RAP-PROOF PADLOCK

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The present invention relates to padlocks and has for its particular purpose the provision of a padlock wherein the locking means cannot be released by rapping or tapping the lock body.

Another purpose is to provide a padlock which may be moved with great facility and wherein the padlock body is so formed that the shackle and locking means thereof may be readily inserted therein.

Other objects will be in part obvious and in part pointed out in more detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings:

Figure 1 is a side elevation with the body portion of the lock shown in section and the shackle and locking means shown in full line;

Fig. 2 is a perspective view of a portion of the locking means;

Fig. 3 is a fragmentary perspective view partly in section showing the mounting of the locking pawl;

Fig. 4 is an end view of Fig. 1 as seen from the bottom of the lock; and

Fig. 5 is a fragmentary sectional view of a lock showing a modified form of locking means.

Referring to the drawing, the lock includes generally a casing A, a shackle B, and locking insert C adapted for preassembly and insertable within the casing as a unit. More specifically, the casing A comprises a one-piece lock body 10, of any suitable metal and of any desirable shape; that shown having a raindrop cross section when viewed in plan, this shape not only adding to the appearance of the design but reducing the metal required to a minimum without any sacrifice in strength.

For convenience in manufacture and assembly the body has drilled therein a vertical bore 12 opening from the top and extending part way through the body and a second vertical bore 14 extending throughout the body; the bores 12 and 14 being spaced to respectively receive the short and long legs 16 and 18 of the shackle B. Intermediate of the bores 12 and 14 the body has drilled therein a third vertical bore 20 open from the bottom of the body and terminating at its upper end in a conical end wall 22; the bore 20 being so centered relative to the bore 12 that the two intersect adjacent the top of the body 10.

The bore 20 is drilled to provide a lower portion 22 of greater diameter than the bore proper, and extending upwardly from the portion 22 there are cut diametrically opposite vertical slots 23 in the wall of the bore. Intermediate of the slots 23 there is further cut a circumferential slot 25 opening into the portion 22.

The bore 20 is formed in the manner described to receive and position the locking insert C, which insert comprises a plug 31 of substantially the same diameter as the bore 20 and terminating at its lower end in a radial flange 34 receivable within the enlarged portion 22 of the bore for properly positioning the plug therein. As is common in this type of lock, the plug 32 is provided with a plurality of locking tumblers 33 adapted to be spring pressed into the slot 23 of the bore to hold the plug against rotation until a proper key is aligned within the plug. When a proper key is so aligned, the tumblers will be withdrawn within the plug, thus permitting rotation thereof. In order to limit the rotation of the plug, there is further provided immediately above the flange 34 a stop 35 which, when the parts are assembled, is rotated within the slot 25 of the bore. It is understood, of course, that any type of cylinder lock may be utilized in place of that shown, and as the locking insert C is of well known construction, no further description of the details thereof is necessary for an understanding of the invention herein.

In the present disclosure, however, the plug 32 carries a pair of vertically extending, parallel spaced ears 36 supporting a pivot pin 37 carrying a locking pawl or keeper 39. As indicated, the pawl 40 is provided with a locking hook 42 having a flat downwardly facing shoulder 43 adapted to engage with a flat upwardly facing shoulder 45 of a notch 44 provided in the short leg 16 of the shackle to secure same in locked position; this locking engagement being obtained by rotation of the plug 32 about its vertical axis, whereupon the locking pawl will be rotated simultaneously therewith.

In accordance with the present invention, the pawl 40 is not only rotatable with the plug 32, but is also free to pivot and move vertically relative thereto to allow automatic locking engagement when the pawl lies in the path of the shackle leg. To accomplish this, there is cut in the pawl a pivot pin receiving aperture 46 of larger diameter than that of the pivot pin 37, thus providing a loose and non-contacting fit between the pawl and the pin.

To normally restrain the pawl 40 against pivoting and vertical movement, it is provided with
a curved upper edge 48 adapted to make a two point contact with the conical end 26 of the bore 20, and to hold it in such two point engagement there is arranged between the lower flat edge 50 of the pawl and the top 52 of the plug a spring 54 which normally urges the pawl upwardly.

The spring 54 is shown as being of U type having one leg 56 abutting the top of the plug and the other leg 58 engaged against the lower edge of the pawl, whereby the normal tendency of the spring to expand will maintain the pawl in its uppermost position with its upper edge 46 abutting the conical end 26, thus maintaining the pawl in a substantially fixed position relative to the plug and preventing wobbling thereof. However, with the pawl so mounted, when the shackle is moved to closed position the lower end of the leg 16 will abut against the cam edge 60 of the pawl hook 42, urging the pawl downwardly out of engagement with the wall 26 and pivoting it about the pin 33. This vertical and pivotal movement allows the lower end of the leg 16 to pass beyond same until the notch 64 is aligned with the hook 42, whereupon the spring 54 will function to raise and pivot the pawl into locking engagement. It will also be noted that when the pawl is again raised to locking position it is spring pressed and held in its substantially fixed position with the top edge 48 in engagement with the conical end wall 26, and rapping or tapping of the lock body will not jar the pawl out of locking engagement.

A further advantage of the construction above described is that the locking means C, including the cylinder lock and the pawl, may be manufactured as a unit and thereafter inserted within the bore 20 and secured therein by peening over a circumferential flange 62 provided at the bottom of the bore. As is usual in padlocks, movement of the shackle is accomplished by slidably and rotatively mounting the long leg 16 in the casing. In the embodiment illustrated, this is done by providing the lower end of the leg 16 with a circumferential groove 64 for receiving an expanding retainer 66. This retainer may be mounted by inserting the long leg 16 of the shackle into the bore 14 until the lower end thereof extends through the bottom of the casing and then placing the retainer thereon. Thereafter there is positioned beneath the end of the leg a compression spring 68 held in position by a centrally arranged plug 70 terminating in its lower end in an enlarged flange 72 which also forms the closure for the bottom of the casing. The flange and shackle are retained in place by peening over a circumferential flange 74 provided on the casing at the lower end of the bore 14. To limit the upward movement of the shackle, the lower end of the bore 14 is enlarged to approximately the diameter of the shackle retainer 66 to provide a downwardly facing shoulder 76 against which the retainer will abut when the shackle is urged to an unlocked position.

In the present lock, the spring 68, in addition to normally urging the shackle outwardly, will, when the members are in locked position, also place the locking pawl 40 under substantial upward pressure and further assist in preventing any releasing of the pawl by rapping on the lock body. Moreover, as the locking pawl is held against the conical end wall 26 of the bore, the force placed thereon by the spring 68 and the spring 54 is transferred directly to the casing and no strain is placed on the locking means, thus adding greatly to the strength of the structure and adding to the life of the locking means as it is not subjected to any jars upon the upward motion of the shackle following a closure thereof.

There is shown in Fig. 5 another embodiment of the lock. This embodiment is adapted to the embodiment shown in Figs. 1 to 4 and is added thereto the parts to the embodiment shown in Figs. 1 to 4 have been correspondingly numbered. In this embodiment, the bore 20 terminates at its upper end in a recess 80 to provide a seat for an abutment 82 extending upwardly from the locking pawl 84; the pawl 84 is normally urged to pivotally move the pawl about the horizontal pivot pin 86. The locking of the pawl is similar to that of the previous embodiment, and the spring 54 normally urges the pawl into a position whereby the abutment 82 is seated in the recess 80. The pawl 84 is further shaped to provide a hook 88 having a downwardly depending finger 90, which finger is receivable within a recess 90 provided at the lower end of a notch 92 in the short leg 18 of the shackle B; this arrangement providing an intergripping therewith which further adds to the security of the lock.

As in the prior embodiment, when it is desired to close the shackle with the bolt 84 in its normal locking or latching position, the lower end of the shackle leg 16 will engage against the forward cam surface 94 of the bolt 84, forcing the pawl 84 downwardly against the tension of the spring 54 to release the abutment 82 from the recess 80, whereupon the pawl may then pivot about the pivot pin 86. Upon clearing the finger 90 of the pawl, the spring 54 will again urge the pawl into locking or latching position.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. A padlock, a body having spaced bores open from one end, a shackle mounted in said bores, said body having a bore intermediate of said spaced bores and opened from the other end, and a locking insert within said bore including a locking pawl mounted for vertical, pivotal, and rotatable movement.

2. In a padlock, a body having spaced bores open from one end, a shackle mounted in said bores, said body having a bore intermediate of said spaced bores and opened from the other end, and terminating in a conical end wall, a locking insert wherein the upper edge of said bore including a locking pawl, the upper edge of said pawl being curved to engage the conical end wall of said bore, means supporting said pawl for vertical, pivotal, and rotatable movement, and spring means normally urging the upper edge of said pawl into contact with the conical end to maintain said pawl in substantially fixed position.

3. In a padlock, a body having spaced bores open from one end, a shackle mounted in said bores, said body having a bore intermediate of said spaced bores and opened from the other end,
a rotatable locking insert within said bore, and a locking pawl mounted on said insert for pivotal and vertical movement relative to said insert.

4. In a padlock, a body having spaced bores open from one end, a shackle mounted in said bores, said body having a bore intermediate of said spaced bores and open from the other end, rotatable locking means within said bore, a locking pawl mounted on the upper end of said locking means for pivotal and vertical movement relative to said means, and spring means for normally urging said pawl into engagement with the end wall of the bore for holding said pawl in substantially fixed position.

5. In a padlock, a body having a shackle mounted therein, and locking means for securing said shackle including a pawl, means rotatably supporting said pawl and upon which said pawl is mounted for limited pivotal and vertical movement, cooperating means on said pawl and on said body for restraining said pawl against pivotal movement, and means for normally urging said pawl vertically relative to said supporting means and into engagement with said cooperating means.

6. In a padlock, a body having a shackle mounted therein, locking means for securing said shackle including a pawl, means rotatably supporting said pawl and upon which said pawl is mounted for limited pivotal and vertical movement, cooperating means on said pawl and on said body for restraining said pawl against pivotal movement, and means for normally urging said pawl vertically relative to said supporting means and into engagement with said cooperating means.

7. In a padlock, a body having spaced bores open from one end, a shackle mounted in said bores, said body having a bore intermediate of said spaced bores and open from the other end and provided at its closed end with a recess, a locking insert within said last-named bore including a locking pawl having an abutment extending upwardly from the upper edge thereof, means mounting said pawl for vertical, pivotal, and rotatable movement, and spring means normally urging said pawl to position the abutment within said recess to maintain said pawl in substantially fixed position.

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