

PADLOCK ASSEMBLY

The present invention relates to padlocks generally.

BACKGROUND OF THE INVENTION

A great variety of padlocks are known and cover a wide range of shackle sizes and diameters. Generally speaking, in the prior art, each padlock shackle size and diameter requires a correspondingly sized and configured lock body.

SUMMARY OF THE INVENTION

The present invention seeks to provide a modular padlock assembly which enables a plurality of shackles of differing sizes and diameters to be employed with a single lock body.

There is thus provided in accordance with a preferred embodiment of the present invention, a padlock assembly including a lock body arranged to accommodate in locking engagement a pair of shackle ends having a predetermined opening therebetween and predetermined diameter, a shackle having first and second shackle ends having a desired opening therebetween which is different from the predetermined opening and having a desired diameter which is different from the predetermined diameter, the first shackle end having the predetermined diameter, and an adaptor which is removably mountable onto the lock body and includes a first member of the predetermined diameter which is arranged in lockable engagement with the lock body, a passageway permitting access of the first shackle end into lockable engagement with the lock body and a socket located at a desired separation from the passageway and having a desired interior space which is sized to accommodate the second shackle end of a desired diameter.

Additionally in accordance with a preferred embodiment of the present invention there is provided a padlock adaptor assembly for use with a lock body arranged to accommodate in locking engagement a pair of shackle ends having predetermined opening therebetween and predetermined diameter, the adaptor assembly including a shackle having first and second shackle ends having a desired opening therebetween which is different from the

predetermined opening and having a desired diameter which is different from the predetermined diameter, the first shackle end having the predetermined diameter, and an adaptor which is removably mountable onto the lock body and including a first member of the predetermined diameter which is arranged in lockable engagement with the lock body, a passageway permitting access of the first shackle end into lockable engagement with the lock body and a socket located at a desired separation from the passageway and having a desired interior space which is sized to accommodate the second shackle end of a desired diameter.

In accordance with a preferred embodiment of the present invention, the socket is formed with raised wall portions which resist removal of the second shackle end therefrom.

In accordance with a preferred embodiment of the present invention apparatus is provided for automatically locking the second shackle end in the socket.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be more fully understood and appreciated from the following detailed description, taken in conjunction with the drawings in which:

Fig. 1 is a pictorial illustration of a padlock assembly constructed and operative in accordance with a preferred embodiment of the present invention;

Fig. 2 is a pictorial illustration of the padlock assembly of Fig. 1;

Fig. 3 is an exploded view illustration of the padlock assembly of Fig. 1;

Fig. 4 is an illustration illustrating the modular characteristics of the padlock adaptor assembly of the present invention;

Fig. 5 is a pictorial illustration of the padlock adaptor of the present invention forming part of a vehicle gearshift lock;

Figs. 6A and 6B are respective general and detailed illustrations of an alternative embodiment of the lock of Fig. 2.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is now made to Figs. 1 - 3 which illustrate a padlock assembly constructed and operative in accordance with a preferred embodiment of the present invention. The padlock assembly comprises a lock body 10 which may be of conventional construction, such as model 16 commercially available from MUL-T-LOCK Ltd. of Israel which is conventionally arranged with first and second passageways 12 and 14 arranged to accommodate in locking engagement a pair of suitably notched generally cylindrical shackle ends. Passageways 12 and 14 have a predetermined center-to-center opening "a" therebetween and have a predetermined inner diameter "b" corresponding to a predetermined diameter of cylindrical bodies which can be lockingly engaged therein.

In accordance with a preferred embodiment of the invention, an adaptor 20 is mountable onto the lock body 10 as by screws 22, which engage suitably formed threadings 24 formed in a casing 26 of the lock body 10. The mounting can be removable when the padlock is not in locked engagement with a shackle, or alternatively may be permanent, when suitable fastening techniques are employed.

The adaptor 20 includes a spacer member 28, which is typically a bent-over metal member formed with apertures 30 and 31 corresponding in their diameter and diameter to passageways 12 and 14 and apertures 32 arranged to accommodate screws 22. An optional lock stand 40 may be interposed between the spacer member 28 and the lock body 10 and is also formed with apertures corresponding in size and opening to apertures 30, 31 and 32.

Adaptor 20 also comprises an integrally formed anchor and socket element 42, which includes a first, suitably notched member 44 of the predetermined diameter "b" which is arranged to seat in passageway 14 in lockable engagement with the lock body 10.

Element 42 includes a generally planar member 46, integrally formed with member 44 and extending generally perpendicularly thereto. Planar member 46 is formed with an aperture which has predetermined diameter "b" and whose center is spaced from the center of member 44 by the predetermined opening "a". Planar member 46 also includes apertures 49 which corresponds in size and opening to apertures 32 in spacer member 28, for accommodating screws 22.

Element 42 also comprises an integrally formed socket portion 50 which is arranged to retain a shackle end at a desired opening from passageway 12. It is a particular feature of the present invention that the opening between the socket portion 50 and passageway 12 may be selected to be greater or lesser than the opening "a". In this manner, adaptor 20 enables shackles of different sizes to be used with a single lock body 10.

Socket portion 50 may have an inner diameter which may be less than, equal to or greater than "b". A shackle 60 having a desired diameter "c" which may be larger than diameter "b" and having an end-to-end opening "d" which corresponds to the opening between the socket portion 50 and passageway 12, is arranged for locking engagement in lock body 10. The shackle 60 is formed with first and second shackle ends 62 and 64. Shackle end 62 is arranged to have an outer diameter which does not exceed "b",

inasmuch as it is intended to be lockably received in passageway 12. Shackle end 64 has an outer diameter "e" which cannot exceed the inner diameter of the socket 50. Figs. 6A and 6B illustrate an alternative embodiment of the present invention wherein the end 64 of the shackle 60 and the socket portion 50 are formed with a self-locking mechanism which prevents forced disengagement of end 64 from socket portion 50 by bending of shackle 60.

The self-locking mechanism of Figs. 6A and 6B includes a locking ball 80 which is disposed at an outward facing end 82 of a transverse bore 84 formed in shackle end 64. A piston 86 is disposed in a bore 88 which extends perpendicularly to and intersects with bore 84 and constrains the ball 80 to remain at end 82 of bore 84. Piston 86 is retained in bore 88 by a retaining ring 89, which engages a shoulder 90 formed on the piston between a relatively narrower forward portion 92 and a relatively thicker central portion 94 thereof.

The piston 86 is urged in a forward direction, i.e. downward in the sense of Figs. 6A and 6B by a spring 96, such that when piston 86 is free to extend beyond the extreme end 98 of shackle end 64, such that shoulder 90 engages retaining ring 89, the ball engages a relatively narrower rear portion 100 of the piston and is permitted to be seated entirely within the cylindrical confines of shackle end 64. In such an orientation, shackle end 64 can readily pass the top portion of wall 102 and enter the socket portion 50.

Once the shackle end 64 is seated in socket portion 50, as seen in Fig. 6B, the forward edge of the piston 104 engages

the flow of socket portion 50, forcing piston 86 but against spring 96 and causing the relatively thicker central portion of the piston against ball 80. In this orientation, ball 80 is forced to extend in locking engagement with a recess 108 formed in wall 102 of socket portion 50.

The height of the recess 108 is selected such that when shackle 60 is withdrawn from socket portion 50 by movement thereof along a longitudinal axis 110, movement of the piston 86 is sufficient to release ball 80 to move away from recess 108 before ball 80 prevents disengagement of the shackle end 64 from socket portion 50.

Should, however, the shackle be forced, as by bending thereof, the movement of the piston will not be sufficient to release ball 80 and ball 80 will assist in locking shackle end 64 in socket portion 50.

Fig. 4 illustrates the modular nature of the adaptor arrangement of the present invention, and shows how a plurality of shackles of differing opening and diameters may be locked by the same lock body.

Fig. 5 illustrates the use of a padlock assembly of the type described in Figs. 1 - 4, 6A and 6B used as a gearshift lock, particularly where the gearshift lever has a diameter which is larger than that which can be accommodated by a shackle having end-to-end opening corresponding to that of the lock body.

It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described hereinabove. Rather the scope of the present invention is defined only by the claims which follow:

CLAIMS

1. A padlock assembly including a lock body arranged to accommodate in locking engagement a pair of shackle ends having predetermined opening therebetween and predetermined diameter, a shackle having first and second shackle ends having a desired opening therebetween which is different from said predetermined opening and having a desired diameter which is different from said predetermined diameter, said first shackle end having said predetermined diameter, and an adaptor which is removably mountable onto the lock body and including a first member of said predetermined diameter which is arranged in lockable engagement with the lock body, a passageway permitting access of said first shackle end into lockable engagement with the lock body and a socket located at a desired separation from the passageway and having a desired interior space which is sized to accommodate said second shackle end of a desired diameter.

2. A padlock adaptor assembly for use with a lock body arranged to accommodate in locking engagement a pair of shackle ends having predetermined opening therebetween and predetermined diameter, the adaptor assembly including:

a shackle having first and second shackle ends having a desired opening therebetween which is different from the predetermined opening and having a desired diameter which is different from the predetermined diameter, the first shackle end having the predetermined diameter, and

an adaptor which is removably mountable onto the lock



body and including a first member of the predetermined diameter which is arranged in lockable engagement with the lock body, a passageway permitting access of the first shackle end into lockable engagement with the lock body and a socket located at a desired separation from the passageway and having a desired interior space which is sized to accommodate the second shackle end of a desired diameter.

3. Apparatus according to either of the preceding claims and wherein the socket is formed with raised wall portions which resist removal of the second shackle end therefrom.

4. Apparatus according to any of the preceding claims and also comprising means for mounting the lock body onto a vehicle for lockable engagement with the gear shift lever thereof.

5. A gear shift lock assembly including a lock body mountable onto a vehicle and arranged to accommodate in locking engagement a pair of shackle ends having predetermined opening therebetween and predetermined diameter, a shackle having first and second shackle ends having a desired opening therebetween which is different from said predetermined opening and having a desired diameter which is different from said predetermined diameter, said first shackle end having said predetermined diameter, and an adaptor which is removably mountable onto the lock body and including a first member of said predetermined diameter which is arranged in lockable engagement with the lock body, a



passageway permitting access of said first shackle end into lockable engagement with the lock body and a socket located at a desired separation from the passageway and having a desired interior space which is sized to accommodate said second shackle end of a desired diameter.

6. Apparatus according to any of the preceding claims and also including means for automatically locking said second shackle end in said socket.

7. A padlock assembly including a lock body, substantially as hereinbefore described with reference to the accompanying drawings.

