

CREDENTIAL MANAGEMENT SERVICE

BACKGROUND

The present invention generally relates to credentials, and more particularly, but not exclusively, relates to a credential management service.

SUMMARY

One embodiment of the present invention is a unique credential management service. Other embodiments include apparatuses, systems, devices, hardware, methods, and combinations for credential management services. Further embodiments, forms, features, aspects, benefits, and advantages of the present application shall become apparent from the description and figures provided herewith.

BRIEF DESCRIPTION OF THE FIGURES

The description herein makes reference to the accompanying figures wherein like reference numerals refer to like parts throughout the several views, and wherein:

FIG. 1 is a schematic diagram of a system.

FIG. 2 is a schematic diagram of a computer.

FIG. 3 is a schematic diagram of a credential and a reader.

FIG. 4 is a schematic diagram of a system including a cloud credential management service.

FIG. 5 is a flow diagram for a technique for enrolling a reader.

FIG. 6 is a flow diagram for a technique for enrolling a host.

FIG. 7 is a schematic diagram of a system including a cloud credential management service.

FIG. 8 is a flow diagram for a technique for sending a credential to a host.

FIG. 9 is a schematic diagram of cloud credential management service.

FIG. 10 is a schematic diagram of a cloud credential management service.

FIG. 11 is a schematic diagram of a system including a cloud credential management service and a credential administration app.

DETAILED DESCRIPTION OF REPRESENTATIVE EMBODIMENTS

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended. Any alterations and further modifications in the described embodiments, and any further applications of the principles of the invention as described herein are contemplated as would normally occur to one skilled in the art to which the invention relates.

FIG. 1 illustrates a system 100 including a cloud credential management service 102 that, among other things, communicates information and data to and/or from mobile devices 104, readers 106, and other devices such as computers 108 or printers. The cloud credential management service 102 may generate and deliver credentials 110 to the mobile devices 104, readers 106, and other devices such as computers 108.

The mobile device 104 may be a mobile phone, such as a cell phone or smartphone, a tablet computer, such as an iPad, a smartcard, or any other type of mobile computing device. The reader 106 may be part of system for access control, payment, transit, vending, or any other application. Moreover, the reader 106 includes an NFC system (not shown) to communicate with an Near Field Communication (NFC) system (not shown) of the mobile device 104.

Generally, the credential 110 is a string of bits of variable length. The length of the credential 110 depends on the type or format of the credential 110. Moreover, the present application allows mobile devices 104 to be utilized as a credential 110 for access control, payment, transit, vending, or any other application.

The cloud credential management service 102 is generally implemented with one or more servers executing operating logic with a processing device. The instructions and operating logic are defined in the different aspects of the present application. Generally, a provider makes the cloud credential management service 102 available to one or more customers over the Internet. Moreover, more than one customer may connect to and utilize the various services provided by the cloud credential management service 102 concurrently. It is contemplated, that in some embodiments, credential management services may be provided without using a cloud service.

The various mobile devices 104, readers 106, and other devices 108 each include components, programming, and circuitry suitable to its particular application, and also include communication circuitry operatively coupled their respective antennas for communication over the Internet or NFC (or similar technology) or both.

The circuitry in the mobile devices 104, readers 106, and other devices 108 may be configured to provide appropriate signal conditioning to transmit and receive desired information (data), and correspondingly may include filters, amplifiers, limiters, modulators, demodulators, CODECs, digital signal processing, and/or different circuitry or functional components as would occur to those skilled in the art to perform the desired communications.

In one nonlimiting form, the mobile devices 104, readers 106, and other devices 108 include circuitry to store or process information, modulate or demodulate a radio-frequency (RF) signal, or the like, or a combination thereof. The information may include a credential, identification information, status information, or any other type of information that would occur those skilled in the art.

FIG. 2 is a schematic diagram of a computer 200. The computer 200 may be one or more servers that are part of the credential management service 102, a mobile device 104, a reader 106, and/or other device 108. Computer 200 includes a processing device 202, an input/output device 204, memory 206, and operating logic 208. In other embodiments, computer 200 may take other forms. Furthermore, in some embodiments, computer 200 may communicate with one or more external devices 210.

The input/output device 204 may be any type of device that allows the computer 200 to communicate with the external device 210. For example, the input/output device may be a NFC system including an antenna and chip, a Bluetooth system including an antenna and chip, network adapter, a network card, or a port (e.g., a USB port, serial port, parallel port, VGA, DVI, HDMI, FireWire, CAT 5, or any other type of port). The input/output device 204 may be comprised of hardware, software, firmware, and/or state machines. It is contemplated that the input/output device 204 may include more than one system, network adapter, network card, and/or port.

The external device 210 may be any type of device that allows data to be inputted to or outputted from the computer 200. For example, the external device 210 may be a NFC system, a Bluetooth system, a reader, a mobile device, a computer, a server, a handheld diagnostic tool, a controller, a printer, a display, an alarm, an illuminated indicator, a keyboard, a mouse, or a touch screen display. Furthermore, it is contemplated that the external device 210 may be integrated into the computer 200. For example, the computer 200 may be a mobile device, a reader, a server, a handheld diagnostic tool, a smartphone, a laptop computer, or a tablet computer in which case

the display would be an external device 210, but the display is integrated with the computer 200 as one unit, which is consistent with the general design of mobile phones, handheld diagnostic tools, smartphones, laptop computers, tablet computers, and the like. It is further contemplated that there may be more than one external device in communication with the computer 200. The computer 200 is one example of an external device 210.

Processing device 202 can be of a programmable type, a dedicated, hardwired state machine, or a combination of these; and can further include multiple processors, Arithmetic-Logic Units (ALUs), Central Processing Units (CPUs), or the like. For forms of processing device 202 with multiple processing units, distributed, pipelined, and/or parallel processing can be utilized as appropriate. Processing device 202 may be dedicated to performance of just the operations described herein or may be utilized in one or more additional applications. In the depicted form, processing device 202 is of a programmable variety that executes algorithms and processes data in accordance with operating logic 208 as defined by programming instructions (such as software or firmware) stored in memory 206. Alternatively or additionally, operating logic 208 for processing device 202 is at least partially defined by hardwired logic or other hardware. Processing device 202 can be comprised of one or more components of any type suitable to process the signals received from input/output device 204 or elsewhere, and provide desired output signals. Such components may include digital circuitry, analog circuitry, or a combination of both.

Memory 206 may be of one or more types, such as a solid-state variety, electromagnetic variety, optical variety, or a combination of these forms. Furthermore,

memory 206 can be volatile, nonvolatile, or a mixture of these types, and some or all of memory 206 can be of a portable variety, such as a disk, tape, memory stick, cartridge, or the like. In addition, memory 206 can store data that is manipulated by the operating logic 208 of processing device 202, such as data representative of signals received from and/or sent to input/output device 204 in addition to or in lieu of storing programming instructions defining operating logic 208, just to name one example. As shown in FIG. 2, memory 206 may be included with processing device 202 and/or coupled to the processing device 202.

FIGs. 3-7 illustrate an embodiment of the present application. As seen in FIG. 3, credentials 302 and readers 304 share a secret key 306. Moreover, the credential 302 may be based on the secret key 306. FIG. 4 illustrates a cloud credential management service 308 that transmits virtual credentials 302 to a credential host 310, such as a mobile device. The credential host 310 presents the credential 302 to the credential reader system 304 for access, payment, transit, or any other application. The cloud credential management service 308 also communicates with the credential reader system 304 by transmitting and receiving keys 306 and virtual credentials 302.

As shown in FIG. 4, smartphone credentials 302 and reader systems 304 can now be programmed via internet connections. Keys 306 and/or 309 can now be managed in a cloud service 308. The cloud service 308 keeps track of matching credential hosts 310 (smartphones) and credential readers systems 304 via internet connections. Keys 306 and/or 309 can be securely distributed to readers systems 304 at arbitrary frequencies. Virtual credentials 302 can be generated and delivered to mobile devices 310, such as smartphones, on demand.

FIG. 5 illustrates a technique 311 for enrolling a reader system 304 with the cloud credential management service 308. Operations illustrated are understood to be exemplary only, and operations may be combined or divided, and added or removed, as well as re-ordered in whole or in part. In operation 312, the reader system 304 authenticates with the cloud service 308 by transmitting a unique ID and password, for example. In another embodiment, the reader system 304 may use a certificate to authenticate, which generally includes a public key and a private key to encrypt/decrypt messages between the reader system 304 and the cloud service 308. In operation 314, the cloud credential management service 308 transmits an authentication status, which may include a token, to the reader 304. Once authenticated, in operation 316, the reader 304 then requests to be enrolled with the credential management service 308 by sending a request along with a specifier such as unique ID (e.g., a device ID). The reader 304 may also send the token to the credential management service 308 to ensure an authenticated communication. In operation 318, the credential management service 308 sends custom keys 309 to the reader system 304. The custom keys 309 may be stored at the credential management service 308 or may be generated by the service 308 based on a unique ID sent by the reader 304. The custom keys 309 are unique to the reader 304.

FIG. 6 illustrates a technique 320 for enrolling a host 310 with the cloud credential management service 308. Operations illustrated are understood to be exemplary only, and operations may be combined or divided, and added or removed, as well as re-ordered in whole or in part. In operation 322, the credential host 310 authenticates with the cloud service 308 by transmitting a user ID and PIN, such as an

email address and password, for example. In another embodiment, the credential host 310 may use a certificate to authenticate, which generally includes a public key and a private key to encrypt/decrypt messages between the credential host 310 and the cloud service 308. In operation 324, the cloud credential management service 308 transmits an authentication status, which may include a token, to the credential host 310. Once authenticated, in operation 326, the credential host 310 then requests to be enrolled with the credential management service 308 by sending a request along with a specifier such as a unique device ID. The credential host 310 may also send the token to the credential management service 308 to ensure an authenticated communication. In operation 328, the credential management service 308 sends a virtual credential to the credential host 310. The credential management service 308 may generate the virtual credential based on the unique device ID.

FIG. 7 illustrates a system 330 in which a cloud credential management service 308 shares a secret key 306 by distributing credentials and/or custom keys with devices, readers, and systems through web services 332. For example, devices, readers, and systems may include a phone 334, an access control system 336, a biometric device 338, and/or a lock/reader 340.

FIG. 8 illustrates another embodiment of the present application including technique 400 in which a mobile device 402, such as a smartcard or mobile phone, or card programming device downloads a mobile or virtual credential 404 from a cloud credential management service 406. Operations illustrated are understood to be exemplary only, and operations may be combined or divided, and added or removed, as well as re-ordered in whole or in part. In operation 408, the mobile device 402 or card

programming device authenticates with the cloud credential management service 406 using a user ID and PIN. The user ID may be an email address, for example. The PIN may be a password. Upon receiving an acceptable user ID and PIN, in operation 410, the cloud credential management service 406 sends an authentication status, including a token, to the device 402. Once the device 402 has been authenticated, the communications between the device 402 and the cloud credential management service 406 may occur over secure sockets over the Internet.

In operation 412, the device 402 then sends a unique device identifier to the credential management service 406 along with the token. In operation 414, the credential management service 406 then generates a unique diversified credential 404 using the unique device identifier and a master key. In operation 416, the unique diversified credential 404 is then sent to the device 402. The device 402 may then use the unique diversified credential 404 for access control, payment, transit, vending, or any other application. Generally, with this method of delivery, credentials 404 can be securely programmed onto cards, phones, and other devices remotely, rather than with a card programmer.

FIGs. 9 and 10 illustrate an embodiment of the present application in which different types credentials 502 may be generated and hosted in a cloud credential management service 504. There are credentials of different types (e.g., CISA, XceedID, etc.) and each credential type has distinct algorithms which take source information and encode it so that it can be transmitted to a credential host (mobile device, e.g., a smartcard or smartphone). Moreover, virtual credential generators 505 generator the various types of credentials 502 supported by the cloud credential

management service 504. The credential 502 is then presented to and read by a credential reader system (not shown).

As seen in FIG. 9, by virtualizing these credentials 502 (i.e., generating them in a central cloud service 504 rather than on type specific programmers) several features may be realized. For example, worldwide encoding schemes can be consolidated into one central cloud service 504. Rather than creating and selling a hardware devices that create credentials, virtual credentials 502 can be sold, which are hosted and delivered via a mobile device such as a smartphone. Virtual credentials 502 can then be written to any credential host (e.g., smartcard, smartphone, etc). Virtual credentials 502 can be generated by the cloud credential management service 504 in multiple formats (e.g., prox, Mifare, EVI, optical, XceedID, eISA) depending on the requesting host. Virtual credentials 502 can be generated and encoded for multiple regions and localities (e.g., Americas, Europe, etc.). Customers of the cloud credential management service 504 can buy and generate these virtual credentials 502 on demand.

FIG. 10 illustrates a schematic diagram and technique using system 506. Operations illustrated are understood to be exemplary only, and operations may be combined or divided, and added or removed, as well as re-ordered in whole or in part. In operation 508, an owner or provider 510 of the cloud credential management service 504 creates and maintains customer information in the cloud credential management service 504. In operation 512, the provider 510 allocates any type of credential 502 to customers 514 using the cloud credential management service 504. In operation 516, customers 514 may assign credentials 502 to end-users 518 using the cloud credential management service 504. In operation 520, the end-users 518 may receive

notifications concerning credentials 502 from the credential management service 504. In operation 522, the end-users 518 enroll and download credentials 502 from the cloud credential management service 504.

FIG. 11 illustrates a schematic flow diagram 600 of another aspect of the present application in which a reader 602, such as an offline lock, is manageable through NFC. To reset the lock 602, a button on the lock is pressed and a master credential 604 is presented close to the lock 602. The master credential 604 then becomes the mechanism for adding new access credentials 606 to the lock. After the master credential 604 is programmed, the master credential 604 is presented to the lock 602, then within a few seconds an access credential 606 is presented. The access credential 606 is then granted access to the lock 602.

In FIG. 11, a credential administration application or app 608, in the form of operating logic 208 as in FIG. 2, for a mobile device, such as an NFC-enabled smartphone 610, acts as both the master credential 604 and several access credentials 606, 612, 614. In one embodiment, to program credentials 606, 612, 614 on the lock 602, a smartphone 610 has the credential administration app 608. The lock 602 is initialized with the credential administration app 608 on the smartphone 610 as the master credential 604. Then, access credentials 606, 612, 614 may be programmed from the same smartphone 610 using the credential administration app 608. For example, the credential administration app 608 on the smartphone 610 may toggle back and forth between the master credential 604 and the access credentials 606, 612, 614. In one embodiment, an email 616 may be sent to the end-user NFC-enabled phone 618 with a link or instruction to download the access credential 606 from the cloud credential

management service 620. In another embodiment, an email 616, containing the access credential 606, may be sent to an end-user NFC-enabled phone 618. In yet another embodiment, a physical access card (not shown) may be created using the credential administration app 608 on the smartphone 610 as a card programmer.

The following are operations for managing credentials in an offline lock 602 as shown in FIG. 11. Operations illustrated are understood to be exemplary only, and operations may be combined or divided, and added or removed, as well as re-ordered in whole or in part.

In operation 1, the credential administration app 608 on the smartphone 610 is launched, and 'master credential' is selected and the NFC-enabled smartphone 610 is presented to the lock/reader 602. The lock 602 may provide visual and audible feedback that the master credential 604 has been programmed.

Then, in operation 2, 'create new access credential' may be selected and the smartphone 610 first emulates the master credential 604, waits for a second or two, and then emulates a new access credential 606. The lock 602 may provide visual and audible feedback that the new access credential 606 has been granted access.

Operation 3 is generally the same as operation 2 except a new distinct 'access' credential 612 is created. Operation 4 is generally the same as operation 2 except that yet another distinct 'access' credential 614 is created.

In operation 5, on the credential administration app 608 on the smartphone 610, 'send credential to user' can be selected and an email 616 is sent to an end-user with a link to the credential 606. The end-user receives the email 616, authenticates, and downloads the access credential 606 to their NFC enabled phone 618 from the cloud

credential management service 620. Operation 6 is generally the same as operation 5 except a different credential 612 is sent to smartphone 622 via a link in email 623.

Operation 7 is generally the same as operation 5 except different credential 614 is sent to smartphone 624 via a link in email 625. This aspect of the present application may simplify the programming of offline electronic locks and simplify the distribution of credentials to offline lock users.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiments have been shown and described and that all changes and modifications that come within the spirit of the inventions are desired to be protected. It should be understood that while the use of words such as preferable, preferably, preferred or more preferred utilized in the description above indicate that the feature so described may be more desirable, it nonetheless may not be necessary and embodiments lacking the same may be contemplated as within the scope of the invention, the scope being defined by the claims that follow. In reading the claims, it is intended that when words such as "a," "an," "at least one," or "at least one portion" are used there is no intention to limit the claim to only one item unless specifically stated to the contrary in the claim. When the language "at least a portion" and/or "a portion" is used the item can include a portion and/or the entire item unless specifically stated to the contrary.

CLAIMS

WHAT IS CLAIMED IS:

1. A method, comprising:

enrolling a reader system with a cloud credential management service;

enrolling a host with the cloud credential management service; and

transmitting a virtual credential to the host from the cloud credential management service.
2. The method of claim 1, wherein the host is a mobile device.
3. The method of claim 1, further comprising:

transmitting a custom key to the reader system.
4. A method, comprising;

transmitting, with a mobile device, a user ID and PIN to a cloud credential management service;

receiving, with the mobile device, an authentication status from the cloud credential management service;

transmitting, with the mobile device, a device ID to the cloud credential management service; and

receiving, with the mobile device, a diversified credential from the cloud credential management service.

5. The method of claim 4, wherein the mobile device is a mobile phone.
6. The method of claim 4, wherein the authentication status includes a token.
7. The method of claim 6, wherein the mobile device transmits the token with the device ID.
8. A method, comprising:
 - receiving, with a cloud credential management service, a user ID and PIN from a mobile device;
 - transmitting, with the cloud credential management service, an authentication status including a token to the mobile device;
 - receiving, with the cloud credential management service, a device ID from the mobile device;
 - generating, with the cloud credential management service, a diversified credential based on the device ID; and
 - transmitting, with the cloud credential management service, the diversified credential to the mobile device.

9. A method, comprising:
- hosting a cloud credential management service over the Internet;
 - providing access to the cloud credential management service to a customer to allow the customer to assign a credential to an end-user's mobile device; and
 - transmitting the credential to the end-user's mobile device.
10. The method of claim 9, wherein the mobile device is a mobile phone.
11. The method of claim 9, wherein the cloud credential management service is structured to generate credentials in a plurality of formats.
12. A method, comprising:
- hosting a cloud credential management service;
 - receiving, with the cloud credential management service, requests to generate credentials in a plurality of formats; and
 - delivering, with the cloud credential management service, the credentials to mobile devices.
13. The method of claim 12, wherein the format includes at least one of prox, Mifare, EVI, optical, XceedID, and eISA.
14. The method of claim 12, wherein the credential is structured to be read by a reader.

15. A system, comprising:

a plurality of servers having processing devices and operating logic in memory, wherein the operating logic when executed includes a cloud credential management service;

a customer computer operable to connect to the cloud credential management service over the Internet and assign credentials to end-users; and

a plurality of mobile devices of the end-users, wherein the mobile devices are structured to receive the credentials from the cloud credential management service.

16. A system, comprising:

a reader coupled to a door lock, wherein the reader is structured to open the door lock when a registered credential is presented;

an administrative mobile device including means for selectively transmitting wirelessly a master credential and an end-user credential to the reader to register the reader to accept the end-user credential; and

a server including means for hosting a cloud credential management service, wherein the server is structured to transmit the end-user credential to an end-user mobile device.

17. The system of claim 16, wherein the mobile device is a mobile phone.

18 A method, comprising:

programming a plurality of credentials in a reader with a mobile phone;

notifying end-users to download credentials from a cloud credential management service; and

providing, with the cloud credential management service, credentials to the end-users.

FIG. 1

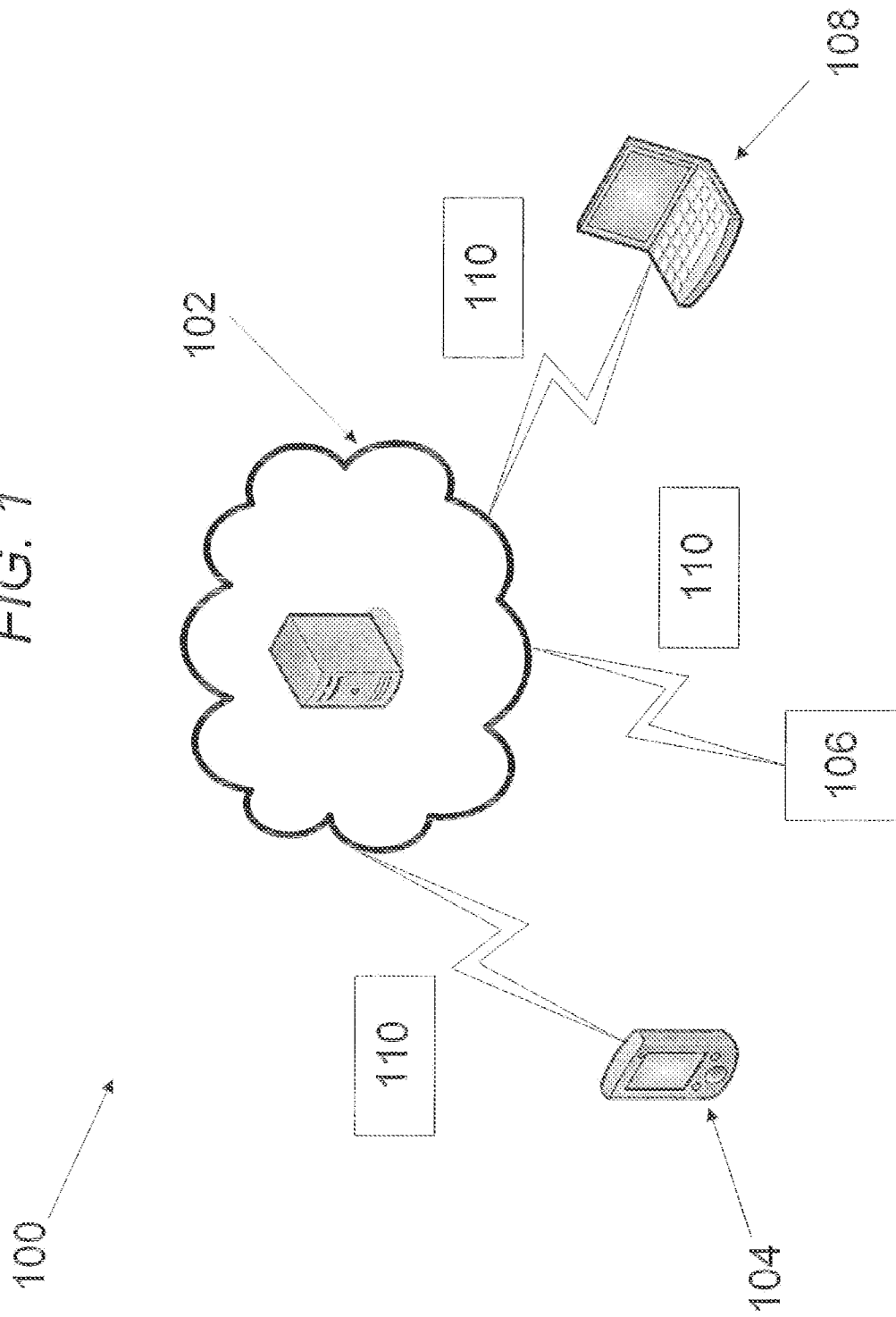


FIG. 2

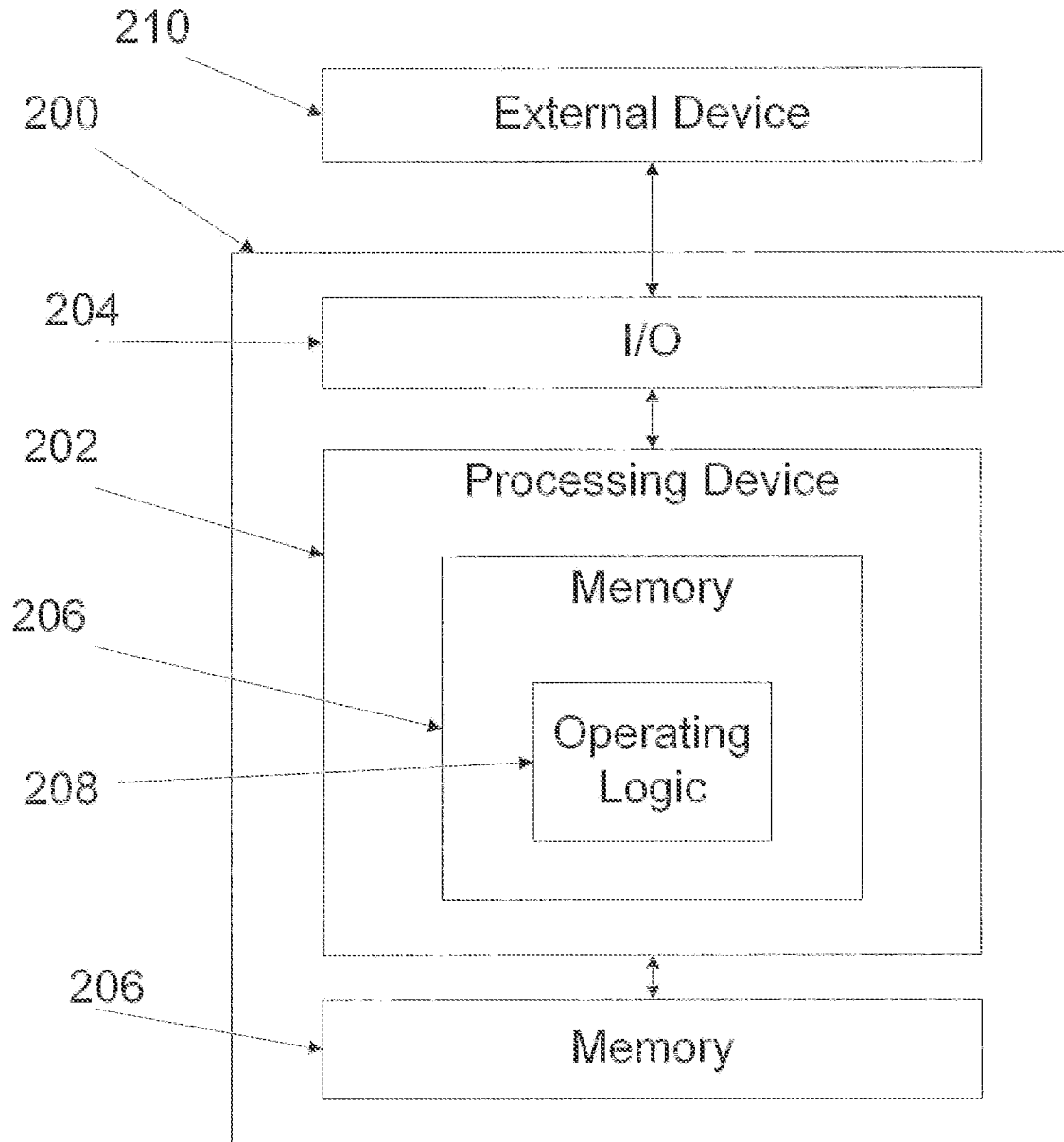


FIG. 3

Credentials and readers share a secret key

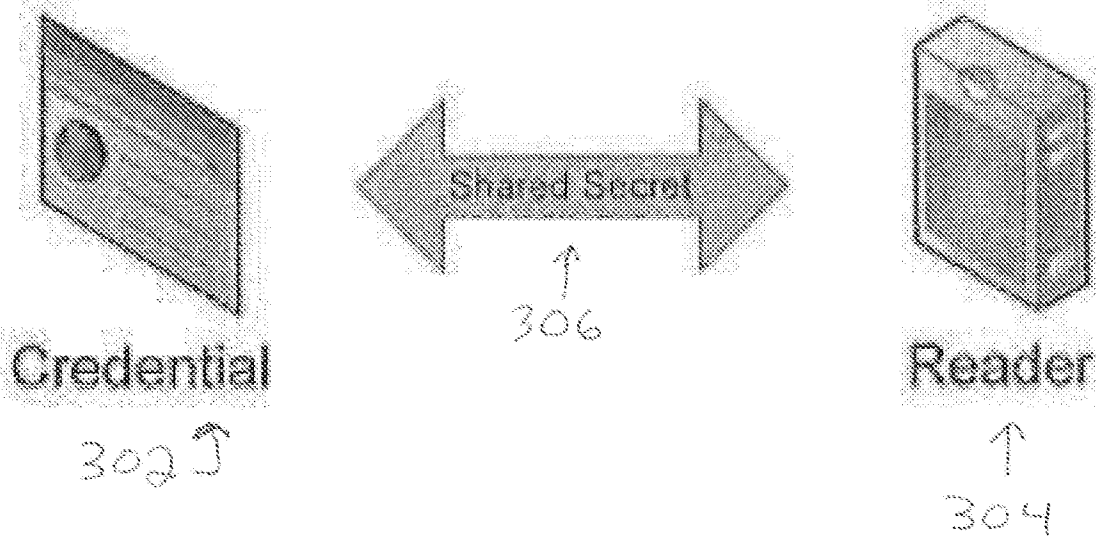


FIG. 4

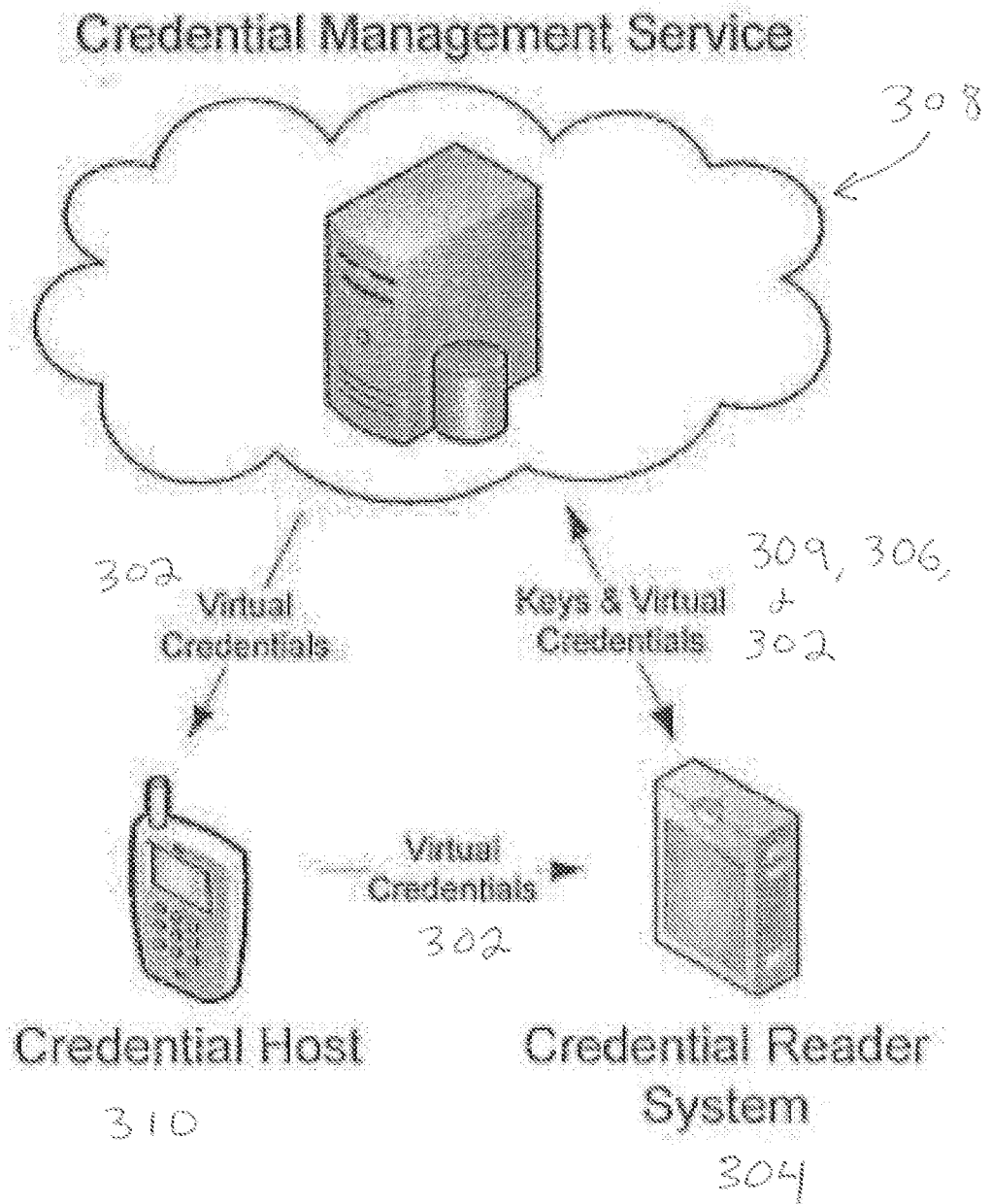
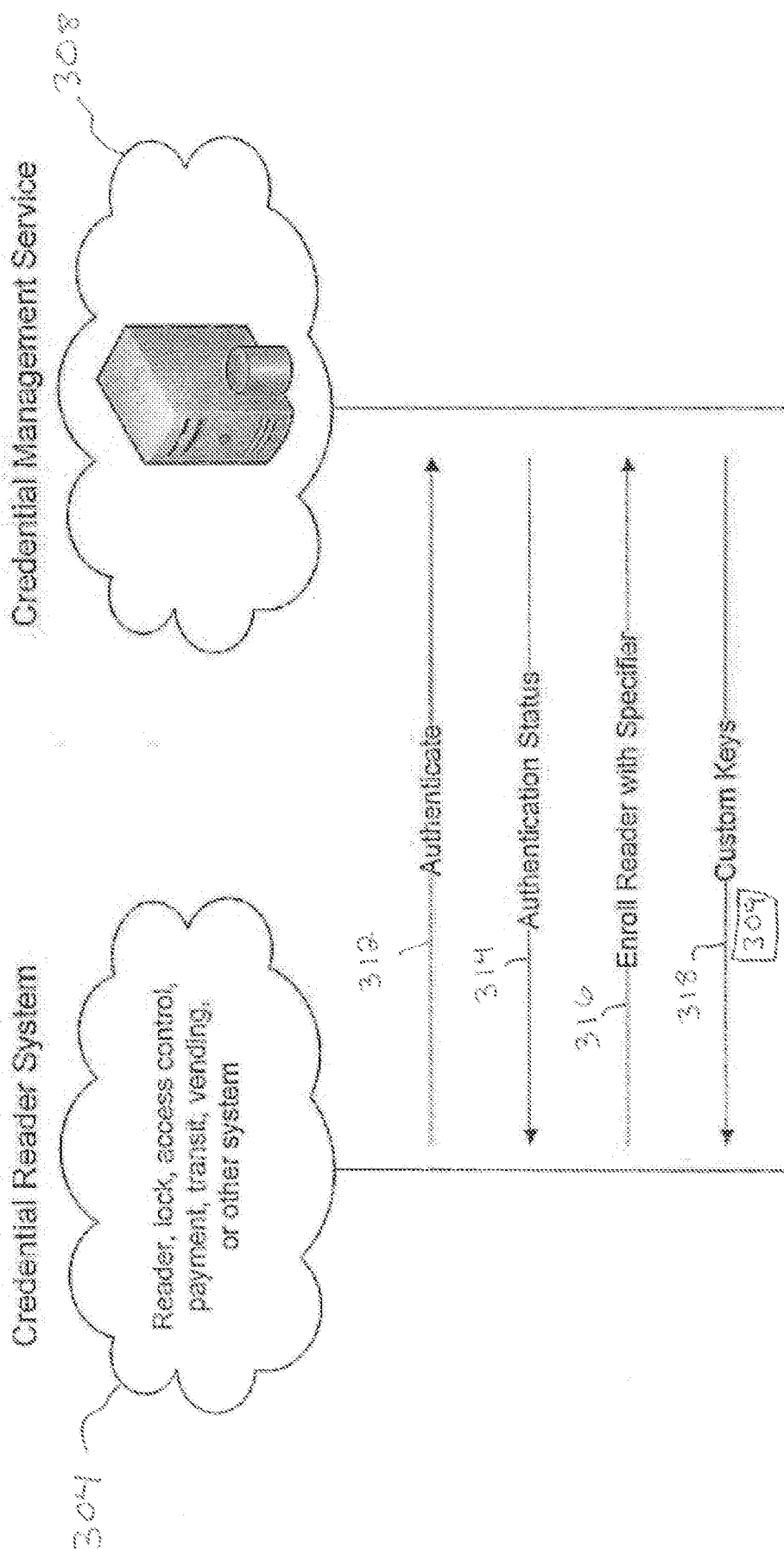


FIG. 5

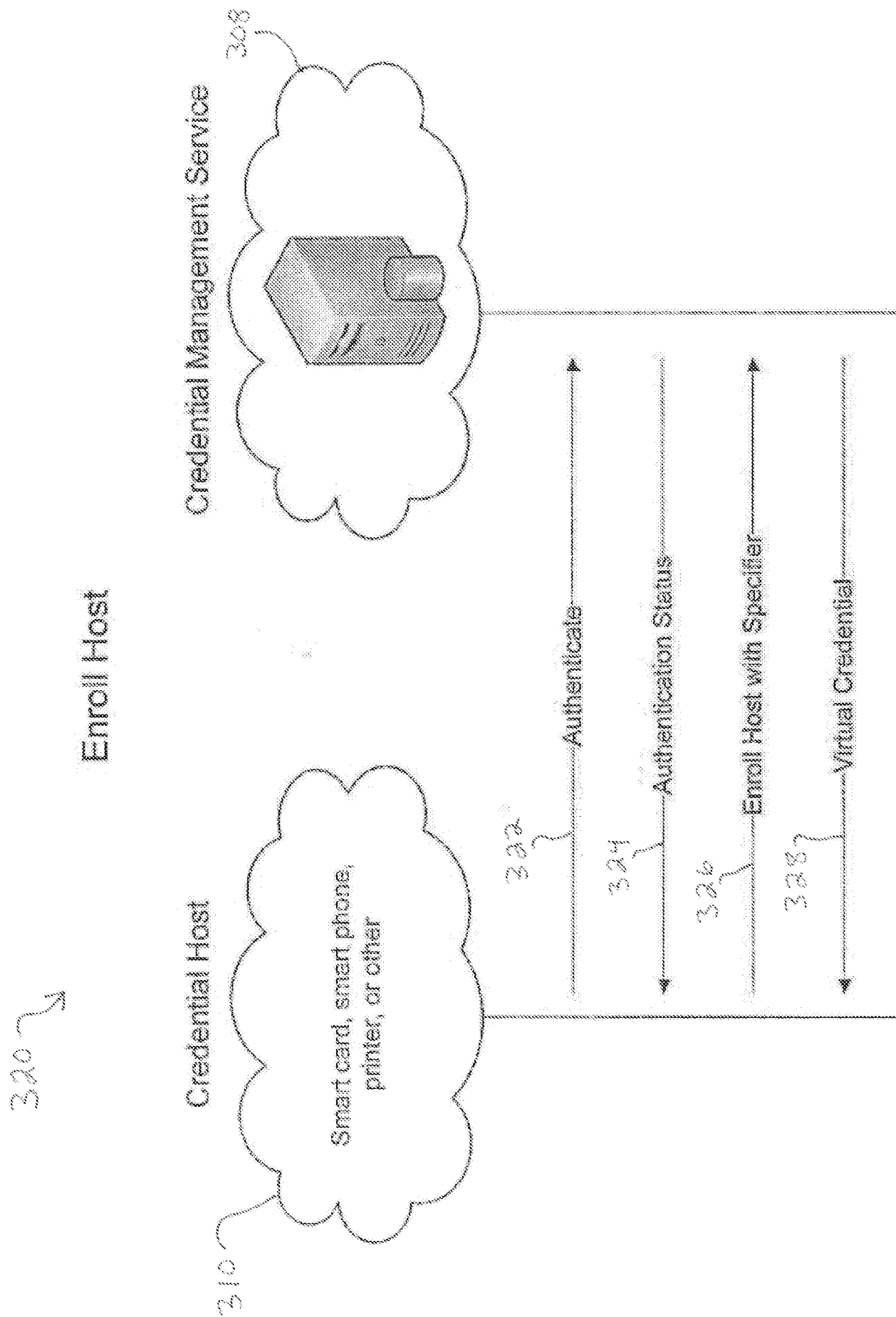
311 ↗

Enroll Reader



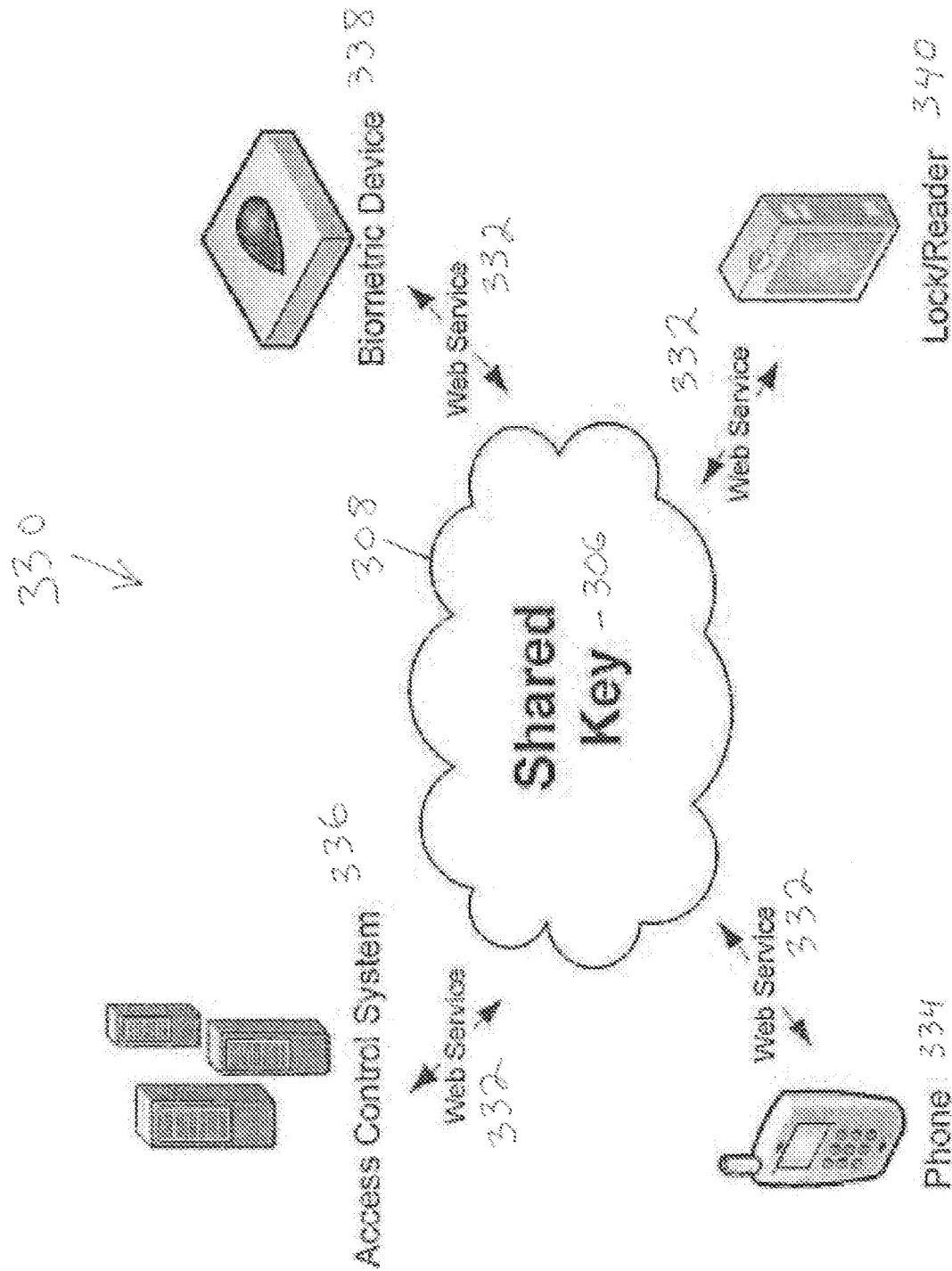
1) The readers system enrolls with the central host and acquires a custom key.

FIG. 6



2) The credential enrolls with the central host and acquires a credential based on the custom key.

FIG. 7



3) The shared key is now managed and shared via the central system (cloud service.)

FIG. 8

400 ↗

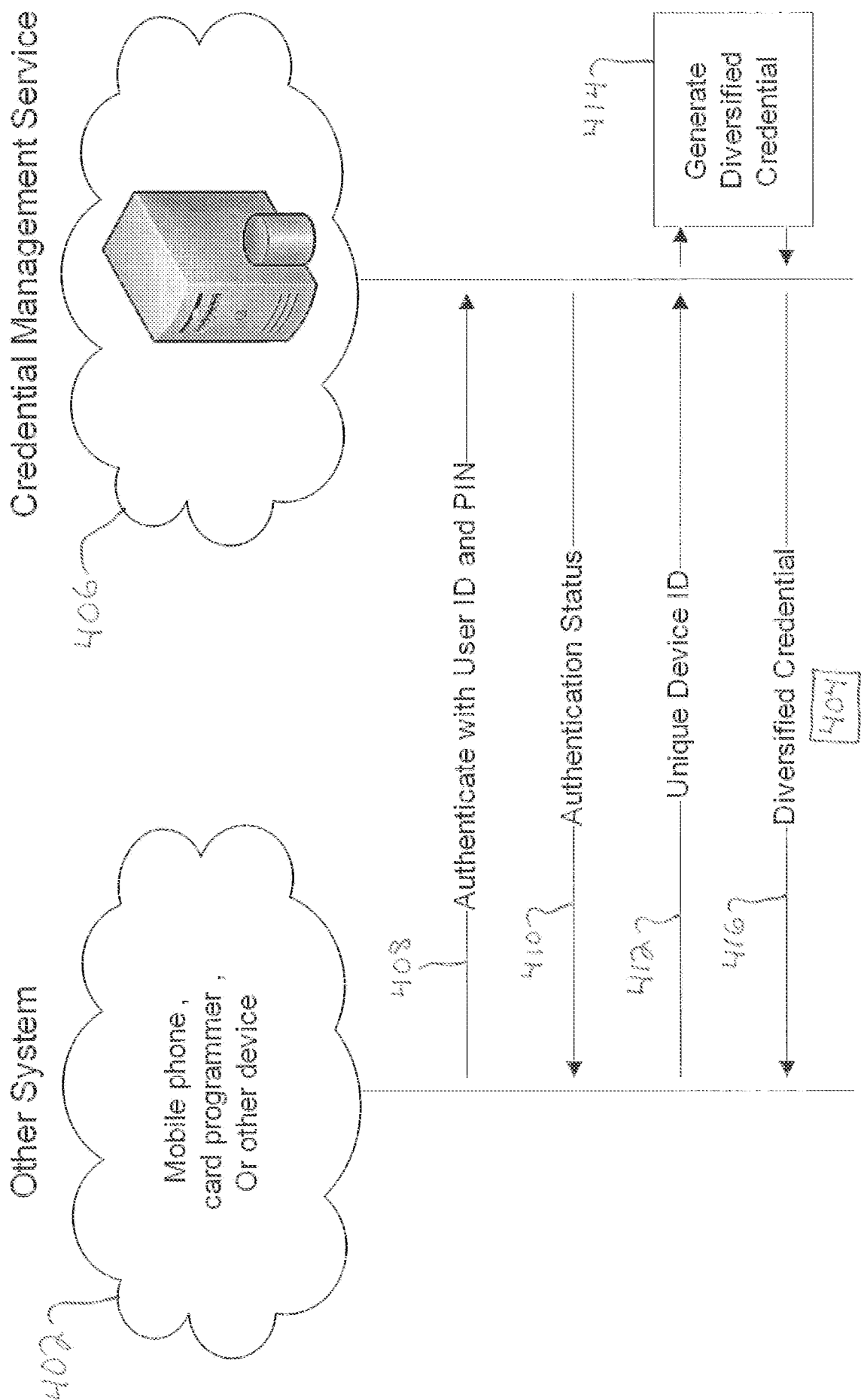


FIG. 9

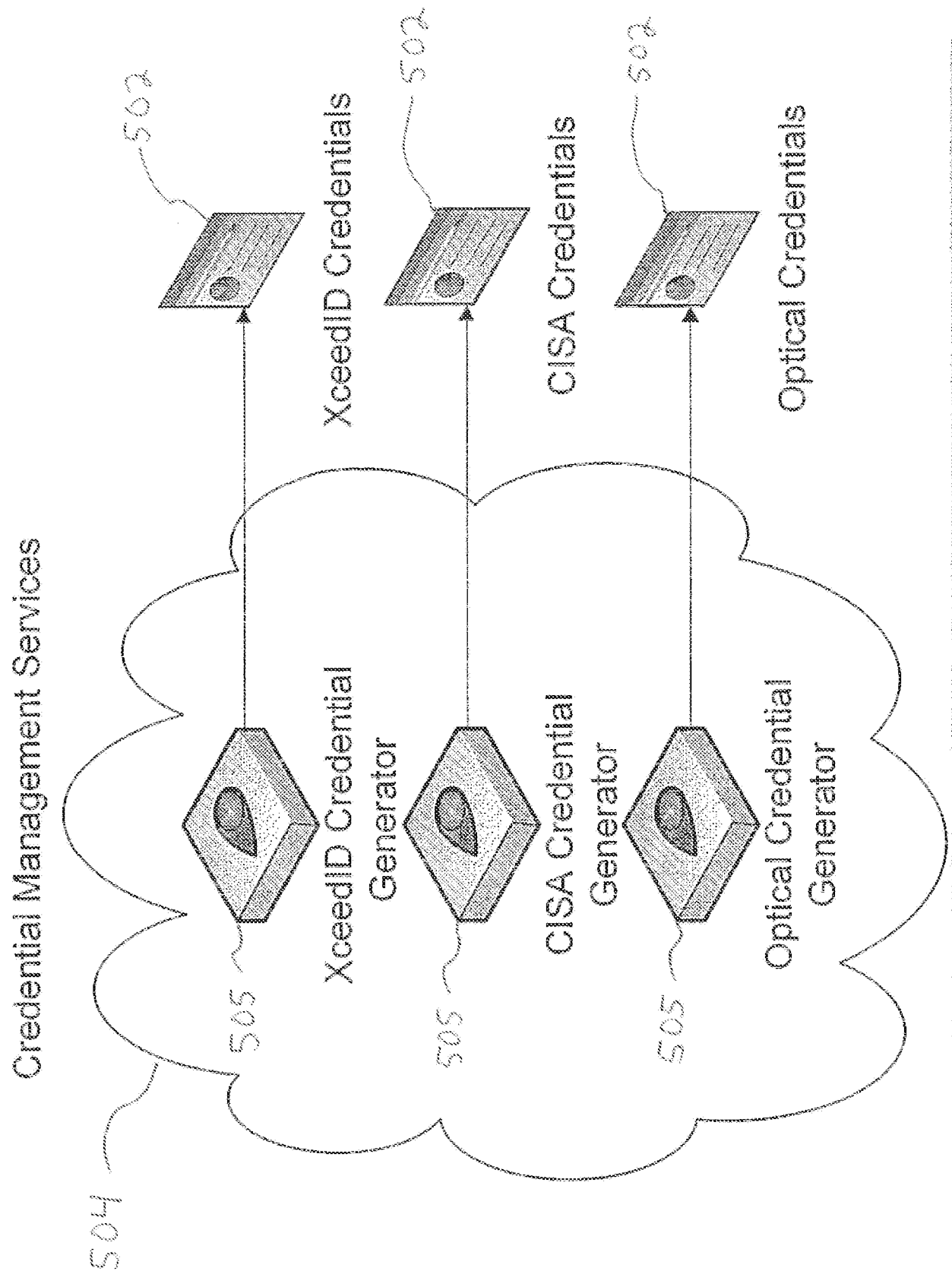


FIG. 10

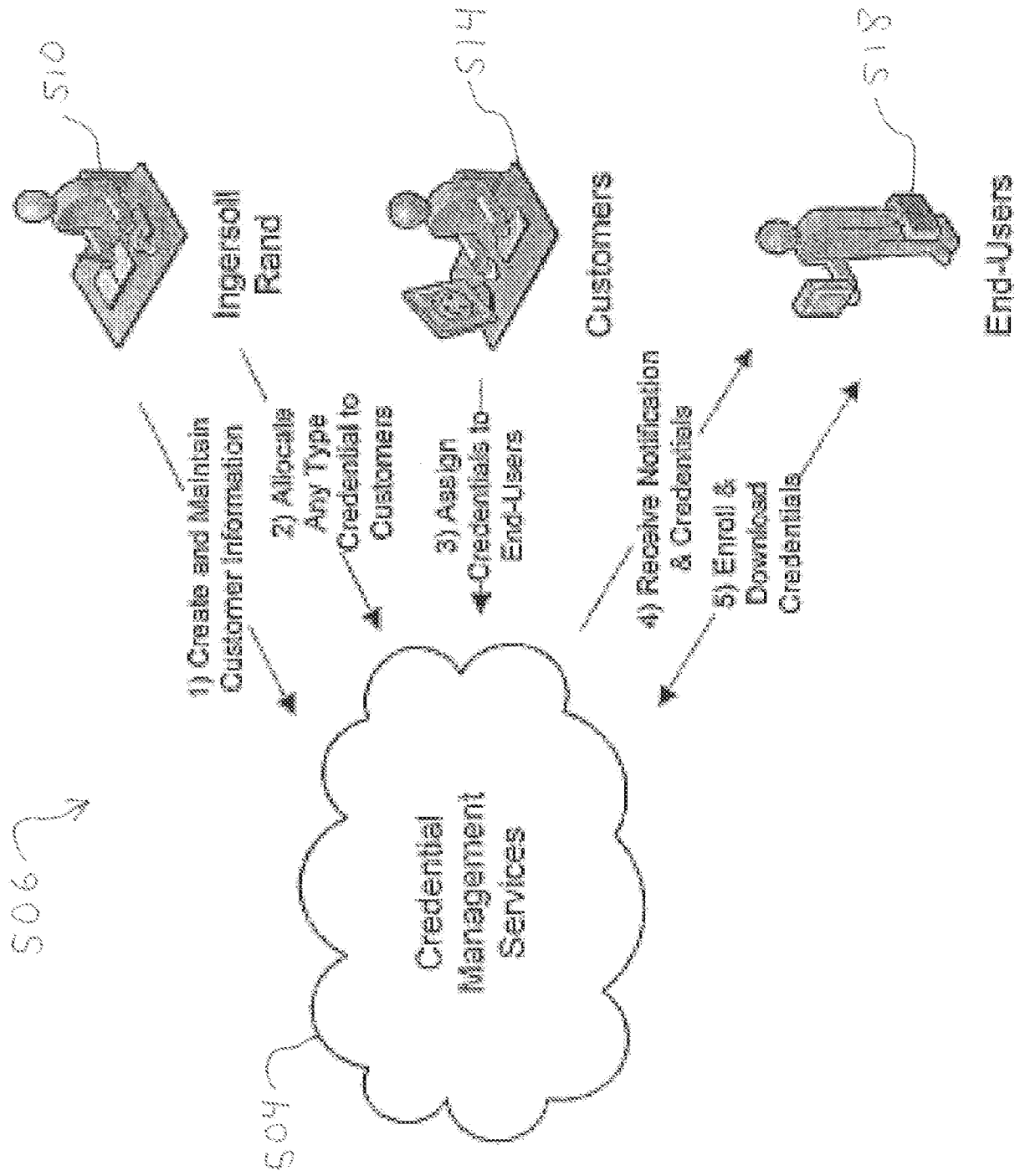
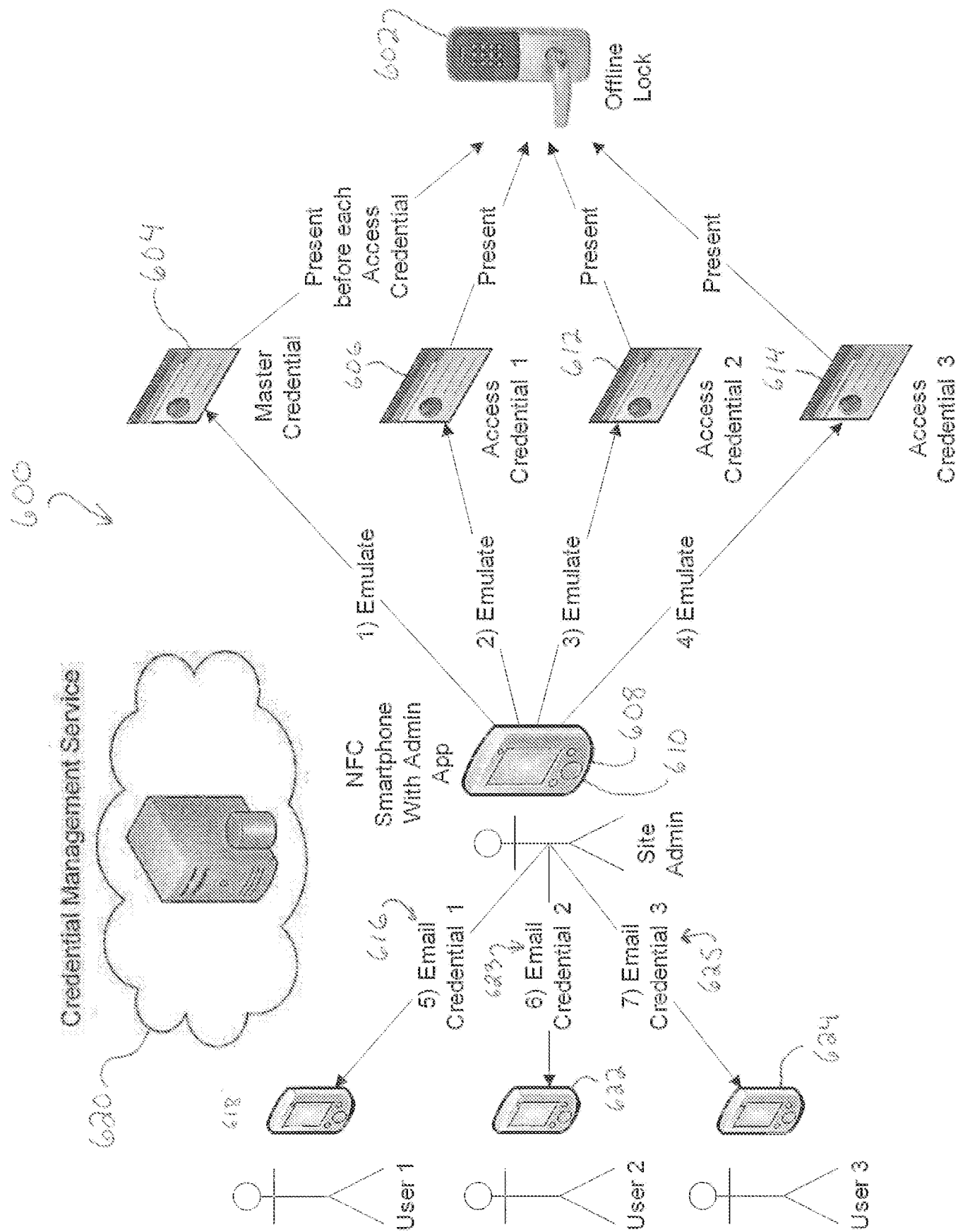


FIG. 11



Electronic Acknowledgement Receipt

EFS ID:	12065999
Application Number:	61598219
International Application Number:	
Confirmation Number:	1063
Title of Invention:	CREDENTIAL MANAGEMENT SERVICE
First Named Inventor/Applicant Name:	Jeffrey Neafsey
Customer Number:	52450
Filer:	John Harold Allie/Patricia Foor
Filer Authorized By:	John Harold Allie
Attorney Docket Number:	IRND-40
Receipt Date:	13-FEB-2012
Filing Date:	
Time Stamp:	18:56:47
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 250
RAM confirmation Number	6157
Deposit Account	122424
Authorized User	ALLIE,JOHN H.

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1	Provisional Cover Sheet (SB16)	IRND-40-Prov-Cover-Sheet.pdf	61316	no	2
			8805cf6c7819378752d90945648352e2b91eafd9		
Warnings:					
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2	Specification	IRND-40-Specification.pdf	1439423	no	15
			b81f8d6de8d56dea902bb38569a40d79d051836c		
Warnings:					
Information:					
3	Claims	IRND-40-Claims.pdf	345421	no	5
			9f15521205005d91100145951417b1452cfb84ba		
Warnings:					
Information:					
4	Drawings-only black and white line drawings	IRND-40-Drawings.pdf	1190529	no	11
			67ab12ca40ef074771d5c6ffadc4645f53b0c648		
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	29121	no	2
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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Provisional Application for Patent Cover Sheet

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)

Inventor(s)

Inventor 1

Remove

Given Name	Middle Name	Family Name	City	State	Country i
Jeffrey		Neafsey	Golden	CO	US

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Rocco		Vitali			

Inventor 3

Remove

Given Name	Middle Name	Family Name	City	State	Country i
Alberto		Andrini			

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

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Title of Invention

CREDENTIAL MANAGEMENT SERVICE

Attorney Docket Number (if applicable)

IRND-40

Correspondence Address

Direct all correspondence to (select one):

☒ The address corresponding to Customer Number☐ Firm or Individual Name

Customer Number

52450

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Entity Status

Applicant claims small entity status under 37 CFR 1.27

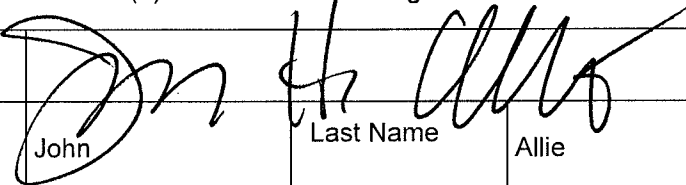
- ☐ Yes, applicant qualifies for small entity status under 37 CFR 1.27
- ☒ No

Warning

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature			Date (YYYY-MM-DD)	2012-02-13	
First Name	John	Last Name	Allie	Registration Number (If appropriate)	39088

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	CREDENTIAL MANAGEMENT SERVICE			
First Named Inventor/Applicant Name:	Jeffrey Neafsey			
Filer:	John Harold Allie/Patricia Foor			
Attorney Docket Number:	IRND-40			
Filed as Large Entity				
Provisional Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Provisional application filing	1005	1	250	250
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				250



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
61/598,219	02/13/2012		250	IRND-40		

CONFIRMATION NO. 1063

52450
KRIEG DEVAULT LLP
ONE INDIANA SQUARE
SUITE 2800
INDIANAPOLIS, IN 46204-2079

FILING RECEIPT



Date Mailed: 03/05/2012

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Jeffrey Neafsey, Golden, CO;
Rocco Vitali, Residence Not Provided;
Alberto Andrini, Residence Not Provided;

Power of Attorney:

John Allie--39088

If Required, Foreign Filing License Granted: 02/29/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/598,219**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

CREDENTIAL MANAGEMENT SERVICE

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international

patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and

Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
61/598,219	02/13/2012	Jeffrey Neafsey	IRND-40

CONFIRMATION NO. 1063

FORMALITIES LETTER



52450
KRIEG DEVAULT LLP
ONE INDIANA SQUARE
SUITE 2800
INDIANAPOLIS, IN 46204-2079

Date Mailed: 03/05/2012

NOTICE TO FILE MISSING PARTS OF PROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(c)

Filing Date Granted

An application number and filing date have been accorded to this provisional application. The items indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The provisional application cover sheet under 37 CFR 1.51(c)(1), which may be an application data sheet (37 CFR 1.76), is required identifying:
 - either city and state, or city and foreign country, of the residence of each inventor.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- A surcharge (for late submission of filing fee or cover sheet) as set forth in 37 CFR 1.16(g) of \$50 for a non-small entity, must be submitted.

SUMMARY OF FEES DUE:

Total fee(s) required within **TWO MONTHS** from the date of this Notice is \$50 for a non-small entity

- \$50 Surcharge.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/hchin/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Customer No. 52,450
 Group: Unassigned
 Confirmation No.: 1063
 Application No.: 61/598,219
 Title of Invention: CREDENTIAL MANAGEMENT SERVICE
 Inventors: Neafsey, et al
 Filed: February 13, 2012
 Attorney Docket: IRND-40
 Examiner: Unassigned

Certificate Under 37 CFR 1.8)	
I hereby certify that this correspondence is being filed using the U.S. Patent Office EFS-Web electronic filing system.	
on August 6, 2012	
/Paul Gosnell/ (Signature)	
Paul Gosnell (Printed Name)	

RESPONSE TO NOTICE TO FILE MISSING PARTS OF A PROVISIONAL APPLICATION FILED UNDER 37 CFR 1.53(c)

Mail Stop: MISSING PARTS
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

Sir:

The above-identified application was filed on February 13, 2012. A filing receipt was mailed on March 5, 2012, together with a Notice to File Missing Parts of a Provisional Application.

The Notice to File Missing Parts of a Provisional Application indicates that, in

order to avoid abandonment of the application, Applicant must submit a provisional application cover sheet providing the city and state or city and foreign country of each inventor and pay the surcharge fee. The provisional application filing fee of \$250 was previously paid.

In reply to the Notice to File Missing Parts, Applicants submits herewith a corrected provisional application cover sheet and payment of the late filing surcharge of \$50. Also submitted is a three-month extension of time (\$1270) up to and including August 5, 2012, which falls on a Sunday. Thus, the total fee submitted is \$1320.

No additional fees are believed to be due; however, if any such fees are deemed necessary, please charge such fees or credit any overpayments to Deposit Account No. 12-2424, but not to include payment of issue fees.

Respectfully submitted,

/Paul Gosnell/

Paul Gosnell
Reg. No. 46,735
KRIEG DeVAULT LLP
One Indiana Square, Suite 2800
Indianapolis, IN 46204-2079
Tel.: (317) 238-6284
Fax: (317) 636-1507

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PROVISIONAL APPLICATION FOR PATENT COVER SHEET – Page 1 of 2

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. _____

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Jeffrey	Neafsey	Golden, CO
Rocco	Vitali	Forli, Italy
Alberto	Andrini	Faenza (Ravenna), Italy

Additional inventors are being named on the _____ separately numbered sheets attached hereto.

TITLE OF THE INVENTION (500 characters max):

CREDENTIAL MANAGEMENT SERVICE

Direct all correspondence to: CORRESPONDENCE ADDRESS		
☒ The address corresponding to Customer Number:	52,450	
OR		
☐ Firm or ☐ Individual Name		
Address		
City	State	Zip
Country	Telephone	Email

ENCLOSED APPLICATION PARTS (check all that apply)

☐ Application Data Sheet. See 37 CFR 1.76 ☒ Drawing(s) Number of Sheets <u>11</u> ☒ Specification (e.g. description of the invention) Number of Pages <u>20</u>	☐ CD(s), Number of CDs _____ ☐ Other (specify) _____
--	---

Fees Due: Filing Fee of \$220 (\$110 for small entity). If the specification and drawings exceed 100 sheets of paper, an application size fee is also due, which is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

METHOD OF PAYMENT OF THE FILING FEE AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT

☐ Applicant claims small entity status. See 37 CFR 1.27. ☐ A check or money order made payable to the <i>Director of the United States Patent and Trademark Office</i> is enclosed to cover the filing fee and application size fee (if applicable). ☒ Payment by credit card. ☒ The Director is hereby authorized to charge the filing fee and application size fee (if applicable) or credit any overpayment to Deposit Account Number: <u>12-2424</u>	0.00 TOTAL FEE AMOUNT (\$)
---	---

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 10 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PROVISIONAL APPLICATION COVER SHEET
Page 2 of 2

PTO/SB/16 (12-08)

Approved for use through 09/30/2010. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.



No.



Yes, the name of the U.S. Government agency and the Government contract number are: _____

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

SIGNATURE /Paul Gosnell/

Date August 8, 2012

TYPED or PRINTED NAME Paul Gosnell

REGISTRATION NO. 46,735
(if appropriate)

TELEPHONE 317-238-6284

Docket Number: IRND-40

Electronic Patent Application Fee Transmittal

Application Number:	61598219			
Filing Date:	13-Feb-2012			
Title of Invention:	CREDENTIAL MANAGEMENT SERVICE			
First Named Inventor/Applicant Name:	Jeffrey Neafsey			
Filer:	Paul C. Gosnell/George Gray			
Attorney Docket Number:	IRND-40			
Filed as Large Entity				
Provisional Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Late provisional filing fee/cover sheet	1052	1	50	50
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 3 months with \$0 paid	1253	1	1270	1270
Miscellaneous:				
Total in USD (\$)				1320

Electronic Acknowledgement Receipt

EFS ID:	13429474
Application Number:	61598219
International Application Number:	
Confirmation Number:	1063
Title of Invention:	CREDENTIAL MANAGEMENT SERVICE
First Named Inventor/Applicant Name:	Jeffrey Neafsey
Customer Number:	52450
Filer:	Paul C. Gosnell/George Gray
Filer Authorized By:	Paul C. Gosnell
Attorney Docket Number:	IRND-40
Receipt Date:	06-AUG-2012
Filing Date:	13-FEB-2012
Time Stamp:	17:49:47
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 1320
RAM confirmation Number	5183
Deposit Account	122424
Authorized User	GOSNELL,PAUL C.

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2012_08_06_As_Filed_Response_to_Missing_Parts.pdf	82661 868feb8afdb01c1819237d4e649b065e2492c526	yes	4

Multipart Description/PDF files in .zip description

Document Description	Start	End
Miscellaneous Incoming Letter	1	2
Provisional Cover Sheet (SB16)	3	4

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	32125 99537e27edc320caeb21f0e0fba8fdae15fb1278	no	2
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Warnings:

Information:

Total Files Size (in bytes):	114786
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY,DOCKET.NO	TOT CLAIMS	IND CLAIMS
61/598,219	02/13/2012		300	IRND-40		

CONFIRMATION NO. 1063

UPDATED FILING RECEIPT

52450
KRIEG DEVAULT LLP
ONE INDIANA SQUARE
SUITE 2800
INDIANAPOLIS, IN 46204-2079



Date Mailed: 08/10/2012

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Jeffrey Neafsey, Golden, CO;
Rocco Vitali, Forli, ITALY;
Alberto Andrini, Faenza (Ravenna), ITALY;

Power of Attorney:

John Allie--39088
Paul Gosnell--46735

If Required, Foreign Filing License Granted: 02/29/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/598,219**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

CREDENTIAL MANAGEMENT SERVICE

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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