



(51) International Patent Classification:

E05B 65/52 (2006.01) *E05B 67/00* (2006.01)
A44B 19/30 (2006.01) *E05B 49/00* (2006.01)

(21) International Application Number:

PCT/AU2016/050733

(22) International Filing Date:

11 August 2016 (11.08.2016)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2015903230 12 August 2015 (12.08.2015) AU

(71) Applicant: AIRBOLT PTY LTD [AU/AU]; 59 Yarra Valley Boulevard, Bulleen, Victoria 3105 (AU).

(72) Inventors: **SIDHU, Kabir Singh**; 59 Yarra Valley Boulevard, Bulleen, Victoria 3105 (AU). **BAKER, Lee Andrew**; 6 Erval Avenue, Preston, Victoria 3072 (AU). **BAYLY, Mark Simon**; 26 Heacham Road, Eltham, Victoria 3095 (AU). **FOX, Andrew Robert**; 1 Ashton Road, Ferntree Gully, Victoria 3156 (AU). **ROSEVEAR, Michelle Lisa**; 65 Ormond Road, Moonee Ponds, Victoria 3039 (AU).

(74) Agent: **DAVIES COLLISON CAVE PTY LTD**; Level 15, 1 Nicholson Street Melbourne, Melbourne, Victoria 3000 (AU).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

[Continued on next page]

(54) Title: PORTABLE ELECTRONIC LOCK

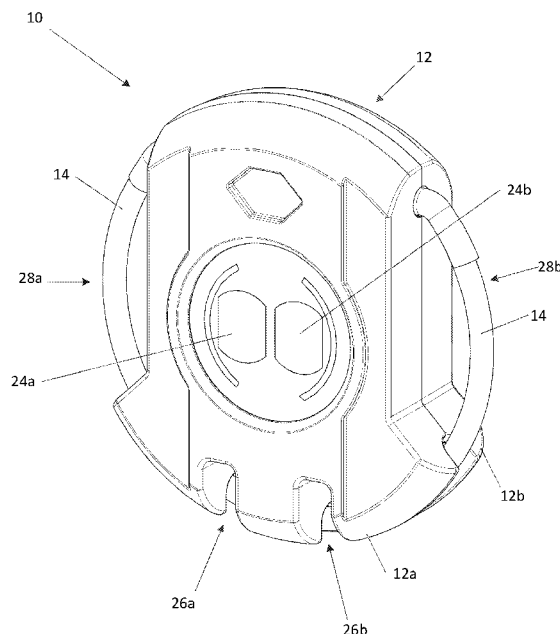


Figure 1

(57) Abstract: A portable electronic lock for luggage, comprising: a housing and a securement member in cooperation with the housing to secure an item to the lock; a locking mechanism in the housing in communication with the securement member to releasably secure the securement member to the housing; a communications module in the housing for operating the locking mechanism to release and secure the securement member in response to a wireless signal; and a secondary release system for releasing the locking mechanism, wherein the secondary release system is selectively operable by a user.





(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE,

SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

PORTABLE ELECTRONIC LOCK

FIELD OF THE INVENTION

- 5 The present invention relates to a portable electronic lock. More particularly, but not exclusively, the invention relates to a portable electronic lock for luggage.

BACKGROUND OF THE INVENTION

- 10 It is desirable to lock luggage when travelling, especially during air travel, to prevent unauthorised access to a person's luggage. Not only is theft a concern, but the insertion of restricted or illegal items to be smuggled into another country. Although unauthorised access is highly undesirable, it can be desirable to provide access to other users whom require access to the luggage.

15

Luggage locks are preferably simple to use and as luggage locks are generally used infrequently they can be hard to find, as can be keys for unlocking. Although combination locks have also been proposed, it can also be difficult to remember the combination.

- 20 Also, losing luggage and a lock is a common problem and some previously proposed luggage locks have also been unreliable. Furthermore, it can be desirable to selectively permit access to a luggage lock to other people.

Examples of the invention seek to solve, or at least ameliorate, one or more disadvantages
25 of previous luggage locks and/or to provide a simplified process for locking luggage.

SUMMARY OF THE INVENTION

- According to one aspect of the present invention, there is provided a portable electronic
30 lock for luggage, comprising:

- 2 -

a housing and a securement member in cooperation with the housing to secure an item to the lock;

a locking mechanism in the housing in communication with the securement member to releasably secure the securement member to the housing;

5 a communications module in the housing for operating the locking mechanism to release and secure the securement member in response to a wireless signal; and

a secondary release system for releasing the locking mechanism, wherein the secondary release system is selectively operable by a user.

10 According to a preferred embodiment, the secondary release system is operable on insertion of a key into a receptacle in the housing. Preferably, operation of the secondary release system generates an electrical signal for releasing the locking mechanism.

According to another aspect of the present invention, there is provided a portable
15 electronic lock for luggage, comprising:

a housing and a securement member in cooperation with the housing to secure an item to the lock;

a locking mechanism in the housing in communication with the securement member to releasably secure the securement member to the housing;

20 a communications module in the housing for operating the locking mechanism to release and secure the securement member in response to a wireless signal; and

at least two buttons on the housing, the buttons operable for manually releasing the locking mechanism on performance of a predetermined unlocking sequence.

25 In this aspect, the lock further can comprise a secondary release system for releasing the locking mechanism, wherein the secondary release system is selectively operable by a user.

According to preferred embodiments, the securement member is a cable, an end of which
30 is secured within the housing on operation of the locking mechanism. In some

- 3 -

embodiments, the housing can include an indentation in which an intermediate portion of the cable can be received when in a secured condition.

Preferably, the locking mechanism includes an electric motor operable to bring a locking
5 pin into engagement with an end of the securement member to secure it within the housing.
Preferably, the communications module is configured for operation using a Bluetooth
protocol.

Preferably, the locking mechanism is operable when in close proximity with a paired
10 mobile device and, more preferably, the locking mechanism is operable only when a
passcode has been entered into the paired mobile device.

In some embodiments, the location of the lock can be determined through communication
with an unpaired mobile device. The lock may further include an alarm operable when the
15 lock moves outside a predetermined boundary.

The lock can further include an indicator for locating the lock. Preferably, the indicator
provides an audible or visible indication. Preferably, the housing has slots formed therein,
in which ends of zippers can be received to secure the zippers together within the housing.
20

Preferably, the lock can be configured to be operable in response to wireless signals from
more than one device.

BRIEF DESCRIPTION OF THE DRAWINGS

25

Preferred embodiments of the invention will be further described, by way of non-limiting
example only, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a lock of one embodiment of the invention;

Figure 2 is a rear view of the lock;

30 Figure 3 is a bottom view of the lock;

Figure 4 is an exploded view of the lock;

- 4 -

Figure 5 is a front view of the lock in a second condition of use; and
Figure 6 is a front view of another lock in a second condition of use.

DETAILED DESCRIPTION

5

Figure 1 illustrates a portable electronic lock 10 in accordance with a preferred embodiment of the present invention. The lock 10 is configured for use with luggage, in particular, locking ends of zippers together to prevent unauthorised access to a users luggage.

10

The lock 10 comprises a housing 12, formed in two parts 12a, 12b and which is preferably waterproof and shockproof, and a securement member 14 in cooperation with the housing to secure an item to the lock 10. The lock 10 also comprises a locking mechanism 16 in the housing 12 in communication with the securement member 14 to releasably secure the
15 securement member 14 to the housing 12, and a communications module in the housing 12 for remotely operating the locking mechanism 16 (refer Figure 4) to release and secure the securement member 14.

The locking mechanism 16 may be protected by forward and rear covers 15a and 15b. To
20 assist with assembly, the lock 10 may include assembly pin 42.

In some embodiments, the lock 10 includes an override system or secondary release system 20 for releasing the locking mechanism 16, wherein the secondary release system 20 is selectively operable by a user. The secondary release system 20 is operable on
25 insertion of a key into a receptacle 22 in a rear portion 12b of the housing 12, as illustrated in Figure 2. In a preferred form, the secondary release system 20 is configured to be operable on insertion of a master key of the United States Transport Security Administration (TSA) to allow use of the lock 10 for travel to/from or within the United States or other countries using similar travel regulations and TSA approved locks. In
30 contrast to earlier proposed locks, operation of the secondary release system 20 by insertion of the key generates an electrical signal for releasing the locking mechanism 16.

- 5 -

So that the secondary release system 20 can be selectively operable by a user, the lock 10 is programmable so that in one mode of operation the secondary release system 20 can be used to release the locking mechanism 16 and in another mode of operation, use of the secondary release system 20 will not release the locking mechanism 16. The secondary
5 release system 20 operates via an electrical contact that is closed on insertion and/or rotation of a TSA master key in the barrel. In one form a displaceable pin is inserted into the barrel and in another form an arm protrudes from the barrel for contacting and closing a contact or operating a micro switch so that insertion of a TSA master key and rotation of the barrel will provide a signal to release the locking mechanism. By configuring the lock
10 10 in this way, a user can select the desired level of security and whether or not they wish for the TSA to have access to the lock 10. Also, by configuring the lock 10 in this way the lock 10 cannot be opened by using the barrel to pick the lock and gain unauthorised access. It will be appreciated that in addition to a master key, the TSA may be provided on the lock 10 with an electronic master device such as a key fob for example.

15

In some embodiments, the lock includes at least two buttons 24a, 24b on the housing 12, in particular on a front face 12a of the housing. The buttons 24a, 24b form part of a button assembly 25, which is covered by a membrane seal 27 to prevent water intrusion into the housing 12. The buttons 24a, 24b are operable for manually releasing the locking
20 mechanism on performance of a predetermined unlocking sequence, which may be pre-programmed by a user. In one example, the predetermined locking sequence includes the order of pressing the buttons, either together or individually, and in other examples the length of time that the buttons are pressed is a feature of the predetermined locking sequence. It will be appreciated that more than two buttons may be provided for a user to
25 input an unlocking sequence and unlock the lock 10. In other embodiments, the lock 10 may be voice activated, using Siri/Amazon to control unlocking.

In the illustrated embodiments, the securement member 14 is a cable, an end 14b of which is secured within the housing 12 on operation of the locking mechanism 16. In the
30 illustrated embodiments, the securement member 14 is in the form of a cable or wire rope, though it will be appreciated that other forms of securement member may be used, such as

- 6 -

a rigid member. Also, when the securement member 14 is in the form of a cable, the lock may be configured so that the length of the cable can be extended when in an unlocked configuration. In the illustrated embodiments, a first end 14a of the cable is secured within the housing 12 by a generally circular plug that allows rotation of the first end 14a though
5 not removal. A second end 14b of the cable is releasably secured within the housing 12. To achieve this, the locking mechanism 16 includes an electric motor 17 operable to bring a locking pin 19 into engagement with an end 14b of the securement member 14 to secure it within the housing 12.

10 On releasing of end 14b, the securement member 14 can be removed from the housing 12 and used to secure the lock to an item or to secure a number of items together. For example, the lock 10 may be used to secure ends of a zippers together to prevent unauthorised access to a travel bag, in which case once released the now free end 14b
15 would be passed through apertures in the zipper ends so that once the free end 14b has been resecured within the housing, the zippers are secured together. In the illustrated embodiment, the housing 12 has slots 26a, 26b formed therein, in which ends of the zippers can be received, though it will be appreciated that side portions 28a, 28b of the securement member 14 may also be used to secure differently sized items such as tags or fabric loops. As can be seen in Figure 3, the housing 12 includes an indentation 30 in
20 which an intermediate portion of the cable 14 can be received when in a secured condition. In an alternative method of use, the cable 14 may be secured without resting in the indentation 30 so as to secure larger items, such as bicycles or other sporting/leisure equipment. Such conditions of use are shown in Figures 5 and 6. In an alternative form of the lock 10, so as to provide additional flexibility and securing, the housing 12 may be
25 formed with a notch 44 in which a recess is formed for receiving the cable.

The communications module is integrally formed within a PCB board 18 and is configured for operation using a Bluetooth protocol, preferably a Bluetooth protocol 4.0 or above, such as Bluetooth 4.2 low energy protocol for example, although it will be appreciated that
30 other wireless communication protocols may also be used. The lock 10 is configured so that the locking mechanism 16 is operable when in close proximity with a paired mobile

- 7 -

device. To achieve this, the mobile device is preferably a mobile phone having software installed, which may be in the form of an App, that facilitates the synchronisation between the lock 10 and the mobile device for operation of the lock 10 from the mobile device. To prevent unauthorised use, encryption of communication data may be used. In one form, the lock 10 operates in the following manner, when a user clicks a button on the lock 10, it looks for a security key on the mobile device and, if they match, the lock 10 unlocks.

When a user presses a button, such as the left button for example, the status of the lock is changed, i.e. it broadcasts that "button press = yes". A paired mobile device can detect this status change and, if desired, send a command to unlock. This communication is done securely under encryption. In order for the lock to be unlocked, the paired mobile device needs to send a hashed security key which is checked by the lock and, if correct, the lock unlocks. This provides a very secure system deploying encryption and hashing.

The describer encryption and key operation method may be used for all possible lock commands, such as alerts, lock, unlock, change programmed keys, change button code etc. Changing a programmed key results in a change the security key of the lock, which may be performed using an authorised phone and the old key, hashing code and user details, should this ever be required.

The lock 10 is preferably configured to operate with different levels of security, which may be simply high and low security, though other intermediate levels may also be possible. In this regard, in low security level operation, a user may press a button on the lock 10 and if the paired mobile device can be found then the lock unlocks. In a higher security level operation, a prompt such as a passcode may be required to be entered on the mobile device to allow operation of the lock. Also, touch ID/a fingerprint recognition system may be used to allow operation of the lock.

A software development kit may be provided for user customisation of subsidiary features and functions of the lock 10. It will be appreciated that such software will enable diverse operation functionality and customisation of a user experience.

- 8 -

The following are examples of different operating functions that may be programmed into the lock. It will be appreciated that these features are not mutually exclusive and that various different features may be group and incorporated into different embodiments of the lock. In one form, the locking mechanism 16 is operable only when a passcode has been entered into the paired mobile device. In other forms, the locking mechanism 16 may be operable based on proximity of the paired mobile device to the lock 10. In another form, the lock 10 may be configured for automatic relocking if unlocked via the communications module or buttons 24a, 24b but the securement member 14 is not removed from the housing 12. Also, the lock 10 may be configured to lock for a predetermined period of time, such as 30 seconds for example, on entering an incorrect security code or an incorrect button combination. Also, communication between the lock 10 and mobile device may be such that a user can check if the lock 10 is locked via the App installed on the mobile device. If a user's luggage is misplaced or stolen, the lock 10 may be programmable via the mobile device so as to be inoperable or only operable on entering a master code particular to the lock 10 and programmed during manufacture. The App may also be configured to allow a user to log into an unpaired device and communicate with their lock provided that certain security measures are satisfied, such as for example, identification of the lock and entering a correct password.

20

By providing a customisable module to the development community, users may be able to gamify their experience and use the lock for leisure activities such as treasure hunts or scavenger hunt type contests.

25 Location of the lock 10 may be achieved via a GPS system or a crowd sourced GPS/crowd location tracking system. In this regard, the lock 10 may be detectable by devices other than a paired mobile device so that the location of the lock may be determined. To achieve this, the App may be configured so that when the software is installed on different user's mobile devices, locks of others users may be detected so that, using GPS location services on the mobile device and the knowledge that the used wireless protocol has a limited field strength, the approximate location of identified locks can be identified and relayed to a

30

- 9 -

central server so that a user may remotely determine the location of their lock. By using location data from a mobile device, the lock 10 may function as if it is a GPS enabled unit to allow location of the lock 10 from a user's mobile device.

5 It will be appreciated that for such a system to operate effectively, a number of users are required to have the App installed and active on their mobile devices. To improve the effectiveness of this system, detection modules may be installed at additional locations such as in airports by third party equipment suppliers. Communication may be via Bluetooth or WIFI or via the internet using a IPv6 protocol for example. Also,
10 communication between locks may be possible to boost communication signals or create a mesh network with multiple devices communicating with each other to share information.

To enable positioning of the lock 10, in alternative forms it may alternatively be provided with a GPS module or an asynchronous GPS system which may or may not use a mobile
15 network.

The lock 10 may include audible or visible indicators, in the form of a LED or an audible alarm or buzzer for example, for locating the lock to assist a user trying to locate the lock 10 in their home, office or hotel. The indicators may also be operable when the lock 10
20 moves outside a predetermined boundary to prevent unauthorised transportation of a users luggage. The PCB 18 may also be configured to record locking and unlocking history, and corresponding GPS locations may also be recorded.

The lock 10 also includes a rechargeable battery 21 fixed to the PCB board 18. The
25 battery 21 is preferably chargeable using a microUSB connector which can be received in port 23 shown in Figure 2, though other connection forms may also be used, such as USB Type C for example or other equivalent or similar forms. The port 23 is preferably covered using cover 40. The battery 21 is preferably configured to provide one year of usage per charge based on standard expected usage conditions. To prevent unintentional
30 operation of buttons 24a, 24b and draining of the battery, the PCB 18 may be configured to timeout after pressing continuously for a predetermined period of time, such as three to six

- 10 -

seconds for example.

To allow extended use of the lock 10, a microcontroller in the PCB is preferably not always on and configured to operate at times in a standby mode or in sleep mode to reduce battery use. In ordinary usage, the lock 10 broadcasts at regular intervals, moving to the microcontroller into sleep mode in between unless activated by a user, such as by pressing a button. In standby mode, which is user operated, the communications module is disabled, which may also be desirable during flights. A user may be able to select a predetermined time during which the lock is in standby mode, based on their expected flight time. Operation of standby mode may be based on a timer, location, prompt from the paired mobile device or a predetermined button press combination, such as a long single hold down for example. In other forms, airlines may be provided with electronic communication means that communicate with the lock 10 to trigger a transition to standby mode. It will also be appreciated that the lock 10 is preferably configured to lock on discharge of the battery.

The PCB board 18 may also control LED lights, preferably an RGB LED, within the housing for indicating various states of operation or use of the buttons 24a, 24b. In one form, individual LEDs may be provided and, for example, a red LED may be provided to indicate a low battery charge, or that the lock is locked or out of range from a paired mobile device, or that an incorrectly entered unlock code has been used. A green LED may be provided to indicate that the lock is unlocked, or in range of a paired mobile device, or that a correctly entered unlock code has been used. In a preferred form, a programmable RGB LED is used so that the different colours can be used to indicate different states or modes of operation.

The embodiments have been described by way of example only and modifications are possible within the scope of the invention disclosed. For example, although the lock is illustrated as a separate component, the lock may be incorporated into a suitcase. Furthermore, although the lock has been described as a lock for luggage, it will be appreciated that it will have many other applications. For example, the lock may be used

- 11 -

for locking a diverse range of articles, such as bikes, lockers or mailboxes, or delivery packages for example. In such an example, one party (a retailer for example) may forward a locked package to another party (such as a customer for example) with the unlock code being sent separately to allow only granted users access to the package.

5

CLAIMS

1. A portable electronic lock for luggage, comprising:
 - a housing and a securement member in cooperation with the housing to secure an
 - 5 item to the lock;
 - a locking mechanism in the housing in communication with the securement member to releasably secure the securement member to the housing;
 - a communications module in the housing for operating the locking mechanism to release and secure the securement member in response to a wireless signal; and
 - 10 a secondary release system for releasing the locking mechanism, wherein the secondary release system is selectively operable by a user.
2. A lock according to claim 1, wherein the secondary release system is operable on insertion of a key into a receptacle in the housing.
3. A lock according to claim 1 or claim 2, wherein operation of the secondary release
- 15 system generates an electrical signal for releasing the locking mechanism.
4. A portable electronic lock for luggage, comprising:
 - a housing and a securement member in cooperation with the housing to secure an
 - item to the lock;
 - a locking mechanism in the housing in communication with the securement
 - 20 member to releasably secure the securement member to the housing;
 - a communications module in the housing for operating the locking mechanism to release and secure the securement member in response to a wireless signal; and
 - at least two buttons on the housing, the buttons operable for manually releasing the locking mechanism on performance of a predetermined unlocking sequence.
- 25 5. A lock according to claim 4, further comprising a secondary release system for releasing the locking mechanism, wherein the secondary release system is selectively operable by a user.
6. A lock according to any preceding claim, wherein the securement member is a cable, an end of which is secured within the housing on operation of the locking
- 30 mechanism.
7. A lock according to claim 6, wherein the housing includes an indentation in which

an intermediate portion of the cable can be received when in a secured condition.

8. A lock according to any preceding claim, wherein the locking mechanism includes an electric motor operable to bring a locking pin into engagement with an end of the securement member to secure it within the housing.
- 5 9. A lock according to any preceding claim, wherein the communications module is configured for operation using a Bluetooth protocol.
10. A lock according to any preceding claim, wherein the locking mechanism is operable when in close proximity with a paired mobile device.
11. A lock according to claim 10, wherein the locking mechanism is operable only when
10 a passcode is entered into the paired mobile device.
12. A lock according to any preceding claim, wherein the location of the lock can be determined through communication with an unpaired mobile device.
13. A lock according to claim 12, further including an alarm operable when the lock moves outside a predetermined boundary.
- 15 14. A lock according to any preceding claim, further including an indicator for locating the lock.
15. A lock according to claim 14, wherein the indicator provides an audible or visible indication.
16. A lock according to any preceding claim, wherein the housing has slots formed
20 therein, in which ends of zippers can be received to secure the zippers together within the housing.
17. A lock according to any preceding claim, wherein the lock can be configured to be operable in response to wireless signals from more than one device.

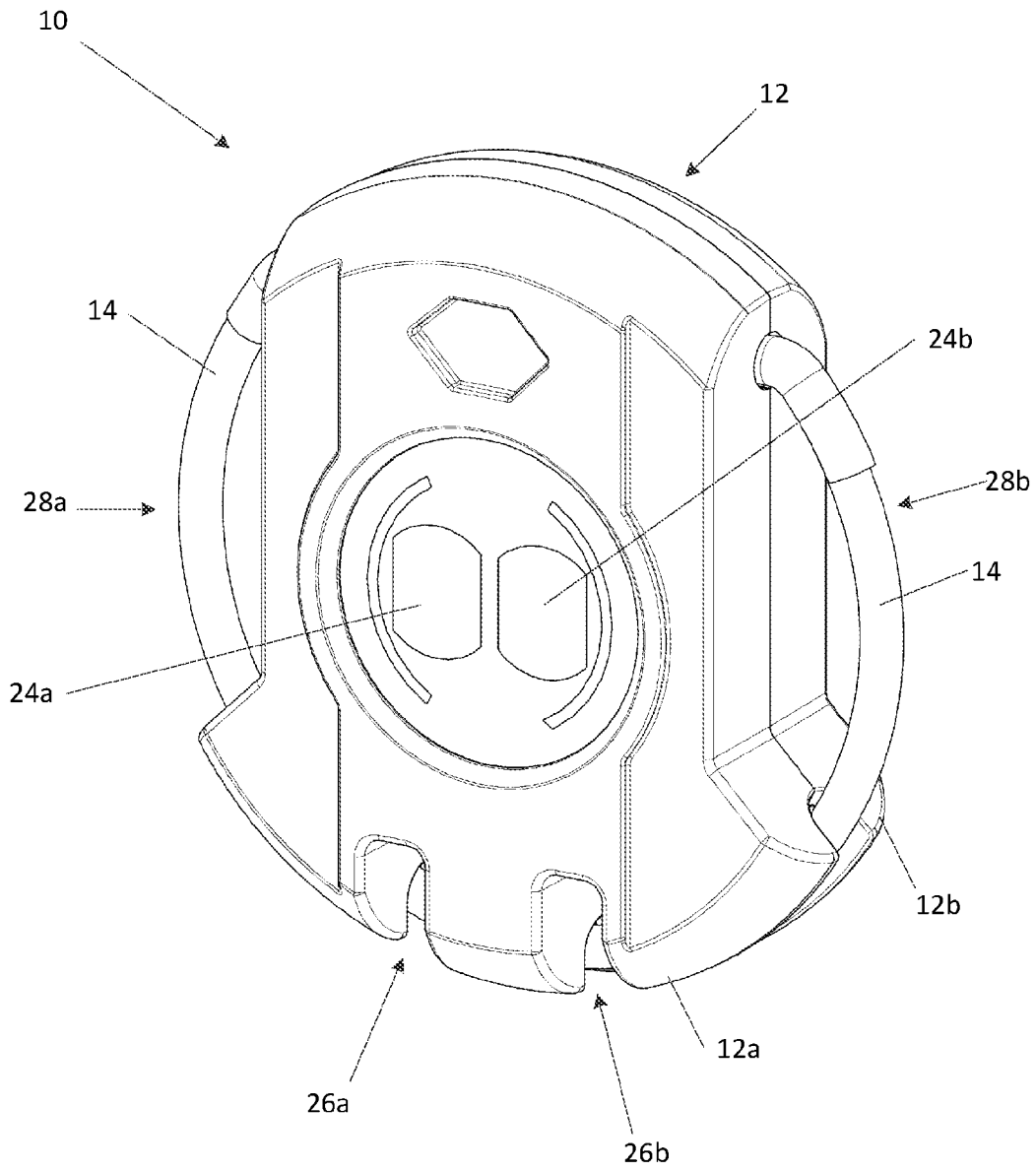


Figure 1

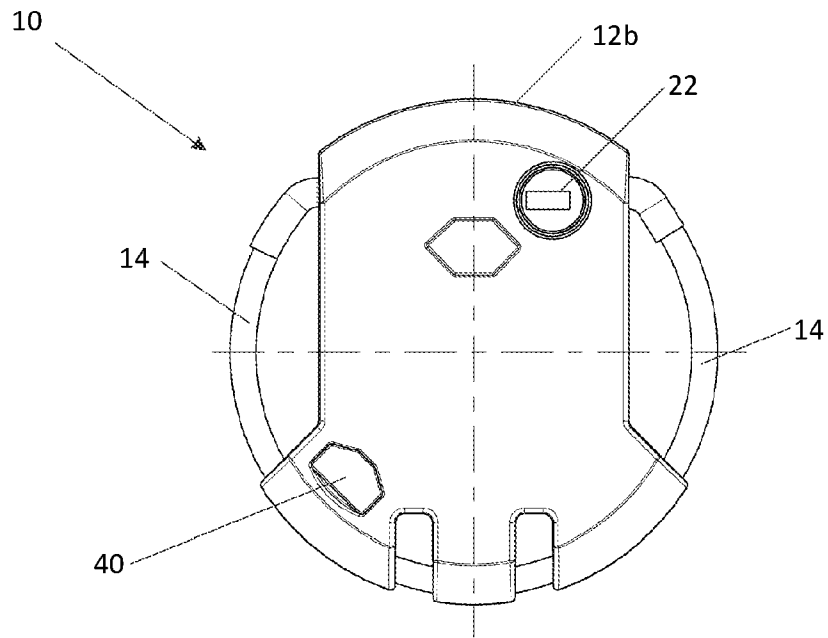


Figure 2

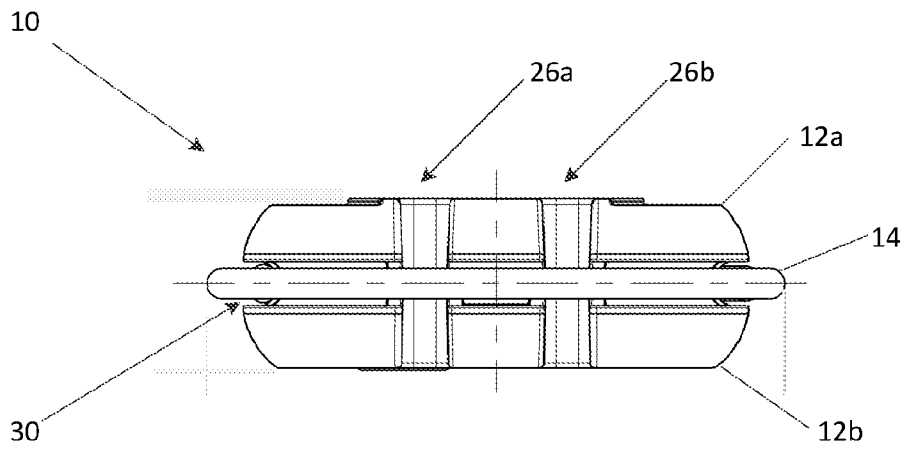


Figure 3

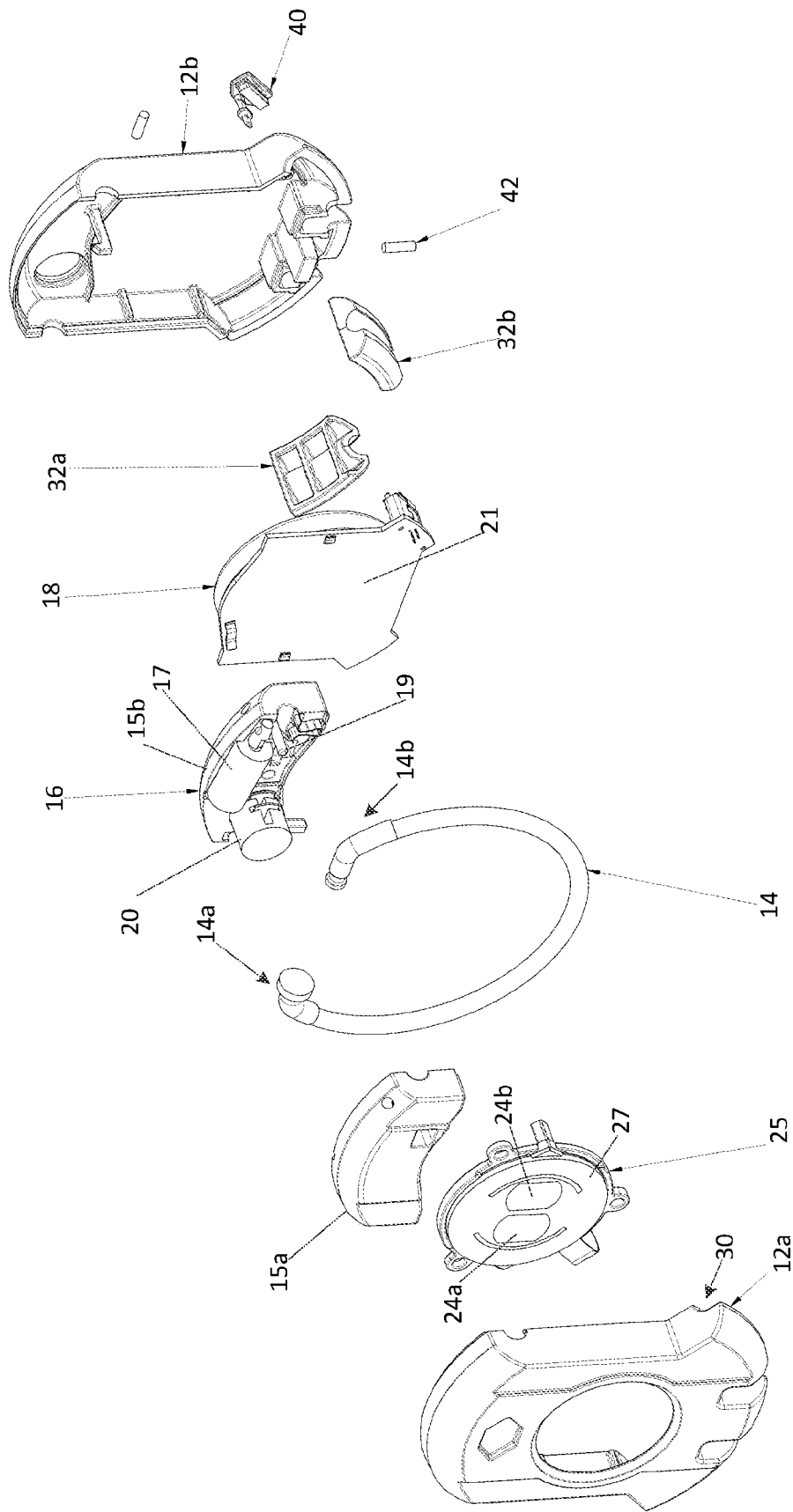


Figure 4

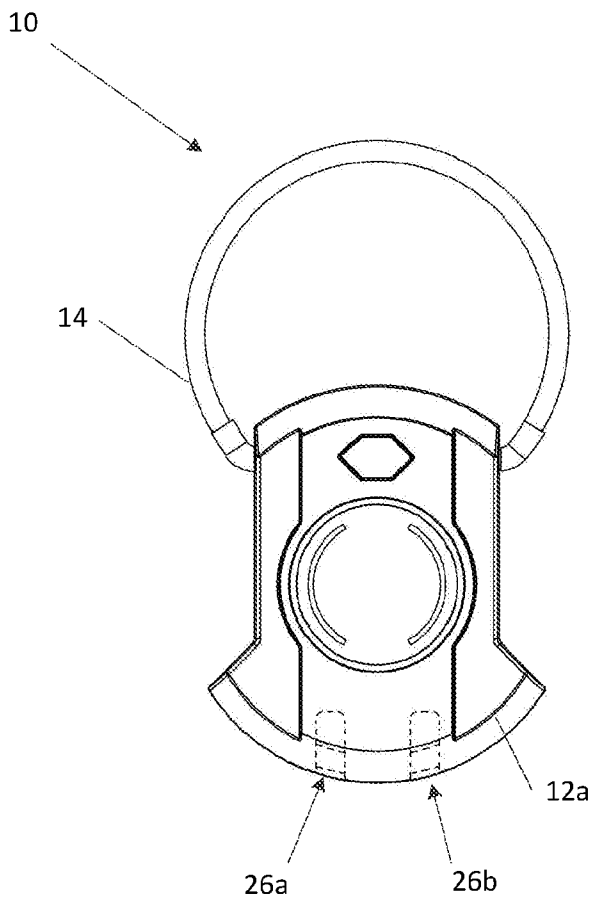


Figure 5

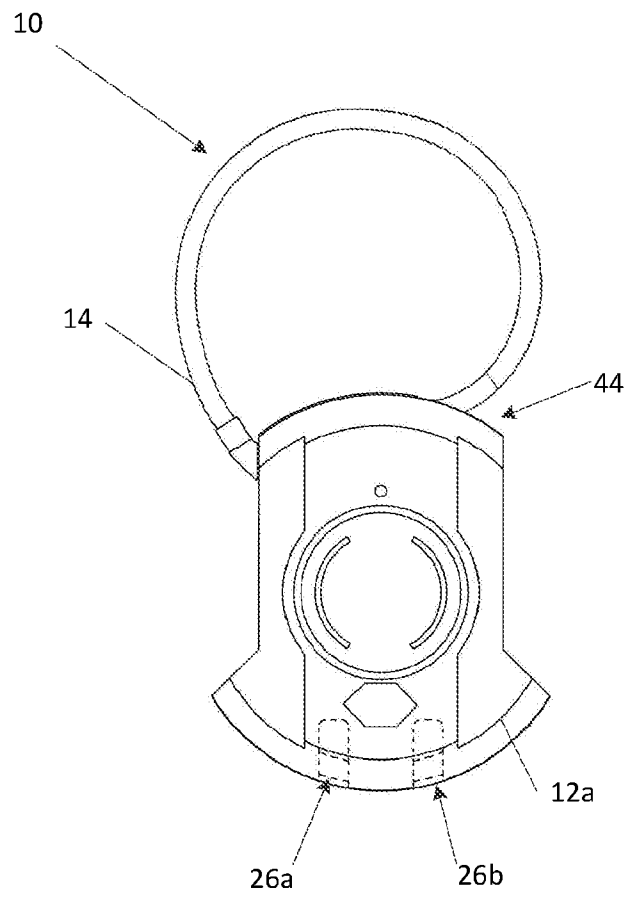


Figure 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2016/050733

A. CLASSIFICATION OF SUBJECT MATTER

E05B 65/52 (2006.01) A44B 19/30 (2006.01) E05B 67/00 (2006.01) E05B 49/00 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPOQUE - WPIAP, EPODOC: IPC/CPC (E05B, E05B67, E05B65/52/low, A44B19/30/low, G07C9, E05B49, E05B37/16/low, E05B47);
Keywords (Luggage, travel bag, zip, padlock, wireless, Bluetooth, RF, smartphone, key, cylinder, lock, combination, code, unlock, button, keypad) & like terms

ESPACENET - Worldwide Database: IPC/CPC (E05B); Keywords/Applicant/Inventor Names

Applicant(s)/Inventor(s) name searched in internal databases provided by IP Australia

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| | Documents are listed in the continuation of Box C | |

 Further documents are listed in the continuation of Box C See patent family annex

| | | |
|---|-----|--|
| * Special categories of cited documents: | | |
| "A" document defining the general state of the art which is not considered to be of particular relevance | "T" | later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| "E" earlier application or patent but published on or after the international filing date | "X" | document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "Y" | document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "O" document referring to an oral disclosure, use, exhibition or other means | "&" | document member of the same patent family |
| "P" document published prior to the international filing date but later than the priority date claimed | | |

Date of the actual completion of the international search
18 November 2016Date of mailing of the international search report
18 November 2016

Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
Email address: pct@ipaustralia.gov.au

Authorised officer

Allan Smailes
AUSTRALIAN PATENT OFFICE
(ISO 9001 Quality Certified Service)
Telephone No. 0262832154

INTERNATIONAL SEARCH REPORT

International application No.

C (Continuation).

DOCUMENTS CONSIDERED TO BE RELEVANT

PCT/AU2016/050733

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| X | US 2006/0283216 A1 (MARCELLE et al.) 21 December 2006 Abstract, figures 3, 7-9, paragraphs 4, 24, 30, 32, 35, 47-51 | 1-2, 8-11, 17 |
| X | US 2014/0250954 A1 (BUZHARDT) 11 September 2014 Abstract, figures 1-2, paragraphs 8, 15 | 1-5, 8-11, 17 |
| X | US 2009/0282876 A1 (ZURASKI et al.) 19 November 2009 Abstract, figures 1-11, paragraphs 44-51 | 1-5, 8-11, 17 |
| X | US 2006/0288744 A1 (SMITH) 28 December 2006 Abstract, figures 1-5, paragraphs 28, 32, 34, 42, 44 | 1-5, 8-11, 17 |
| A | US 7236085 B1 (ARONSON et al.) 26 June 2007 Abstract, figure 3, column 3 lines 16-19 | 3 |

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
the subject matter listed in Rule 39 on which, under Article 17(2)(a)(i), an international search is not required to be carried out, including
2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See Supplemental Box for Details

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-5, 8-11, 17

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

Supplemental Box

Continuation of: Box III

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

This Authority has found that there are different inventions based on the following features that separate the claims into distinct groups:

- **Claims 1-2, 4-5, 8-11, 17** are directed to a portable electronic lock for luggage, with a housing, securement member releasably secured by a locking mechanism, a communications module operating the locking mechanism in response to a wireless signal wherein the lock can be operated wirelessly and by a button sequence and/or key and using various wireless communication means. **The feature of the lock being operated wirelessly and by a button sequence and/or key and using various wireless communication means is specific to this group of claims.**
- **Claim 3** is directed to a portable electronic lock for luggage, with a housing, securement member releasably secured by a locking mechanism, a communications module operating the locking mechanism in response to a wireless signal with a secondary release system operated by inserting a key into a receptacle to generate an electrical release signal. **The feature of generating an electrical unlock signal from insertion of a physical key is specific to this group of claims.**
- **Claims 6-7** are directed to a portable electronic lock for luggage, with a housing, securement member releasably secured by a locking mechanism, a communications module operating the locking mechanism in response to a wireless signal wherein the securement member is a cable, an intermediate portion of which can be received in an indentation of the housing. **The feature of an intermediate portion of a securement cable being received in an indentation of the housing is specific to this group of claims.**
- **Claims 12-13** are directed to a portable electronic lock for luggage, with a housing, securement member releasably secured by a locking mechanism, a communications module operating the locking mechanism in response to a wireless signal wherein the lock includes means for determining its location for use in remotely tracking the lock or for operating an alarm when it moves outside a boundary. **The feature of a the lock having means for determining its location for use in remotely tracking the lock or for operating an alarm when it moves outside a boundary is specific to this group of claims.**
- **Claims 14-15** are directed to a portable electronic lock for luggage, with a housing, securement member releasably secured by a locking mechanism, a communications module operating the locking mechanism in response to a wireless signal wherein the lock has an audible or visual indicator for locating the lock. **The feature of an audible or visual indicator for locating the lock is specific to this group of claims.**
- **Claim 16** is directed to a portable electronic lock for luggage, with a housing, securement member releasably secured by a locking mechanism, a communications module operating the locking mechanism in response to a wireless signal wherein the housing has slots for the reception and securement of zipper ends. **The feature of the housing having slots for the reception and securement of zipper ends is specific to this group of claims.**

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

When there is no special technical feature common to all the claimed inventions there is no unity of invention.

In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. The only feature common to all of the claimed inventions and which provides a technical relationship among them is **a portable electronic lock for luggage, with a housing, securement member releasably secured by a locking mechanism, a communications module operating the locking mechanism in response to a wireless signal**. However this feature does not make a contribution over the prior art because it is disclosed in:

US 2014/0250954 A1 (BUZHARDT) 11 September 2014 – Disclosing a portable electronic lock for luggage (electronic padlock (100) that is suitable for luggage), with a housing (figure 2), securement member (hasp) releasably secured by a locking mechanism (inherent as it is a lockable padlock), a communications module (260, 270) operating the locking mechanism in response to a wireless signal (abstract, figure 1, paragraphs 8, 15). Furthermore, any other features common to sub groups of the above

Supplemental Box

inventions are also known from this document – see for example key operable secondary release system and buttons for unlocking (figure 1, paragraph 15).

Therefore in the light of this document this common feature cannot be a special technical feature. Therefore there is no special technical feature common to all the claimed inventions and the requirements for unity of invention are consequently not satisfied *a posteriori*.

The International Searching Authority believes that a search and examination for the second invention will not involve more than negligible additional search and examination effort over that for the first invention and so no additional search fee is required in order to search and examine that invention. However it is considered that the search for each of the third, fourth and fifth invention will require significant additional search and examination effort over that for the first invention and each other, and therefore an additional search fees are warranted for each of those inventions. Furthermore, the sixth invention can be searched together with the third invention without warranting an extra search fee.

In summary claims 1-5, 8-11, 17 can be searched without an additional fee, and the following groups of claims each require an additional fee: (1) claims 6-7, 16; (2) claims 12-13; (3) claims 14-15.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2016/050733

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent Document/s Cited in Search Report | | Patent Family Member/s | |
|---|-------------------------|-------------------------------|-------------------------|
| Publication Number | Publication Date | Publication Number | Publication Date |
| US 2006/0283216 A1 | 21 December 2006 | US 2006283216 A1 | 21 Dec 2006 |
| | | US 7948359 B2 | 24 May 2011 |
| | | AU 2006252585 A1 | 07 Dec 2006 |
| | | CA 2616807 A1 | 07 Dec 2006 |
| | | CN 101233288 A | 30 Jul 2008 |
| | | CN 102061849 A | 18 May 2011 |
| | | EP 1891290 A2 | 27 Feb 2008 |
| | | WO 2006130660 A2 | 07 Dec 2006 |
| | | US 2014/0250954 A1 | 11 September 2014 |
| US 2009/0282876 A1 | 19 November 2009 | US 2009282876 A1 | 19 Nov 2009 |
| | | US 8225629 B2 | 24 Jul 2012 |
| | | EP 2300676 A2 | 30 Mar 2011 |
| | | EP 2300676 B1 | 07 Aug 2013 |
| | | EP 2628667 A2 | 21 Aug 2013 |
| | | US 2011265526 A1 | 03 Nov 2011 |
| | | US 8839650 B2 | 23 Sep 2014 |
| WO 2009158326 A2 | 30 Dec 2009 | | |
| US 2006/0288744 A1 | 28 December 2006 | US 2006288744 A1 | 28 Dec 2006 |
| US 7236085 B1 | 26 June 2007 | US 7236085 B1 | 26 Jun 2007 |
| | | US 7880585 B1 | 01 Feb 2011 |
| | | US 8633799 B1 | 21 Jan 2014 |

End of Annex