

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference JSBA001	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/SG2010/000194	International filing date (day/month/year) 25.05.2010	Priority date (day/month/year)	
International Patent Classification (IPC) or national classification and IPC INV. E05B67/00			
Applicant Jsb Tech Private Limited			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>10</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (sent to the applicant and to the International Bureau) a total of <u>16</u> sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☒ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3bis of Annex C of the Administrative Instructions).			
4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ Box No. II Priority ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability ☐ Box No. IV Lack of unity of invention ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement ☐ Box No. VI Certain documents cited ☒ Box No. VII Certain defects in the international application ☒ Box No. VIII Certain observations on the international application			
Date of submission of the demand		Date of completion of this report	
24.05.2011		29.06.2012	
Name and mailing address of the international preliminary examining authority:  European Patent Office P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Fax: +31 70 340 - 3016		Authorized officer Pérez Méndez, José F Telephone No. +31 70 340-4091	



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/SG2010/000194

Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a) and (b))
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-9 as originally filed

Claims, Numbers

1-15 filed with telefax on 13-06-2012

Drawings, Sheets

1/7-7/7 as originally filed

- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):
- ☐ the description, pages
 - ☒ the claims, Nos. 4,7-15
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
5. ☐ This report has been established:
- ☐ taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
 - ☐ without taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91(Rules 66.4bis and 70.2(e)).

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/SG2010/000194

6. ☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 4, 8, 10, 11, 13, 14

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☒ the claims, or said claims Nos. 4, 8, 10, 11, 13, 14 are so inadequately supported by the description that no meaningful opinion could be formed (*specify*).

see separate sheet

☐ no international search report has been established for the said claims Nos.

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13ter.1(a) or (b) and 13ter.2.

☒ See separate sheet for further details

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/SG2010/000194

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-3, 5-7, 9, 12, 15</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>1-3, 5-7, 9, 12, 15</u>
	No: Claims	
Industrial applicability (IA)	Yes: Claims	<u>1-3, 5-7, 9, 12, 15</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item I

Basis of the report

- 1 The amendments filed with telefax of 13-06-2012 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 19(2) PCT. The amendments concerned are the following:

1.1 Claims 7, 9, 12, 15

The applicant has replaced the following original features of claims 7, 9, 12, 15:

- claim 7: "optical sensor" (lines 1, 2) by "optical pointing sensor";
- claim 9: "electronic key" (line 1) by "electronic interface key unit";
"unlocking function" (line 2) by "locking-unlocking functions";
"electronic key connector" (lines 2, 3) by "connector of the said key unit";
- claim 12: "electronic key connector" (line 3) by "connector of said key unit";
- claim 15: "a toggle solenoid" (line 1) by "a toggle motorized solenoid".

The replacement of these features introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 19(2)/Article 34(2)(b) PCT.

For establishing the reasoned statement with regard to novelty, inventive step and industrial applicability in Item V of this report, it has been considered as if the above mentioned amendments had not been made.

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

- 2 New claims 4, 8, 10, 11, 13, 14 contain subject-matter which extends beyond the content of the application as filed, contrary to Article 19(2)/Article 34(2)(b) PCT. See in particular:

- "...the use of a computer or a communication device in conjunction with software can be configured to serve as a method of entering and setting access codes, loading firmware to the said lock" [claim 4];
- "... connectors to interface with a computer or communication devices" [claim 8];
- "... proximity wireless receiver for communicating ... and a computer or other communication devices" [claim 10];
- "... of proximity wireless transmission" [claim 11];
- "... to interconnect with a computer or communication devices and software to gain access on the said lock" [claim 13];
- "... the use of a sound buzzer for user interfaces purpose" [claim 14].

Since there is no support in the original description (Article 19(2)) for new claims 4, 8, 10, 11, 13 and 14, an opinion with regard to novelty, inventive step and industrial applicability will not be established for these claims.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

3 Reference is made to the following documents:

- | | |
|----|---|
| D1 | WO 2006/130660 A2 (MASTER LOCK CO [US]; MEEKMA GLENN P [US]; MARCELLE JESSE A [US]; LESLI) 7 December 2006 (2006-12-07) |
| D2 | US 2009/226050 A1 (HUGHES MICHAEL L [US]) 10 September 2009 (2009-09-10) |
| D3 | US 6 337 618 B1 (CRAIG JAMES J [US] ET AL) 8 January 2002 (2002-01-08) |

- D4 US 2007/236341 A1 (MACKJUST TYSON J [US] ET AL
 MACKJUST TYSON JAMES [US] ET AL) 11 October 2007
 (2007-10-11)
- D5 GB 2 409 317 A (LEAR CORP [US]) 22 June 2005 (2005-06-22)

3.1 The following document was not cited in the international search report. A copy of the document is appended hereto.

- D6 WO 2006/097769 A1 (MAPLE, AJ [GB]; LENNARD IM [GB]) 21
 September 2006 (2006-09-21)

4 Independent claim 1

4.1 The term "miniature" used in the designation of claim 1, i.e. "a miniature electronic combination lock", is a relative term, which has no well-recognized meaning in the field of locks, and specially in such locks as described in the application (see lines 13-17), i.e. padlocks, chain locks, luggage locks, wire locks and bicycle locks. For this reason, the term "miniature" has not a limiting effect and the electronic combination lock disclosed in D6 (see Fig. 1), which is intended for locking a door of a commercial vehicle, and which in one embodiment corresponds with a "conventional key-operated padlock" (see page 4, lines 20-22) can also be seen as a "miniature electronic combination lock" in the sense of claim 1. For this reason, the document D6 (see page 5, line 11 - page 8, line 12; Figs. 1-3F) is considered to be the closest prior art to the subject-matter of claim 1 and discloses (the references in parentheses applying to this document):

- a miniature electronic combination lock (see Figs. 1, 2) comprising a battery (see page 6, lines 3, 4) powered electronic system unit, a mechanical housing (10), a miniaturized latch (page 6, lines 3-11), a plurality of electromechanical sensors and switches, the said electronic system unit consists of:

- a) a visual display unit (20) for user interface,

b) a touch sensor in the form of a touch screen (see page 6, lines 12-19) to provide a means for entering access codes (see page 7, lines 12-24),
c) and a controller programmed with software in combination with electronic circuitry to drive a toggle solenoid (see page 7, lines 25-31; Fig. 2) to perform latching and unlatching functions of the said lock, the compact electronic system unit fits to the mechanical housing (10) to form a unitary embodiment of electronic locking device (see page 8, lines 9-12).

4.2 The subject-matter of claim 1 therefore differs from this known electronic combination lock in that:

- a vast variety of access codes in the form of alphanumeric characters, colors graphics, symbols, shapes, patterns and other language characters, and their combination to form words, numbers, names, and other mixture can be constructed by users and saved in the memory of the electronic system, so that the variety and types of access codes may content one or more components to create user-defined access codes that are meaningful and easy to memorize.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

4.3 The problem to be solved by the present invention may be regarded as:

- to provide a combination lock with a vast variety of security access codes that are meaningful, user-friendly, and easy to remember (see lines 19-23; lines 63-67).

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) with respect to the cited documents (D1-D6), since none of the cited documents discloses an electronic combination lock capable of storing in its memory access codes in the form of e.g. color graphics, symbols, shapes, patterns and their combinations to create user-defined access codes that are meaningful and

easy to memorize. In particular, in the electronic combination lock of D6 (see page 3, lines 14-23; page 8, lines 1, 2) only codes in the form of digits can be stored in the memory of the electronic system.

5 Dependent claims 2, 3, 5-7, 9, 12, 15

Claims 2, 3, 5-7, 9, 12, 15 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

6 Industrial application

Claims 1, 2, 3, 5-7, 9, 12, 15 meet the requirements of Art. 33(4) PCT, since they are industrially applicable in the field of locks.

Re Item VII

Certain defects in the international application

- 7** Independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art D6 being placed in the preamble (Rule 6.3(b)(i) PCT) and the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

In the present case, the features mentioned in point 4.1 are known in combination from D6 and belong in the preamble of such a claim.

- 8** The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

- 9** Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D6 is not mentioned in the description, nor is this document identified therein.

Re Item VIII

Certain observations on the application

- 10 The application does not meet the requirements of Article 6 PCT, because the description is not adapted to the new claims. See e.g. the initial statement under summary of the invention (lines 44-52) which does not correspond to new claim 1.

- 11 The subject-matter of claim 3 is already contained in claim 1, thus claim lacks conciseness and as such does not meet the requirements of Article 6 PCT.

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EPO - DG 2

24. 05. 2011

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European Patent Office,
P.B. 5818 Patentlaan 2
NL-2880 HV Rijswijk
Tel :(+31-70) 340-2040
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Our Ref: JSBA001
Your Ref:

18 May 2011

No. of Pages 8

Dear Sirs

Re: PCT Patent Application NO. PCT/SG2010/000194
entitled AN ELECTRONIC COMBINATION LOCK
in the name JSB TECH Private Limited

We are filing herewith a Demand for International Preliminary Examination and a fee calculation sheet. Could you fax us your bank details for the arrangement to telegraphic transfer of Euro 1910 to your account.

We note with appreciation in the Written Opinion of the International Searching Authority that the Examiner has found former claims 2-7, 9, 12, 14 and 15 to be novel in the light of cited documents.

In the enclosed replacement claims set, new Claim 1 replaces Claim 1 as filed, new Claim 4 replaces 4 as filed, new Claim 6 replaces Claim 6 as filed, new Claim 8 replaces Claim 8 as filed, new Claim 9 replaces Claim 9 as filed, new Claim 10 replaces Claim 10 as filed, new Claim 11 replaces Claim 11 as filed, new Claim 13 replaces Claim 13 as filed, new Claim 14 replaces Claim 14 as filed and new Claim 15 replaces Claim 15 as filed. Claim 2,3,5,7,12 is unchanged. The present application now comprises Claims 1 - 15.

In summary, the applicant has presented a new claims set with independent claims comprising the subject matter dependent claims found patentable by the Examiner and thus we submit that the present application is in order for an entirely positive International Preliminary Report on Patentability. However, if the Examiner has further concerns, we respectfully request for a further Written Opinion so that we can address his concerns.

Yours sincerely

Loo Swee Yong
Common Representative of
JSB TECH Private Limited



CLAIMS

1. A miniature electronic combination lock comprising a battery powered electronic system unit, a mechanical housing, a locking structure, a plurality of electromechanical sensors and switches. The said electronic system unit consists of: a). a visual display unit for user interface, b). a set of touch sensors to provide a means for entering and setting access codes, c). a receiver as a means of receiving signal, d). and a controller programmed with software in combination with electronic circuitry to drive a toggle solenoid or a miniaturized motor to perform latching and unlatching functions of the said lock. The compact electronic system unit fits to the mechanical housing to form a unitary embodiment of electronic locking device.
2. The electronic combination lock defined in claim 1, in conjunction with a set of mechanical switches, movement sensors and software protocol, to form a method to activate the electronic system of the said lock. This method is to prevent unnecessary powering the electronic system continuously. Thus, the disclosed method conserves battery power and hence extending battery life of said locking device.
3. The electronic combination lock defined in claim 1, wherein a vast variety of access codes can be constructed by users and saved in the memory of the electronic system. The variety and types of access codes may content one or more components of colors graphics symbols, shapes, patterns, alphanumeric characters, other language characters, and their combination to form words, numbers, names, and other mixture, to produce a vast variety of high security user-defined access codes that are meaningful and easy to memorize.
4. The electronic combination lock defined in claim 3, wherein the use of a computer or a communication device in conjunction with software can be configured to serve as a method of entering and setting access codes, loading firmware to the said lock.
5. The electronic combination lock defined in claim 3, wherein the use of a touch screen sensor, and an electronic display unit in conjunction with software can be configured to serve as a method of entering and setting access codes.

- 40 6. The electronic combination lock defined in claim 3, wherein the use of a track-pad sensor and an electronic display unit in conjunction with software can be configured to serve as a method of entering access code.
- 45 7. The electronic combination lock defined in claim 3, wherein the use of an optical pointing sensor with a switch and an electronic display unit in conjunction with software can be adapted to serve as a method of entering access code.
- 50 8. The electronic combination lock defined in claim 1, wherein an electronic interface key unit comprising an electronic system, a mechanical housing, connectors to interface with a computer or communication devices, and contents at least one pre-programmed access code, and an electronic transmitter can be paired with the said lock.
- 55 9. The electronic combination lock defined in claim 8, wherein the electronic interface key unit can be used to perform locking-unlocking functions by inserting a connector of the said key unit into the said lock to enable the transfer of a pre-programmed access code.
- 60 10. The electronic combination lock defined in claim 1, wherein the receiver of the said lock can be configured to become a proximity wireless receiver for communicating with the electronic interface key unit, and a computer or other communication devices.
- 65 11. The electronic combination lock defined in claim 8, wherein the electronic transmitter of the said key unit can be configured to transmit pre-programmed access codes to the said lock by means of proximity wireless transmission.
- 70 12. The electronic combination lock defined in claim 8, wherein the electronic interface key unit can serve as an alternative power source to the electronic combination lock by inserting the connector of the said key unit into the electronic combination lock.

- 75 13. The electronic combination lock defined in claim 1, wherein the electronic
 interface key unit can be configured to interconnect with a computer or
 communication devices and software to gain access on the said lock.
- 80 14. The electronic combination lock defined in claim 1, wherein the use of a
 sound buzzer for user interfaces purpose.
15. The electronic combination lock defined in claim 1, wherein a toggle
 motorized solenoid is used to perform latching and unlatching functions to
85 form a locking system.

21. 06. 2011

Statement under Article 19(1)

The following documents have been cited in the Search Report and Written Opinion:

- D1 WO 2006/130660A2
- D2 US 2009/226050 A1
- D3 US 6337618 B1
- D4 US 2007/236341 A1
- D5 GB 2409 317 A

In response to the Written Opinion, the applicant amended claim 1. The terms "miniature 5-way switch or Joystick", "a set of 5 switches" and "a plurality of optical sensor" have been removed from the claim 1. However, none of the citations in D1 to D5 has adopted touch sensors or optical pointing sensors disclosed herein as a means to manipulate access codes entry on a combination lock. Scrolling conventional mechanical wheels cited on D4 for car alarm has completely different method from said touch sensors. Therefore, the subject matter with the adoption of the said sensors in an electronic combination lock is novel and considered inventive.

Claims 2 to 7 were found novel in the Written Opinion in the light of cited D1 to D5. With respect to claims 1, 6 and 7, it is especially advantageous to adopt the recent rapid advancement in size miniaturization of Microelectromechanical System (MEMS) sensors and ultra low power microprocessors, and in combination with claims 2, 3, 4, and 5 to create an unique configuration, hence considered novel and inventive, to form a compact, easy-to-use and low-power new Combination Lock enabling to provide the public with a useful choice.

Claim 4 has been removed and replaced by a new dependent claim 4 as novel and involves an inventive step.

Claim 6 has been removed and replaced by a new dependent claim 6 as novel and involves an inventive step.

The applicant revised claim 8. "The electronic key unit" has been restricted to "electronic interface key unit" that the unit becomes dependent to pair with a computer or other communication devices in order to interact with the main combination lock electronic system. This unit and in combination of claim 12 and 13, provide a supporting means to power up or to download firmware to the Combination lock unit. In regard of such limitation, claim 8 becomes novel and inventive.

Claim 10 has been removed and replaced by a new dependent claim 10 as novel and involves an inventive step.

Claim 11 has been removed and replaced by a new dependent claim 11 as novel and involves an inventive step.

In regard to Claim 12 was found novel in the Written Opinion. However, none of the documents in prior art electronic combination lock has shown the use of the "slave unit" to power up an exhausted "master unit" electronic system. A skilled person in the art would postulate to use a new battery to replace a "flat" battery or to remove the usable battery in the slave unit and then replace the exhausted battery in the master's unit. In contrary, disclosed claim 12 resolves the issue uniquely by focusing at ease-of-use. In this regard, the applicant argues that claim 12 is non-obvious and thus inventive.

Claim 13 has been removed and replaced by a new dependent claim 6 as novel and involves an inventive step.

**In summary, the new claims 1 – 15 are new and inventive.
Industrial applicability is given.**

21. 06. 2011

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AMENDED CLAIMS

received by the International Bureau on 11 April 2011 (11.04.2011)

1. A miniature electronic combination lock comprising a battery powered electronic system unit, a mechanical housing, a locking structure, a plurality of electromechanical sensors and switches. The said electronic system unit consists of: a). a visual display unit for user interface, b). a set of touch sensors to provide a means for entering and setting access codes, c). a receiver as a means of receiving signal, d). and a controller programmed with software in combination with electronic circuitry to drive a toggle solenoid or a miniaturized motor to perform latching and unlatching functions of the said lock. The compact electronic system unit fits to the mechanical housing to form a unitary embodiment of electronic locking device.
2. The electronic combination lock defined in claim 1, in conjunction with a set of mechanical switches, movement sensors and software protocol, to form a method to activate the electronic system of the said lock. This method is to prevent unnecessary powering the electronic system continuously. Thus, the disclosed method conserves battery power and hence extending battery life of said locking device.
3. The electronic combination lock defined in claim 1, wherein a vast variety of access codes can be constructed by users and saved in the memory of the electronic system. The variety and types of access codes may content one or more components of colors graphics symbols, shapes, patterns, alphanumeric characters, other language characters, and their combination to form words, numbers, names, and other mixture, to produce a vast variety of high security user-defined access codes that are meaningful and easy to memorize.
4. The electronic combination lock defined in claim 3, wherein the use of a computer or a communication device in conjunction with software can be configured to serve as a method of entering and setting access codes, loading firmware to the said lock.
5. The electronic combination lock defined in claim 3, wherein the use of a touch screen sensor, and an electronic display unit in conjunction with software can be configured to serve as a method of entering and setting access codes.

6. The electronic combination lock defined in claim 3, wherein the use of a track-
pad sensor and an electronic display unit in conjunction with software can be
configured to serve as a method of entering access code.

7. The electronic combination lock defined in claim 3, wherein the use of an
optical pointing sensor with a switch and an electronic display unit in
conjunction with software can be adapted to serve as a method of entering
access code.

8. The electronic combination lock defined in claim 1, wherein an electronic
interface key unit comprising an electronic system, a mechanical housing,
connectors to interface with a computer or communication devices, and
contents at least one pre-programmed access code, and an electronic
transmitter can be paired with the said lock.

9. The electronic combination lock defined in claim 8, wherein the electronic
interface key unit can be used to perform locking-unlocking functions by
inserting a connector of the said key unit into the said lock to enable the
transfer of a pre-programmed access code.

10. The electronic combination lock defined in claim 1, wherein the receiver of the
said lock can be configured to become a proximity wireless receiver for
communicating with the electronic interface key unit, and a computer or other
communication devices.

11. The electronic combination lock defined in claim 8, wherein the electronic
transmitter of the said key unit can be configured to transmit pre-programmed
access codes to the said lock by means of proximity wireless transmission.

12. The electronic combination lock defined in claim 8, wherein the electronic
interface key unit can serve as an alternative power source to the electronic
combination lock by inserting the connector of the said key unit into the
electronic combination lock.

- 75 13. The electronic combination lock defined in claim 1, wherein the electronic
interface key unit can be configured to interconnect with a computer or
communication devices and software to gain access on the said lock.
- 80 14. The electronic combination lock defined in claim 1, wherein the use of a
sound buzzer for user interfaces purpose.
- 85 15. The electronic combination lock defined in claim 1, wherein a toggle
motorized solenoid is used to perform latching and unlatching functions to
form a locking system.



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Date: 8th June 2012

Our Ref: JSB/11/DT025
Your Ref:

Dear Sir/Madam,

Re: Reply to the Written Opinion of the International Preliminary Examining Authority (PCT Rule 66) for Patent Application **PCT/SG2010/000194** entitled **AN ELECTRONIC COMBINATION LOCK** in the name **JSB TECH Private Limited**

Reference to Written Opinions of the Examiner in the International Preliminary Examining Authority (WOIPE), the author amends Claim 1 in accordance with Examiner's consideration in point 8 and 4.1. The amended claims do not introduce subject matter extending beyond the content of the application as filed.

The new set of Claims is presented as follows:

- New Claim 1 replaces Claim 1 as filed.
- Claim 2-15 are Unchanged.

In summary, the applicant has replaced Claim 1 as filed. We also note with appreciation in the Written Opinion of the International Preliminary Authority that the Examiner found claims 1,3,15 to be Novel (N) and claims 2,5-7,9,12 to be involved in inventive step (IS). Thus, we submit that the present application is in order for an entirely positive International Preliminary Report on Patentability.

Yours Sincerely,

Daniel Tien Tze Siong
Common Representative of
TECH Private Limited

CC: 1. Receiving Office: the Intellectual Property Office of Singapore (IPOS)
The lead government agency under the Ministry of Law that advises JSB
and administers intellectual property (IP) laws in Singapore.

2. Dr Jim Li Hui Hong

Citations and explanations (Rule 66)

The following documents have been cited in the Search Report and Written Opinion:

- D1 WO 2006/130660 A2 (Master Lock Co [US]; Meekma Glenn P [US]; Marcelle Jesse A [US]; Lesli) 7 Dec 2006 (2006-12-07)
- D2 US 2009/226050 A1 (Hughes Michael L [US]) 10 Sept 2009 (2009-09-10)
- D3 US 6337618 B1 B1 (Craig James J [US] Et Al) 8 Jan 2002 (2002-01-08)
- D4 US 2007/236341 A1 (Mackjust Tyson J [US] Et Al Mackjust Tyson James [US] Et Al) 11 Oct 2007 (2007-10-11)
- D5 GB 2409 317 A (Lear Corp [US]) 22 June 2005 (2005-06-22)
- D6 WO 2006/097769 A1 (Maple, AJ [BGB]; Lennard IM [GB]) 21 Sep. 2006 (2006-09-21)

Reference is also made to:

- (i) Originally-Filed Application Document dated 25th May 2010 (**OFAD**),
- (ii) The Written Opinion of the International Searching Authority dated 15th April 2011 (**WOISA**),
- (iii) The Application's Letter dated 29th April 2011 with Citation & Explanations (**L1**), and
- (iv) The Written Opinion of the International Preliminary Examination Authority dated 19th December 2011 (**WOIPE**).

Claim 1:

In response to the **WOIPE**, the applicant amended Claim 1 in accordance with Examiner's consideration in point 8 and 4.1. Further, the combination features disclosed in the original-filed Claim 3 has been amended in accordance with Examiner's consideration in point 8. Hence, the proposed combination of features is consistent with the aim of present invention for providing a miniaturized combination lock with a vast variety of security codes that are meaningful, user-friendly, and easy to remember (see Lines 19-23; line 63-67 in **OFAD**). The new Claim 1 has resolved objections mentioned in point 1.1 and 4.2 and becomes novel and involved in inventive steps in the light of cited documents D1-D6.

Claim 3:

The author argues that Claim 3 does not require to exclude "alphanumeric characters" reason being that the multi-digit codes in D6 (see page 1 line 4) is referred to 'three-digit **seven-segment display**' (see page 8 lines 1 to 2), whereas such seven-segment display could only display numeric number. A complete set of alphanumeric characters includes alphabet

and numeric digits typically require fourteen-segment display. Further, none of the description in D6 has specifically indicated any alphabet character and thus could not be interpreted for the entitlement on the inclusion of alphabet characters. In addition, D6 clearly cited that 'random or pseudo-random' multi-digit codes are used (see page 3 lines 18-19). A skilled person in the art would expect typical random or pseudo-random digits (i.e. commonly computer generated by using specific mathematical formulas) are referring to numeric numbers rather than alphanumeric characters.

Newly introduced citation D6 by the Examiner (WOIPE):

The applicant argues that the electronic lock disclosed in the newly introduced citation D6 by the Examiner (WOIPE) is: (i). clearly directed to the utilization of smartcard reader technology (see page 1 line 1; page 9 Claim 1 line 7) and (ii). explicitly to address applications in securing goods in commercial vehicle (see page 2 line 3-21; page 3 line 4-13; page 4 line 26-30) wherein **the size of the said lock** would be significantly large (see figure 3A page 2/4) and also to withstand all climatic condition including challenge by vandals (page 2 line 14-19). In contrast, the disclosed miniaturized combination lock in present invention is to address completely different set of applications i.e. luggage lock and small padlock (see page 1 lines 12-13) and is characterized by: (i). relatively miniature in size (see page 1 line 10-17), (ii). having little capacity to store power (i.e. due to its tiny in size), thus requires specific combination of switches, sensors and intelligent software protocol to manage battery power consumption (see page 3 lines 10-17; Claim 2) and (iii) providing novel mitigation solution when the said lock completely lost its battery power (see page 4 line 10-14; claim 12).

Further, the methods for codes entry disclosed in D6 also requires significant larger amount of battery power for energizing a smartcard and thus its size. Hence, the disclosed features in the cited document D6 are essentially inapplicable in regards to the distinct features set forth in present invention of an **ultra-low-powered** and **miniaturized** electronic combination lock.

**In summary, the new claims 1 – 15 are new and inventive.
Industrial applicability is given.**

CLAIMS

The invention has been described with reference to the illustrated preferred embodiments. The invention is not unduly limited by this disclosure of the preferred embodiment described. Instead, it is intended that the invention be defined and their equivalents, set forth in the following claims:

What is claimed is:

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CLAIMS

1. A miniature electronic combination lock comprising a battery powered electronic system unit, a mechanical housing, a miniaturized latch, a plurality of electromechanical sensors and switches. The said electronic system unit consists of: a). a visual display unit for user interface, b). a touch sensor in the form of touch screen, touch panel or track-pad panel to provide a means for entering access codes, c). and a controller programmed with software in combination with electronic circuitry to drive a toggle solenoid or a miniaturized motor to perform latching and unlatching functions of the said lock.

The compact electronic system unit fits to the mechanical housing to form a unitary embodiment of electronic locking device wherein a vast variety of access codes in the form of alphanumeric characters, colors graphics symbols, shapes, patterns and other language characters, and their combination to form words, numbers, names, and other mixture can be constructed by users and saved in the memory of the electronic system, so that the variety and types of access codes may content one or more components to create user-defined access codes that are meaningful and easy to memorize.

2. The electronic combination lock defined in claim 1, in conjunction with a set of mechanical switches, movement sensors and software protocol, to form a method to activate the electronic system of the said lock. This method is to prevent unnecessary powering the electronic system continuously. Thus, the disclosed method conserves battery power and hence extending battery life of said locking device.

3. The electronic combination lock defined in claim 1, wherein a vast variety of access codes can be constructed by users and saved in the memory of the electronic system. The variety and types of access codes may content one or more components of colors graphics symbols, shapes, patterns, alphanumeric characters, other language characters, and their combination to form words, numbers, names, and other mixture, to produce a vast variety of high security user-defined access codes that are meaningful and easy to memorize.

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- 40 4. The electronic combination lock defined in claim 3, wherein the use of a computer or a communication device in conjunction with software can be configured to serve as a method of entering and setting access codes, loading firmware to the said lock.
- 45 5. The electronic combination lock defined in claim 3, wherein the use of a touch screen sensor, and an electronic display unit in conjunction with software can be configured to serve as a method of entering and setting access codes.
- 50 6. The electronic combination lock defined in claim 3, wherein the use of a track-pad sensor and an electronic display unit in conjunction with software can be configured to serve as a method of entering access code.
- 55 7. The electronic combination lock defined in claim 3, wherein the use of an optical pointing sensor with a switch and an electronic display unit in conjunction with software can be adapted to serve as a method of entering access code.
- 60 8. The electronic combination lock defined in claim 1, wherein an electronic interface key unit comprising an electronic system, a mechanical housing, connectors to interface with a computer or communication devices, and contents at least one pre-programmed access code, and an electronic transmitter can be paired with the said lock.
- 65 9. The electronic combination lock defined in claim 8, wherein the electronic interface key unit can be used to perform locking-unlocking functions by inserting a connector of the said key unit into the said lock to enable the transfer of a pre-programmed access code.
- 70 10. The electronic combination lock defined in claim 1, wherein the receiver of the said lock can be configured to become a proximity wireless receiver for communicating with the electronic interface key unit, and a computer or other communication devices.

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- 75 11. The electronic combination lock defined in claim 8, wherein the electronic transmitter of the said key unit can be configured to transmit pre-programmed access codes to the said lock by means of proximity wireless transmission.
- 80 12. The electronic combination lock defined in claim 8, wherein the electronic interface key unit can serve as an alternative power source to the electronic combination lock by inserting the connector of the said key unit into the electronic combination lock.
- 85 13. The electronic combination lock defined in claim 1, wherein the electronic interface key unit can be configured to interconnect with a computer or communication devices and software to gain access on the said lock.
14. The electronic combination lock defined in claim 1, wherein the use of a sound buzzer for user interfaces purpose.
- 90 15. The electronic combination lock defined in claim 1, wherein a toggle motorized solenoid is used to perform latching and unlatching functions to form a locking system.

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