlock 100 according to an embodiment of the present invention. As shown in FIG. 1A, the U-frame padlock 100 includes a U-frame body 110, a locking bolt 150 and a hollow threaded bush 170. The locking bolt 150 is disposed to slide across an opening of the U-frame body 110 to secure a gate across a doorway/passageway, a lid over an enclosure or a hasp-staple to prevent or permit access through the doorway/passageway or an interior of a protected space. The locking bolt 150 is supported coaxially by the hollow threaded bush 170, with the threaded bush 170 being provided to secure the U-frame padlock 100 to an eye bracket 14 on the gate or the lid or staple. Preferably, the threaded bush 170 is engaged into one arm of the U-frame body 110 to provide a spacing S that is adjustable to accommodate a thickness of the eye bracket 14, whilst the opposite arm houses a lock catch 160 to engage with an annular groove 152 formed on a proximal end of the locking bolt 150 when the U-frame padlock 100 is in the locked position; this can be seen in a section view shown in FIG. 1B. The lock catch 160 is connected to a lock cylinder mechanism 30, which can be located in two alternative

positions as shown in FIG. 1B. Depending on design of the lock cylinder mechanism 30, the locking bolt 150 may be pushed to engage with the lock catch 160 in a snap lock (or automatic lock) manner; alternatively, the lock cylinder mechanism 30 may require the key to be turned both to lock and to unlock the U-frame padlock 100 to prevent accidental locking, ie. when a user does not have possession of the key for the U-frame padlock. To ensure that the annular groove 152 on the locking bolt 150 engages with the cooperating lock catch 160 when the U-frame padlock is locked, a spring loaded ejector plug 162 is provided to bias the locking bolt 150 to its unlock position by a compression spring 164. Other security features provided for in the U-frame padlock of the present invention will be disclosed in a later description.

[0033] In addition, FIG. 1B shows a variation of the threaded bush being made up of a nut 170a and a bush 170b with one end having threads to cooperate with the nut. FIG. 1C shows a threaded bush 170c according to a variation, which extends partially into the associated arm of the U-frame body 110.

[0034] FIG. 1D shows the U-frame padlock 100 is secured to the eye bracket 14 located on a stationary leaf 10 of a gate. FIG. 1E shows the gate is closed and an eye bracket 16 on a moveable leaf 12 is in cooperative position with the eye bracket 14 to allow the gate to be secured with the U-frame padlock 100. FIGs. 1F and 1G illustrate fitting of a soft case 105 onto the U-frame body 110, preferably on the body part that extends into the passageway of the gate. The soft case 105 provides a cushioning effect to a user in case of an accidentally knock onto the U-frame padlock 100.

[0035] FIG. 2A shows a U-frame padlock 100a according to another embodiment. The U-frame padlock 100a is similar to the above U-frame padlock 100, except that the U-frame body is now made up of two swivel parts, an L-shaped swivel body 110a and a mounting body 110b that are connected to swivel about a pivot pin 120 (which is shown more clearly in exploded FIG. 2B). The pivot axis of the pivot pin 120 is substantially perpendicular to a longitudinal axis of the locking bolt 150, so that when the mounting body 110b is secured to the eye bracket 14 located on the stationary leaf 10 of the gate, the swivel body 110a can be turned through substantially a quarter turn (or 90 deg.) so as not to obstruct the moving leaf of the gate or, narrow or obstruct, the passageway through the gate. When assembled,

opposite ends of the pivot pin 120 are supported by two clevises 132, 134 that extend from an inside face 135 of the mounting body 110b, with a lower arm 111 of the L-shaped swivel body 110a journaled between the clevises 132, 134. As in the above embodiment, the lock cylinder mechanism 30 is preferably located inside the swivel body 110a.

[0036] In FIG. 2B, on the inside face 135 of the mounting body 110b located between the two clevises 132, 134, there two spaced apart detent ball-spring mechanisms 136. When assembled, the detent balls extend out of the inside face 135 and engage respectively with depressions 116 formed on three side surfaces on the swivel body 110a. Preferably, the detent balls engage with the depressions when the swivel body 110a is oriented at substantially quarter-turn positions with the mounting body 110b; one such turned position is seen in FIG. 2C.

[0037] FIGs. 2C-2D show the mounting of the U-frame padlock 100a, in particular, securing the mounting body 110b onto the eye bracket 14 located on a stationary leaf 10 of a gate. When the U-frame padlock 100a is thus mounted, the swivel body 110a is turned through substantially 90 degree so as not to obstruct the moving leaf from being closed; also, with the swivel body 110a being turned, the U-frame padlock 100a does not extend into the passageway through the gate. Thus, in this turned position, the U-frame padlock 100a does not become a safety hazard, for eg. to a face of a person passing through the passageway. Also, as the U-frame padlock 100a is fixedly mounted onto the eye bracket 14, the swivel body 110a or the mounting body 110b is prevented from swaying and damaging the surface finish on the gate, eye brackets and associated door. In FIG. 2E, the gate is closed with the eye brackets 14, 16 in cooperation, whilst FIG. 2F shows the gate is secured by the locking bolt 150 of the U-frame padlock 100a.

[0038] FIG. 3A shows a U-frame padlock 100b according to another embodiment. The U-frame padlock 100b is similar to the above U-frame padlock 100a except that the swivel body 11a is now made up of two jointed parts 112, 113. Preferably, as shown in FIG. 3B, the joint holding the two parts 112, 113 together is a dovetail joint 117 and a lock pin 118. It is possible to use other type of joints to hold the two parts 112, 113 together, for eg., a tongue and groove joint, or a step-connect joint. An advantage of this embodiment is that

the two parts 112, 113 can be made from smaller pieces of materials, which means reducing the costs of producing this U-frame padlock 100b.

[0039] In the above U-frame padlock 100a, 100b, the mounting body 110b is described to have a pair of clevises 132, 134 to support the swivel pin 120. In an alternative design, it is possible to extend the clevises from the swivel body 110a without affecting the use of the U-frame padlock.

[0040] In the above figures, the threaded bush 170 or threaded nut 170a is shown to attach the U-frame padlock 100, 100a, 100b to an eye bracket 14 on a gate 10. To minimize damaging paintwork or surface finish on the eye bracket 14, a flat washer may be used between the threaded bush 170 and the eye-bracket 14 or between the threaded nut 170a and the eye bracket 14. In addition, a lock washer may be used between the flat washer and the threaded bush 170.

[0041] FIG. 4A shows a U-frame padlock 100c according to another embodiment. The U-frame padlock 100c is similar to the above U-frame padlock 100a except that the swivel body 110a is now made up of two jointed parts, a lock cylinder housing 112a and a lower arm 111a. In FIG. 4A, the lower arm 111a is configured with a stack of metal plates being held together by rivets, with one rivet 190 being shown. An advantage of this U-frame padlock 100a is that the metal plates may be lower in costs than thicker bar stocks; in addition, these metal plates are thin and can be more easily hardened and tempered or case hardened or directionally strengthened during roll manufacturing processes. The use of the U-frame padlock 100c on the eye brackets 14, 16 remains unchanged, as is seen in FIGs. 4B-4D.

[0042] FIG. 5A shows a U-frame padlock 100d according to another embodiment. The U-frame padlock 100d is similar to the above U-frame padlock 100c, except that the lower arm (now labeled 111b) of the swivel body is now made from a solid piece. The use of the U-frame padlock 100d on the eye brackets 14, 16 remains unchanged, as is seen in FIGs. 5A-5C.

[0043] FIG. 6A shows a padlock 200 according to another embodiment. The padlock 200 is similar to the above U-frame padlocks except that it has an upper pivot plate 211 provided between a swivel body 210a and a mounting body 210b at a location above a lower pivot plate 211 (instead of the single lower arm 111). As in other U-frame padlocks, a locking bolt 150 and a threaded bush 170 allow the padlock 200 to be mounted on an eye bracket 14. As shown in FIG. 6A, two pivot pins 220 allow the pivot plates 211 to swivel on the mounting body 210b so as to prevent the padlock from obstructing the gate passageway. Preferably, the lock cylinder mechanism 30 is located from a lower part of the swivel body 210a, as seen in FIG. 6A. The use of the padlock 200 on the eye brackets 14, 16 remains unchanged, as seen in FIGs. 6B-6C. In use, depressions 216 on the edges of the pivot plates 211 engage with detent mechanisms to preferably hold the swivel body 210a at quarter-turn positions with the mounting body 210b.

[0044] Any padlock is not entirely secure; depending on the lock cylinder mechanism 30, a padlock can be picked to unlock. In addition, the body or the locking bolt can be sawn or broken. Security of the above padlocks 100, 100a-100d, 200 can be further enhanced by making them more difficult to be sawn or to be broken open, if prevention is not possible. For example, FIG. 7 shows a U-frame padlock 100e according to another embodiment. The U-frame padlock 100e is similar to the above U-frame padlock 100, 100a-100d except that the U-frame padlock 100e is being made more secure by providing a case hardened armour 180 over substantially the swivel body 110a that houses the lock cylinder mechanism 30. It is also possible to provide an additional case hardened armour over the mounting body 110b. In addition, the U-frame body 110, swivel body 110a and/or the mounting body 110b can be embedded with hardened-tempered or case hardened pins to increase the time when the padlock is being sawn, as will be described with FIG. 10.

[0045] FIG. 8A shows a U-frame padlock 300 according to another embodiment. The U-frame padlock 300 is similar to the above U-frame padlock 100a-100e except that the swivel body (now labeled 310a) is now pivoted to a mounting body 310b by a pivot pin 320, which pivot axis is perpendicular to but offset from the longitudinal axis of the locking bolt 150. When mounted on an eye bracket 14, the swivel body 310a is swung vertically down to prevent obstructing the gate passageway (instead of swinging horizontally as for U-frame padlock 100a-100e or padlock 200). As seen in FIG. 8A, the

swivel body 310a has a case hardened armour 182 for added security; in addition, an end of the case hardened armour 182 is used to support the pivot pin 320. The use of the U-frame padlock 300, shown in FIGs. 8B and 8C, is no different from the above U-frame padlock 100a-100e or padlock 200, except that the swivel body 310a is swung in a vertical manner.

[0046] FIG. 8D shows a U-frame padlock 300a according to another embodiment. The U-frame padlock 300a is similar to the above U-frame padlock 300, except that the U-frame padlock 300a has an additional case hardened armour 185 over the mounting body 310b. In addition, the case hardened armour 182 over the swivel body 310a is formed from a sheet metal cut-out so that after forming, the armour is made up a vertical member 183 joined to a horizontal member 184 by a radiused bend, as seen in FIG. 8D; advantageously, the radiused bend between the members 183 and 184 forming an L corner is smooth and does not become a hazard. Preferably, the contiguous edges of members 183 and 184 on both sides at the L corner are welded. After forming into shape, the armour is then case hardened. For illustration, FIG. 8E shows an exploded view of the U-frame lock body 310. The use of the U-frame padlock 300a is similar to that of the above U-frame padlock 300 and is illustrated in FIGs. 8F and 8G.

[0047] FIG. 9A shows a U-frame padlock 400 according to another embodiment. The U-frame padlock 400 also has a threaded bush 170 for securing it to an eye bracket 14 and a slide locking bolt 150, except that a bar 411 pivotally connects a swivel body 410a and a mounting body 410b to form a substantially U-frame body; the swivel body 410a and the mounting body 410b are relatively pivotable about the bar 411, ie. with the swivel axis of the bar 411 being parallel to the longitudinal axis of the locking bolt 150. The use of the U-frame padlock 400 is similar to that of the above U-frame padlocks and is illustrated in FIGs. 9B and 9C.

[0048] FIGs. 11A-11F show a U-shackle padlock 500 according to another embodiment of the present invention. As in the above padlocks, the U-shackle padlock 500 has a threaded bush 170 for securing an arm 155a of a U-shackle bolt 155 to an eye bracket 14 of a gate 10 whilst a lock cylinder housing 512 is slidable on the other arm 155b of the U-shackle bolt 155. Advantageously, when the U-shackle padlock 500 is secured onto the eye bracket 14, the lock cylinder housing 512 is moveable away from the gate passageway to avoid

obstruction or is moved behind the gate to avoid being a hazard to a user, as can be seen in FIG. 11D. As seen in FIGs. 11A-11C, the threaded bush 170 engages with a mounting body 510. Preferably, the mounting body 510 is sized to substantially match the size of the eye bracket 14. In FIG. 11A, the lock cylinder body 512 is shown to be rotated, whilst FIG. 11B shows the lock cylinder body 512 is rotated and aligned with the U-shackle 155 in an unlocked position. FIG. 11C shows the U-shackle padlock 500 is locked. As can be seen in FIG. 11C, a spacing S between the threaded bush 170 and the mounting body 510 is provided to accommodate a thickness of the eye bracket 14, whilst another spacing SS between the threaded bush 170 and the lock cylinder body 512 is provided to accommodate a thickness of a cooperating eye bracket 16 and some clearance gaps. FIGs. 11D-11F show more clearly the mounting of the U-shackle padlock 500 on the eye bracket 14, with the cooperating eye bracket 16 on a moveable leaf 12 of a gate for illustration. As in the above, a proximal end of the U-shackle bolt 155 has a groove 152a in engagement with a cooperating lock catch 160 (not shown in FIGs. 11A-11F) when the U-shackle padlock 500 is locked; preferably, a spring loaded ejector plug 162 is also provided in cooperation with the lock catch.

[0049] FIGs. 12A-12G show a U-frame padlock 600 according to yet another embodiment of the present invention. As in all the above embodiments, the U-frame padlock 600 also has a threaded bush 170 for securing the U-frame padlock 600 to an eye bracket 14, a slide locking bolt 650 and a U-frame body 610. This U-frame padlock 600 is equipped with a motor 666 for wirelessly actuating a rotary lock catch 660 to engage with a lock groove 652 formed on the slide locking bolt 650. Preferably, the rotary lock catch 660 is biased by a torsion spring 668 (which is more clearly shown in FIG. 12F) to a normally lock position (in engagement with the lock groove 652); upon wirelessly activating the motor 666, the rotary lock catch 660 is rotated to an unlock position, for eg., for a predetermined unlock period, after which the motor 666 is deactivated and the torsion spring 668 returns the lock catch 660 to the lock position. Also as shown in the figures, more clearly shown in FIG. 12C, the lock catch 660 is contiguous with a cam 672, which is disposed at an end of a manual lock cylinder mechanism 630; the manual lock cylinder mechanism 630 is actuated by a key 20 through a keyhole 632. With the cam 672, the key 20 allows the U-frame padlock 600 to be unlocked in the event of any malfunction, failure of an electronic board 667 that provides wireless control of the motor 666, or lack of power from a battery 690.

The cam 672 has a cam surface 674, which drives a cam follower 670, with the cam follower 670 forming another part of the lock catch 660.

[0050] To enhance a user friendly feature, a ball-spring detent mechanism 680 is provided to hold the slide locking pin 650 when it is in the lock position; this feature allows a user to operate this U-frame padlock 600 with only one-hand. To release the ball-spring detent mechanism 680 when the U-frame padlock 600 is unlocked, a detent release button 661 is provided at a proximal end of the slide locking bolt 650, so that by depressing the detent release button 661, an ejector plug 662 is being pushed inward, causing a tact switch 665 to become open and the motor 666 remains activated for a set predetermined period, as shown in FIG. 12D; FIG. 12E shows the slide locking bolt 650 is moved to a fully open position. When the user wishes to lock the U-frame padlock 600, the motor 666 is activated to unlock the U-frame padlock 600 and the slide locking bolt 650 is urged to the lock position so that the tact switch 665 becomes closed, which then deactivates the motor 666 and the lock catch 660 is returned to the lock position by the torsion spring 668. The state of locking or unlocking is indicated to the user via an application on an external electronic device (such as, a smartphone application) in wireless communication with the electronic board 667. With this arrangement of the lock catch 660, motor 666, torsion spring 668 and tact switch 665, the motor 666 is turned on for short periods of time only when activated to unlock; this helps to conserve power in the battery 690. Also as in the above embodiments, hardened pins 188 are embedded in the lock body 610 to enhance physical security of the U-frame padlock 600. Whilst a U-frame padlock has been described, lock and unlock of the above padlock with wireless control and an alternate physical key 20 can also be implemented on the above swivel body padlock embodiments.

[0051] In the above embodiments, bodies of the U-frame padlocks are made from solid parts. In another embodiment, FIG. 12G shows a structure of the body 610 being formed by a unitary casting, such as brass or steel. An advantage of this unitary casting is a reduction of material and weight; in areas where strength and rigidity are required, they are provided by ribs, so that strength and rigidity are not compromised.

[0052] While specific embodiments have been described and illustrated, it is understood that many changes, modifications, variations and combinations thereof could be made to

the present invention without departing from the scope of the present invention. For eg., the U-frame body 110 may be made of a hardened-tempered material, such as precipitate hardened brass, aluminium alloy or steel alloy. In addition, the locking bolt 150 or U-shackle bolt 155 and the cooperating catch 160 may be case hardened for added security or longer operating life. In addition, several hardened or case hardened pins 188 are embedded inside the swivel body, the mounting body or lock cylinder body, as illustrated in FIG. 10, to make sawing away of the above padlocks more difficult or to prolong the time for such destruction. In another eg., the above mounting body or lock cylinder housing can also be made from stacked hardened or case hardened metal plates.

CLAIMS:

1. A U-frame padlock comprising:
 - a U-frame body;
 - a locking bolt operable to extend across an opening of the U-frame body; and
 - a threaded bush disposed coaxially with the locking bolt to support and to secure an associated arm of the U-frame body onto an eye bracket at a point of use.
2. The U-frame padlock according to claim 1, further comprising a soft case fittable onto a part of the U-frame body to provide a cushioning effect.
3. The U-frame padlock according to claim 1, wherein the U-frame body comprises an L-shaped swivel body and a mounting body that are connectable by a swivel pin, which swivel axis is substantially perpendicular to a longitudinal axis of the locking bolt.
4. The U-frame padlock according to claim 3, wherein the mounting body comprises a pair of clevises to support the swivel pin.
5. The U-frame padlock according to claim 4, further comprises a detent ball and spring mechanism disposed on an inside face of the mounting body located between the pair of clevises, so that the detent ball engages with a detent depression located on the L-shaped swivel body at predetermined quarter-turn positions between the L-shaped swivel body and the mounting body.
6. The U-frame padlock according to claim 3, wherein the L-shaped swivel body comprises a pair of clevises to support the swivel pin.
7. The U-frame padlock according to any one of claims 3-6, wherein the L-shaped swivel body is made up of two-jointed parts, which are being secured together by a securing pin.
8. The U-frame padlock according to claim 7, wherein the two-jointed parts are connected by one of the following joints: dovetail, tongue and groove, and step connect.

9. The U-frame padlock according to any one of claims 3-5, wherein the L-shaped swivel body is made up of a lock cylinder body attached to a lower body to form an L-shape.
10. The U-frame padlock according to claim 9, wherein the lower body is made up of stacked metal plates.
11. The U-frame padlock according to claim 3, wherein an arm of the L-shaped swivel body is configured as a lower pivot plate.
12. The U-frame padlock according to claim 11, further comprising a pivot plate disposed parallel to but spaced apart from the lower pivot plate.
13. The U-frame padlock according to claim 1, wherein the U-frame body comprises an L-shaped body and a mounting body that are connectable by a swivel pin, which swivel axis is substantially perpendicular to but offset from a longitudinal axis of the locking bolt.
14. The U-frame padlock according to any one of claims 3-13, further comprises a case hardened armour disposed to protect the U-frame body, L-shaped swivel body and/or mounting body.
15. The U-frame padlock according to claim 14, when dependent on claim 12, wherein the case hardened armour supports the swivel pin.
16. The U-frame padlock according to claim 14, wherein the case hardened armour disposed on the L-shaped swivel body is cut out from a sheet metal, formed and bent so that an L corner is radiused before the metal is case hardened.
17. The U-frame padlock according to claim 3, wherein the U-frame body comprises a swivel body and a mounting body that are connectable by an elongate bar, with a swivel axis between the swivel body and the mounting body being along a longitudinal axis of the elongate bar.

18. The U-frame padlock according to any one of claims 1-10, wherein the U-frame body, L-shaped swivel body and/or mounting body is/are made up of stacked plates of hardened or case hardened metal.

19. The U-frame padlock according to any one of the preceding claims, wherein a proximal end of the locking bolt has an annular groove to engage with a cooperating lock catch located in the other arm of the U-frame body.

20. The U-frame padlock according to claim 19, wherein the locking bolt, annular groove and lock catch are hardened or case hardened for added security and longer operating life.

21. The U-frame padlock according to claim 19, further comprising a spring loaded ejector plug disposed in cooperation with the lock catch.

22. The U-frame padlock according to claim 20, where the spring loaded ejector plug comprises a compression spring.

23. The U-frame padlock according to any one of the preceding claims, further comprising one or more hardened or case hardened pins embedded in the U-frame body, L-shaped swivel body, swivel body and/or mounting body for added security.

24. A U-frame padlock comprising:

- a U-shackle bolt;

- a threaded bush disposed coaxially with a first arm of the U-shackle bolt;

- a mounting body disposed coaxially with the first arm of the U-shackle bolt in cooperation with the threaded bush; and

- a lock cylinder housing;

wherein a spacing between the threaded bush and the mounting body is provided to allow the padlock to be mounted onto an eye bracket at a point of use and the lock cylinder housing is slidable on a second arm of the U-shackle bolt to an unobstructed position.

25. The padlock according to claim 24, wherein a proximal end of the U-shackle bolt has a groove in cooperation with a lock catch, with the lock catch being located in the lock cylinder housing.
26. The padlock according to claim 25, further comprising an ejector plug disposed in cooperation with the lock catch.
27. The padlock according to any one of claims 19-23 or claims 25-26, wherein the lock catch is rotatory actuated by a motor, which is wirelessly controlled through an electronic board and an application on an external electronic device.
28. The padlock according to claim 27, further comprising a torsion spring to bias the lock catch to a lock position.
29. The padlock according to claim 27 or 28, wherein a part of the lock catch is configured as a cam follower, which is contiguous with a cam surface formed on a cam, which cam is disposed at a distal end of a cylinder lock mechanism and a physical key provides an alternate locking or unlocking of the padlock when there is a malfunction on the motor, electronic board or external electronic device, or when a battery supplying power to the motor, electronic board or external electronic device becomes low.