

(21) Application No: **0612517.3**
(22) Date of Filing: **23.06.2006**
(30) Priority Data:
(31) **0512919** (32) **24.06.2005** (33) **GB**

(51) INT CL:
E05B 67/22 (2006.01) **E05B 47/06** (2006.01)
G07C 9/00 (2006.01)

(52) UK CL (Edition X):
E2A ABC ACPD ACPX ALV A101 A106 A118 A160

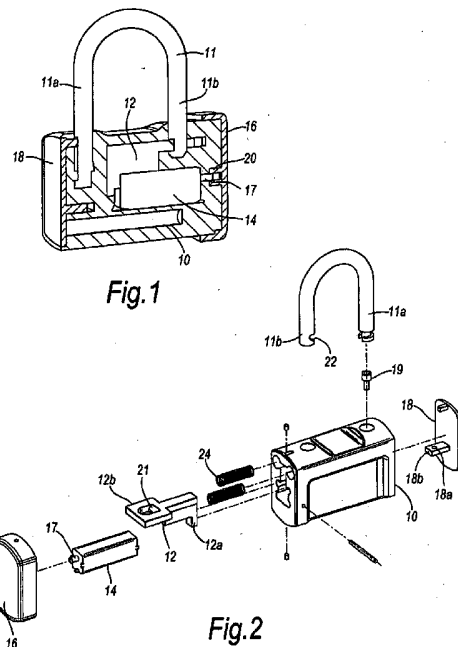
(71) Applicant(s):
PBT (IP) Limited
(Incorporated in the United Kingdom)
1 Astra Centre, Edinburgh Way, HARLOW, Essex,
CM20 2BN, United Kingdom
(72) Inventor(s):
Simon Powell
(74) Agent and/or Address for Service:
A A Thornton & Co
235 High Holborn, LONDON, WC1V 7LE,
United Kingdom

(56) Documents Cited:
GB 2184774 A **EP 1205885 A1**
WO 2004/077473 A **WO 1997/025503 A**
JP 080068245 A **US 6898952 A**
US 6792779 A

(58) Field of Search:
UK CL (Edition X) **E2A**
INT CL **E05B**
Other: **WPI, EPODOC**

(54) Abstract Title: **Electronic portable securing device**

(57) The present invention provides a portable electronic securing device having a lock body 10 and a hasp 11 to be latched into the lock body. The securing device comprises a mechanically operable release button 16 fitted to the lock body, which is electrically controlled by a locking control device 14 such that the release button triggers the release the hasp from the lock body only if successful authentication is provided by the locking control device 14. An unlock signal sent to device 14 enables action of a plunger 17 on latch element 12 to disengage from the hasp 11. Various means such as biometric scanning, numeric key-codes or RF tags may be used to provide validation codes for the release signal sent to device 14. The device 14 is preferably a piezo-ceramic mechanism.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This is a reprint to rectify errors introduced in the course of reproduction-Correct Text and Figs printed-18.02.2009

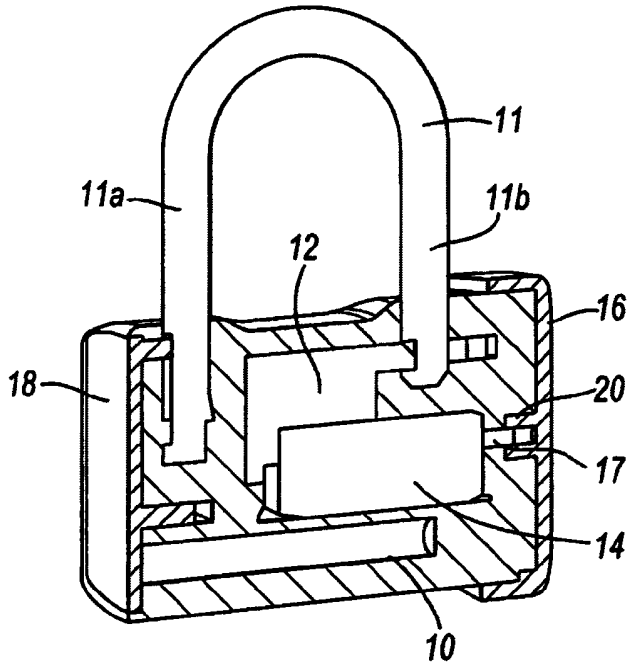


Fig. 1

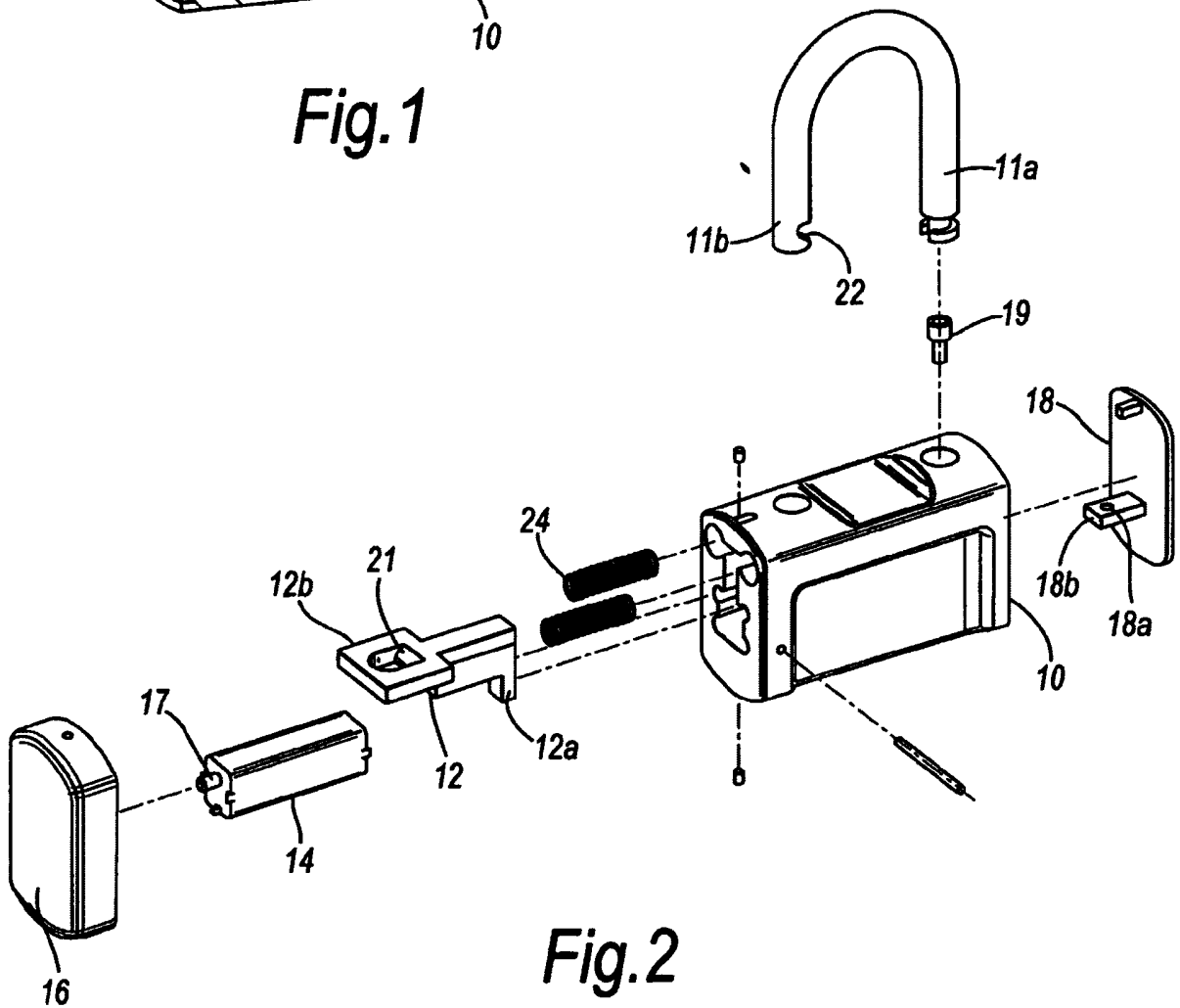
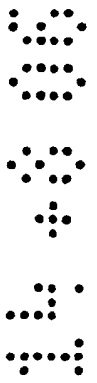


Fig. 2



Electronic Securing Device

The present invention relates to an electronic securing device and more particularly a portable electronic securing device.

5

Portable securing devices in the form of padlocks have been known for a considerable number of years but more recently keyhole-less electronic padlocks have been contemplated and one such lock is disclosed in GB-A-2184774. In this prior proposal, a traditional "hoop" style padlock has been utilised and the basic functionality is the same of that as a conventional key/cylinder base padlock. After successful authentication, the user is able to lift the hoop which is free to pivot once unlocked. Locking and unlocking is achieved by means of a solenoid and this necessitates some considerable power which is difficult to supply given the "go-anywhere" nature and long in-service life of such a product.

15

It is proposed to utilise a piezo ceramic controlled latching mechanism for latching the hoop to the body of the securing device.

20

Preferably, the piezo ceramic latching device is as described in our co-pending application WO 2004/077473.

25

In order for the present invention be more readily understood, an embodiment thereof will now be described by way of example with reference to the accompanying drawings in which: -

Fig. 1 shows a perspective sectional view of a portable securing device according to the present invention;

Fig. 2 shows an exploded view of the device shown in fig. 1.

30

The preferred embodiment of the present invention takes the form of an electrically controlled, mechanically latched portable locking device which looks similar to a conventional padlock insofar as it has a main body and a movable

hoop or hasp. The basic functionality is the same as that as a conventional key/cylinder based padlock but the present invention proposes to dispense with a conventional key and keyhole and to utilise a key hole-less construction.

5 This basic construction is capable of a number of functional modifications and this should be kept in mind when considering the following description of the preferred embodiment. We propose to provide a release button which, after successful authentication of an input code can be operated by a user to free the hasp from the lock body. To relock, the user simply pushes the hasp down into the lock
10 body. As with conventional padlocks, in order to make the product more convenient the hoop is free to pivot once unlocked and free of the lock body.

Turning now to the drawings, the same reference numerals are used throughout to refer to the same parts. The portable securing device comprises a lock body
15 10 and a hoop member or hasp 11 which is adapted to be latched into the body 10. As is conventional, a first leg 11a is mounted in the body 10 such that it is capable of axial movement during the locking and relocking procedure as well as pivotal movement once the hasp 11 has been unlocked and a second leg 11b is free of the lock body.

20

The hasp 11 is locked into the lock body by means of a latch blade 12 which is moveable towards and away from the leg 11b under the control of an electrically operated locking control device 14. The locking control device 14 includes a plunger 17 and acts as an electrically operated clutch which can one condition
25 will transmit a mechanical force applied to one end of the plunger so as to cause movement of the latch blade 12 while in another condition does not transmit a mechanical force applied to the plunger. Mechanical force is applied to the plunger by means of a release button which in this case takes the form of a moveable end cap 16.

30

We currently prefer to utilise the Servocell Active Latch 2 (AL2) the basic operation of which is described in WO 2004/077473. In AL2 a plunger and a

pawl is comprised in a housing , the pawl being engagable with the plunger. A electrically controlled piezo ceramic actuator is provided for moving the pawl towards the plunger. The advantage of using the Servocell Active Latch 2 product is that although it comprises an electrically controlled piezo ceramic actuator, this
5 is located within the plunger itself and so only simple electrical connections are required to be made to the device.

All of the electronic components required by securing device of the present invention as well as the locking control device 14, including batteries, are located
10 within the lock body and are concealed under an end plate 18 which is fixed to the lock body 10 by means of a screw 19 hidden under the first leg 11a of the hasp 11 which engages in a hole 18a in a projection 18b on the end plate. Access to this screw is achieved by unlocking the hasp, rotating it by 180° and pulling it free of the lock body.

15

The release button 16 is a close fit to the lock body 10 with its travel guided/limited by steel pins pushed into the button which fit into slots cut into the top and the bottom of the lock body. Damage to the locking control device 14 through application of excessive force while in the locked state is prevented by a
20 feature on the release button which is best seen in Fig. 1. The button 16 engages the plunger 17 of the device 14 by means of a structure 20 which can be in the form of fingers which will deform and slide over the plunger 17 before the force applied to the button 16 reaches the maximum permissible load on the device 14. A sprung C-clip could be fixed about the fingers 20 to prevent
25 permanent deformation.

The latch blade 12 has a portion 12a arranged to be contacted by the plunger 17 and is provided with a slotted portion 12b which is arranged to receive the second leg 11b of the hasp 11 and to hold the hasp in the latch body by means of a
30 projection 21 entering a recess 22 in the end of the leg 11b. The latch blade 12 is resiliently biased to the latched position and in this case this is achieved by

means of two springs 24. Although two springs have been shown, one larger spring can be used if desired.

In operation, the portable locking device has two distinct stable states. In the
5 locked state, depending on the access control system utilised, there is the potential for the device to draw no or very little power in the locked state when the device is locked there is no power consumption from the Servocell active latch 2 device. When the release button is depressed, its stroke is limited by the device 14 and the lock will not open. If the button is forced, the fingers 20 will deform
10 about the plunger 17 and whilst the button will depress the lock will remain closed.

In order to unlock the device, on successful user authentication, a signal is sent to the driver circuit for the device 14 which is then powered for a limited duration
15 which could potentially be varied by the user or manufacturer. With the locking control device 14 powered, as the release button is depressed, the plunger 17 is pushed into the lock body. The plunger in turn pushes against the latch blade 12 against the action of the springs 24 which releases the blade from the recess 22 in the hasp 11. In this way the hasp is capable of being moved out of the latch
20 body. This outward movement may be spring assisted if desired. To reset the lock, the hasp is pushed back into the body until the latch blade clicks into place with the projection 21 in position in the recess 22. This will happen regardless of the electronic state of the device 14.

25 It will be appreciated that there has been no description of a device or process by which to input and verify a code to the locking device in order to commence the unlocking process. This is deliberate in view of the fact that there are many suitable arrangements which may be utilised. It is envisaged that access control systems such as biometric scanning, numeric key-codes and RFID tag system
30 etc. may be used for the securing device.

Modifications to the above constructions are, of course, possible and one such modification would be to remove the need for the use of a release button by utilising a spring loaded hasp and a suitably shaped projection and recess arrangement for retaining the hasp in the lock body. This, of course, would require careful design of the relative spring forces. Further, rather than having the device battery powered it may be possible to utilise a form of remote, non-contact code input device which could also inductively provide power temporarily to the locking device during the unlocking operation.

Claims

1. A portable electronic securing device having a lock body (10) and a hasp (11), being adapted to be latched into the lock body (10); said portable electronic
5 securing device comprising:
 - a mechanically operable release button (16) fitted to the lock body (10) for triggering the release the hasp (11) from the lock body (10) , said release button (16) being electrically controlled by a locking control device (14) .
- 10 2. A device as claimed in claim 1 wherein the release button (16) when mechanically depressed, is enabled to come in contact with a plunger (17) which is adapted to push against a latch blade (12) provided for releasing the hasp (11).
3. The device as claimed in claims 1 and 2 further comprising deformable
15 finger structure (20) provided on the inner surface of the release button (16), said finger structures (20) being arranged to slide over the plunger (17) when an external force applied to the release button (16) exceeds a permissible limit.
4. The device as claimed in claim 1 wherein the hasp (11) is provided with a
20 first leg (11a) connected to the lock body (10) capable of axial and pivotal movement, and a second leg (11b) adapted to be latched into an opening provided on the top of the lock body (10).
5. The device as claimed in claims 1 to 4 wherein the latch blade (12) is
25 connected to a spring (24) provided to hold the latch blade (12) in position and to facilitate the movement of the latch blade(12) towards and away from leg (11b).
6. The device as claimed in claims 1 to 5 , wherein the latch blade (12) comprises an extended portion (12a) arranged to be contacted by the plunger
30 (17) and a slotted portion (12b) arranged to receive the second leg (11b) of the hasp (11), said slotted portion (12b) being provided with a projection (21) arranged to enter a recess (22) provided on the lower end of the leg (11b).

7. The device as claimed in claim 3, wherein a spring clip is provided between the finger structures (20) to avoid excess and/or permanent deformation.
- 5 8. The device as claimed in claims 1 to 7, wherein the locking control device (14), latch blade (12) and spring (24) are comprised within the lock body (10) and are held in place by an end plate(18), said end plate (18) being engaged to the first leg (11a) of the hasp(11) via a hole (18a) provided on a projection (18b) on the end plate (18), the end plate being attached to the lock body (10) by means
10 of a screw (19) provided under the leg (11a).
9. The device as claimed in claims 1 to 8, wherein the locking control device (14) is arranged to enable the release button (10) to trigger the release of the leg (11b) of the hasp (11) only when a successful user authentication signal is sent
15 from an access control system provided for the device.
10. The device as claimed in claims 1 to 9 wherein said locking control device (14) is a piezo-electric ceramic actuator.
- 20 11. The device as claimed in claims 1 to 10 wherein power required for operating the locking control device (14) is derived from a battery provided within the lock body (10).
- 25 12. The device as claimed in claims 1 to 10 wherein power required for operating the locking control device (14) is derived from a remote source.
13. The device as claimed in claim 9 wherein said access control system is present on the lock body (10).
- 30 14. The device as claimed in claim 9 wherein said access control system is a remote device.

15. The device as claimed in claims 1 to 14 wherein the device is a portable electronic padlock.



For Innovation

Application No: GB0612517.3

Examiner: Philip Silvie

Claims searched: 1-15

Date of search: 29 September 2006

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X,Y	X: 1, 2, 4, 9, 15 at least; Y: 10, 13, 14	JP 08068245 A (RHYTHM WATCH) see figs. 1, 2 and WPI Abstract Accession No.1996-197050[20]
X,Y	X: 1, 2, 4, 9, 15 at least; Y: 10, 13, 14	US 6792779 A (SHEN) see fig. 2
X,Y	X: 1, 4, 9, 15 at least; Y: 10, 13, 14	WO 97/25503 A (SUPRA) see figs. 7-10
Y	14	GB 2184774 A (WAITROSE) see fig. 1
Y	14	EP 1205885 A1 (ASTRA) see fig. 2 and WPI Abstract Accession No. 2002-501954[54]
Y	13	US 6898952 A (EZ TREND) see figs 1, 3
Y	10	WO 2004/077473 A (PBT) see fig. 1

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :