

United States Patent

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[54] **PADLOCKS**
7 Claims, 8 Drawing Figs.

[52] U.S. Cl. 70/38 C,
70/53

[51] Int. Cl. E05b 67/22,
E05b 67/06

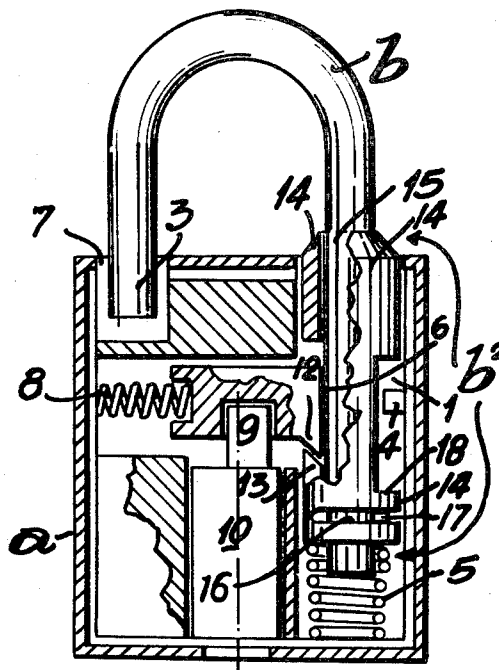
[50] Field of Search 70/38, 38
A, 38 B, 38 C, 39, 24, 26, 41, 42, 43, 45, 46, 47, 53

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ABSTRACT: A padlock includes a housing having a U-shaped locking bolt with a pair of legs extending into the housing. One of the legs is of increased diameter and a recess is defined in the increased diameter portion of the leg which is arranged to receive a movable latching member. The recess and the latching member interlock to prevent inadvertent unlocking of the padlock, except by operation of the operating mechanism of the lock.



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FIG. 1

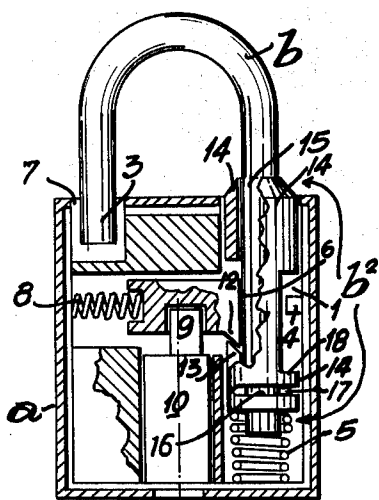


FIG. 2

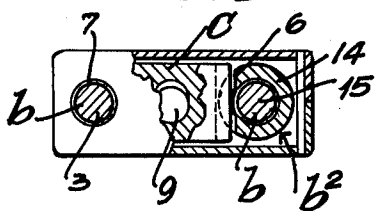


FIG. 3

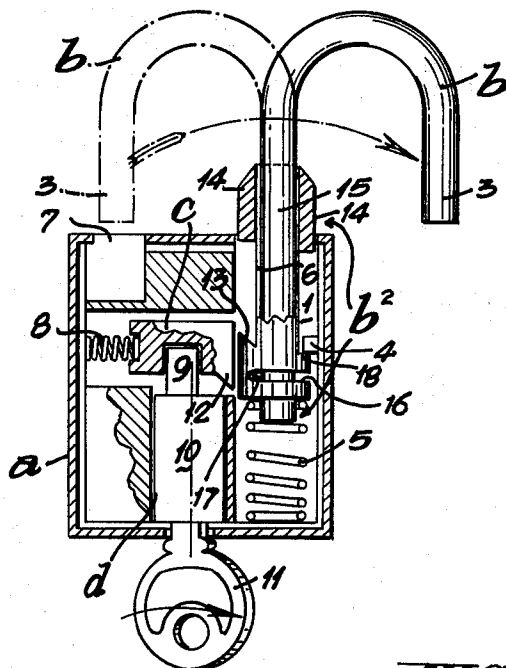
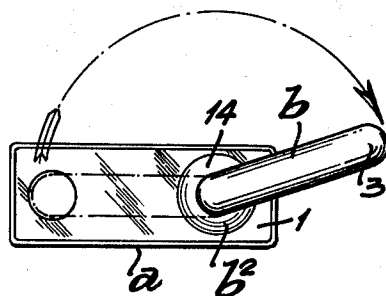


FIG. 4



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FIG. 5

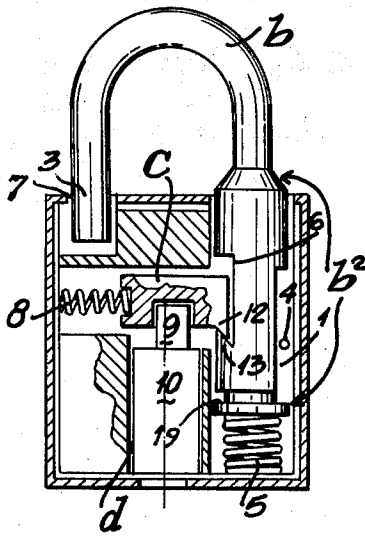


FIG. 7

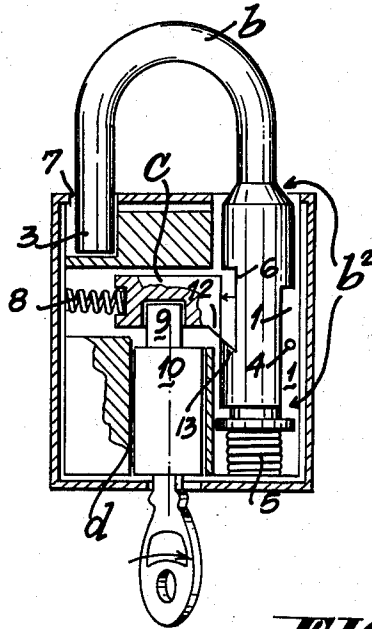


FIG. 6

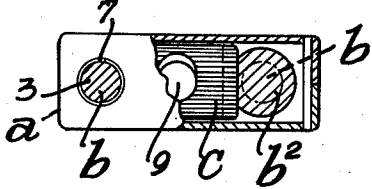
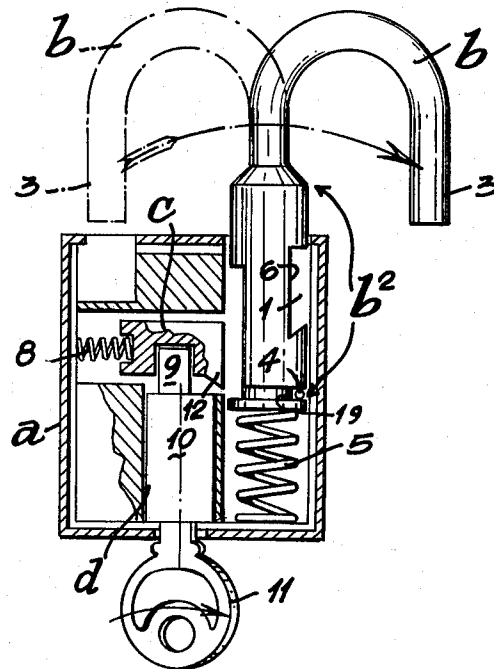


FIG. 8



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PADLOCKS

RELATED APPLICATION

This application is a continuation-in-part of my copending application, Ser. No. 759,865, filed Sept. 16, 1968, now abandoned.

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to padlocks and, more particularly, to padlocks having an improved, strengthened and secure construction.

The known padlock constructions generally comprise a housing into which a U-shaped locking bolt is inserted and locked therein. In the prior locks, the U-shaped locking bolt must be of scarce section in order to pass through the staple or eyebolt of a conventional hasp lock. However, due to the reduced section of the locking bolt of such prior padlocks, deep notches or recesses cannot be formed in the long leg portion of the locking bolt for firmly receiving the latching member of the lock, since deep notches or recesses in the reduced section bolt substantially weaken the lock and subject the lock to tampering and to damage from forceful blows or the like and possible compromise and opening of the lock. Also in the prior padlocks, the pawl or latching means is generally urged toward the latching recess by a spring and if the housing is struck externally, the spring force may be reduced to a point where liberation of the pawl from the recess occurs, causing unlocking of the bolt.

The padlock constructed in accordance with the principles of my invention obviates these disadvantages. In the lock of my invention, the major portion of the U-shaped locking bolt external of the housing is of reduced section so as to be freely and easily received by the hasp elements with which it is to be used, but the section of the bolt internal of the housing is of increased diameter and carries deep latching notches or recesses without reducing the strength of the lock. In the padlock of my invention, the latching notches or recesses may be of increased depth to provide for secure locking of the padlock and yet the increased depth recesses will not detract from the overall strength of the lock. In the padlock of my invention, the latching mechanism is constructed to prevent inadvertent withdrawal from the latching recess in the U-shaped locking bolt in the event of impact to the padlock.

A padlock constructed in accordance with the principles of my invention includes a housing and a U-shaped locking bolt having unequal length legs. The longer of the legs is of enlarged diameter within the housing and a recess is provided in the enlarged diameter portion which receives the latching member of the lock in latching engagement therewith. Limit means cooperates with the enlarged diameter portion of the bolt to limit movement of the longer leg out of the housing.

These and other objects, features and advantages of the invention will become evident upon consideration of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

In the course of this description, the drawings will frequently be referred to in which:

FIG. 1 is a cross-sectioned elevation view of one preferred embodiment of padlock constructed in accordance with the principles of my invention and shown in its locked condition;

FIG. 2 is a plan view of the padlock of FIG. 1 in which a portion of the housing is broken away;

FIG. 3 is a cross-sectioned elevation view of the padlock in FIG. 1 shown in its unlocked condition;

FIG. 4 is a plan view of the unlocked padlock shown in FIG. 3;

FIG. 5 is a cross-sectioned elevation view of a second preferred embodiment of padlock of my invention shown in its locked condition;

FIG. 6 is a plan view of the padlock of FIG. 5 in which a portion of the housing is broken away;

FIG. 7 is a cross-sectioned elevation view of the padlock shown in FIG. 5 in which unlocking has been commenced; and FIG. 8 is a cross-sectioned elevation view of the padlock shown in FIG. 5 in its unlocked condition.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Since numerous components of the padlocks of the embodiments shown in FIGS. 1-4 and FIGS. 5-8 are identical or of similar construction, like reference numerals will be employed to designate substantially like components.

As shown in the drawings, the padlocks of my invention comprise a housing *a* having a U-shaped locking bolt *b* of unequal length legs extendible into the housing. The longer of the two legs carries an enlarged diameter portion, generally designed *b*². The enlarged portion has formed therein a run limit cavity 1 for limiting the movement of the bolt *b* and its shorter leg 3 into and out of the housing. To limit the movement of bolt *b* and prevent complete withdrawal of the bolt from the housing, a projecting butt 4 is carried on the interior of the housing wall to cooperate with cavity 1 during the locking and unlocking of the padlock. A spring 5 is positioned at the lower end of the enlarged section *b*² and exerts an upward force between the bottom wall of the housing *a* and the enlarged diameter portion *b*².

A latching recess 6 of substantial depth is formed in the enlarged diameter portion *b*² to enable the locking of the bolt *b* in its locked position as shown in FIGS. 1 and 5 in which the short leg 3 of the bolt is positioned in and retained in aperture 7 of the housing. A latching pawl or member *c* is urged horizontally toward the latching recess 6 by a spring 8, which extends between the wall of the housing and the latching member. An eccentric 9 is positioned in a groove in the latching member *c* such that rotation of the eccentric by way of the drum 10 of the operating mechanism and a coded device, such as key 11, will effect movement of the latching member *c* against the force exerted by spring 8 into and out of the latching recess 6.

The end of the latching member *c* nearest the latching recess 6 carries a downwardly inclined projecting tooth 12 which cooperates with counterprojecting inclined tooth 13 at the bottom of the latching recess 6. The teeth 12 and 13 cooperate with each other when the lock is in the locked position as shown in FIGS. 1 and 5 to prevent accidental unlatching of the lock as a result of impact to the housing which may diminish the spring force exerted by spring 8. Although movement of the latching member to the left as viewed in FIGS. 1 and 5 is prevented by the interengagement of teeth 12 and 13 in the presence of impact, the teeth present no obstacle to the opening of the lock by way of the key 11, since rotation of the eccentric 9 by the key displaces the latching member to the left and its tooth 12 merely slides upward along the inclined surface of tooth 13 until the teeth are separated from each other, as shown by way of example in FIG. 7.

The major portion of the locking bolt *b* which extends from the housing is of minimum section so that it may readily enter the staple or eyebolt of the hasp or other locking structure with which the padlock is to be employed. However, since the portion of the lock *b*² which carries the latching recess 6 and cavity 1 is of substantially increased section, not only is the latching recess able to be substantially deeper thus effecting more secure latching of the lock, but also the strength of the lock is not reduced and in fact is increased by the presence of the enlarged portion.

Referring now to FIGS. 1-4 in particular, a preferred embodiment of enlarged bolt portion *b*² is shown in which the enlarged portion is formed by way of a tubular bushing 14 in which the reduced diameter longer leg 15 of the bolt *b* is slidably received. The cavity 1 and latching recess 6 are formed in the bushing. A slot 16 is cut through the major diameter of the bushing at its lower end and a key link 17 is fixed to the longer leg of bolt *b* and extends into the slot 16. The slot and key link renders the bolt *b* rotatable within and relative to the bushing as shown in FIGS. 1 and 2, but the bolt

and bushing are fixed to each other for joint longitudinal movement in unison with each other in the housing.

In operation, the padlock is shown in the locked position in FIG. 1 in which the short leg 3 of bolt *b* is received in the aperture 7 and the long leg 15 and bushing 14 are positioned furthest into the housing *a*. In the locked position, the latching member *c* is urged to the right by spring 8, such that the right end of the latching member is positioned in the latching recess 6 with which it is aligned.

To unlock the lock, the key 11 is rotated rotating the drum 10 of the operating mechanism and eccentric 9. Upon rotation of eccentric 9, the latching member *c* is moved to the left against the force of spring 8 causing the inclined surface of tooth 12 to ride upward against the inclined surface of tooth 13 and finally disengage the latching member from the recess 6. Upon disengagement, the bolt *b* moves upward under the influence of spring 5 to the dot and dash line position shown in FIG. 3. Since the bushing 14 is keyed to the longer leg 15 of bolt *b* by way of slot 16 and key link 17, the bushing and bolt move upward together until the butt 4 contacts the lower shoulder 18 of cavity 1, restraining further outward movement of the bolt and bushing. In this position the shorter leg 3 of the bolt *b* is now freed from aperture 7, and the bolt *b* may be rotated within bushing 14 as shown in FIG. 3.

The second preferred embodiment of padlock shown in FIGS. 5-8 is similar in many respects to the padlock shown in FIGS. 1-4, except that the enlarged portion *b*₂ of the locking bolt *b* is formed in integral one-piece association with the longer leg of the bolt. Operation of this embodiment is substantially the same as that previously described, except that the longer leg of bolt *b* and the enlarged portion also rotate in unison with each other. Thus, as the latching member *c* is withdrawn from the latching recess 6, the bolt *b* is urged upward by spring 5 until the lower edge of cavity 1 contacts the butt 4. Since the enlarged portion *b*₂ is formed integral with the remainder of the bolt *b* and is rotatable therewith, a circumferential groove 19 is formed about the lower end of the enlarged portion *b*₂, so as to receive the butt 4 and provide for unrestrained rotation of the bolt *b* when the shorter leg 3 has been withdrawn from aperture 7.

It should be understood that the embodiments of the invention which have been described are merely illustrative of some of the applications of the principles of the invention. Nu-

merous modifications may be made by those skilled in the art without departing from the true spirit and scope of the invention.

I claim:

1. In a padlock of the type including a housing, a substantially U-shaped locking bolt having unequal length legs and a latching member movable into and out of latching engagement with the longer of the two legs of the locking bolt, the improvement comprising in combination therewith:

an enlarged diameter portion on the distal end of said longer leg of a strength substantially greater than the remainder of said bolt,

a recess defined in said greater strength enlarged diameter portion which receives the latching member when the latching member is moved into latching engagement therewith, and

limit means cooperating with said enlarged diameter portion for limiting the movement of the longer leg out of the housing.

2. The padlock of claim 1 wherein said limit means is operable independent of said recess and latching member.

3. The padlock of claim 1 wherein said enlarged diameter portion is formed in integral one-piece relationship with said longer leg.

4. The padlock of claim 1 wherein said enlarged diameter portion comprises an elongated annular bushing which axially receives said longer leg.

5. The padlock of claim 1 wherein said limit means comprises a second recess defined on said enlarged diameter portion and projecting stop means projecting from the housing into said recess.

6. The padlock of claim 1 including means normally urging said latching member into latching engagement with the longer of the two legs and restraining means in said housing to prevent movement of said latching member out of said latching engagement when the force exerted by said urging means is substantially diminished.

7. The padlock of claim 6 wherein said restraining means comprises projecting means in said recess and said latching member includes a projecting member arranged to contact and be restrained by said projecting means when said force is diminished.

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