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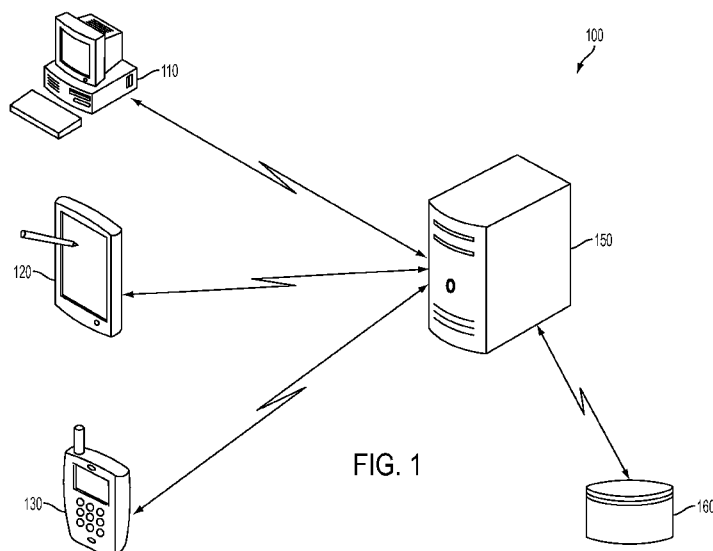


FIG. 1

(57) Abstract: Systems and methods for device registration and authentication are disclosed. In one embodiment, a method for authentication of a device may include (1) receiving, at a mobile device, a first credential; (2) transmitting, over a network, the first credential to a server; (3) receiving, from the server, a first key and a first value, the first value comprising a receipt for the first credential; (4) receiving, at the mobile device, a data entry for a second credential; (5) generating, by a processor, a second key from the data entry; (6) retrieving, by the mobile device, a third credential using the first key and the second key; (7) signing, by the mobile device, the first value with the third credential; and (8) transmitting, over the network, the signed third value to the server.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/054751

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H04L 9/14 (2012.01)

USPC - 713/168

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)

IPC(8) -H04L 9/14, 9/28, 9/30, 9/32 (2012.01)

USPC - 380/44, 45, 47, 282; 713/168, 169, 170, 172, 176, 179, 180

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)

PatBase, Orbit, Google Patents, Google Scholar

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,925,182 B1 (EPSTEIN) 02 August 2005 (02.08.2005) entire document	1-21, 26-46
Y	US 2011/0131638 A1 (KAN) 02 June 2011 (02.06.2011) entire document	1-21, 26-46
Y	US 2005/0235148 A1 (SCHEIDT et al) 20 October 2005 (20.10.2005) entire document	7, 8, 10-21, 29-31, 38, 43, 45, 46
Y	US 7,308,261 B2 (HENDERSON et al) 11 December 2007 (11.12.2007) entire document	22-25
Y	US 2011/0059727 A1 (LISBOA) 10 March 2011 (10.03.2011) entire document	12,21-27,29,30,32,36-46
Y	EP 1 710 980 A2 (LABROU et al) 11 October 2006 (11.10.2006) entire document	23, 24, 27, 28, 30, 31
Y	US 7,591,008 B2 (NALLIAH et al) 15 September 2009 (15.09.2009) entire document	33-43
A	US 2010/0312703 A1 (KULPATI et al) 09 December 2010 (09.12.2010) entire document	1-46

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

20 December 2012

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/054751

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:

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 extra sheet.

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.:

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.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-21, 26-46, drawn to a method of authentication of a mobile device comprising receiving a first credential; transmitting the first credential to a server to receive a first key and a first value; receiving, at the mobile device, a data entry for a second credential to generate a second key; retrieving, by the mobile device, a third credential using the first key and the second key; signing, by the mobile device, the first value with the third credential; and transmitting, over the network, the signed first value to the server to authenticate the user and the mobile device.

Group II, claims 22-25, drawn to a method of registering a mobile device, comprising receiving, at a server, a request for a registration code to register a mobile device and transmitting the registration code; receiving, from the mobile device, the registration code and a mobile device identifier; and authorizing the mobile device.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: authentication of a mobile device comprising receiving a first credential; transmitting the first credential to a server to receive a first key and a first value; receiving, at the mobile device, a data entry for a second credential to generate a second key; retrieving, by the mobile device, a third credential using the first key and the second key; signing, by the mobile device, the first value with the third credential; and transmitting, over the network, the signed first value to the server to authenticate the user and the mobile device as claimed therein is not present in the invention of Group II. The special technical feature of the Group II invention: registering a mobile device, comprising receiving, at a server, a request for a registration code to register a mobile device and transmitting the registration code; receiving, from the mobile device, the registration code and a mobile device identifier; and authorizing the mobile device as claimed therein is not present in the invention of Groups I.

Groups I and II lack unity of invention because even though the inventions of these groups require the technical feature of transmitting and receiving data/credentials/codes between a mobile device and a server, and an authorized mobile device, this technical feature is not a special technical feature as it does not make a contribution over the prior art in view of US 7,308,261 B2 (HENDERSON et al) 11 December 2007 (11.12.2007), abstract, Fig. 4-5, column 11, lines 35-55.

Since none of the special technical features of the Group I or II inventions are found in more than one of the inventions, unity of invention is lacking.