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(54) **EFFECTING PAYMENTS USING OPTICAL COUPLING**

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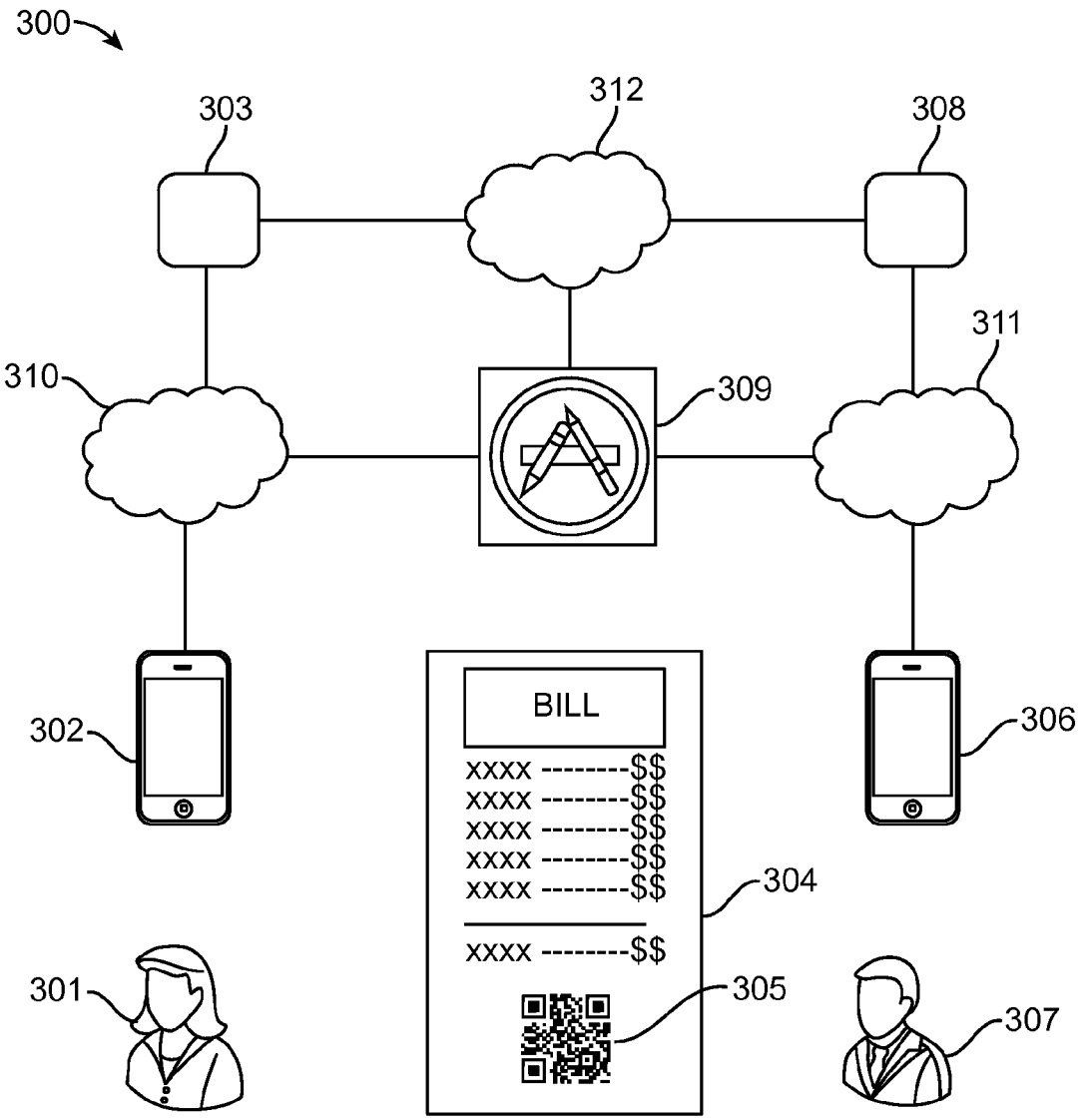
(57) **ABSTRACT**

The present technology relates to secure mobile payment systems for interacting with traditional paper invoices. Generating optical codes in a clearinghouse which, when decoded by a customer device, provides the customer with an anonymous portal for reconciling an invoice through the clearinghouse. Effecting payments by utilizing mobile devices equipped with digital camera, software for decoding optical codes, and an infrastructure of network-based clearinghouses for maintaining the anonymity of a plurality of customers and protecting their private and financial data. The present technology relates to a prescription lifecycle management system using optical coupling.



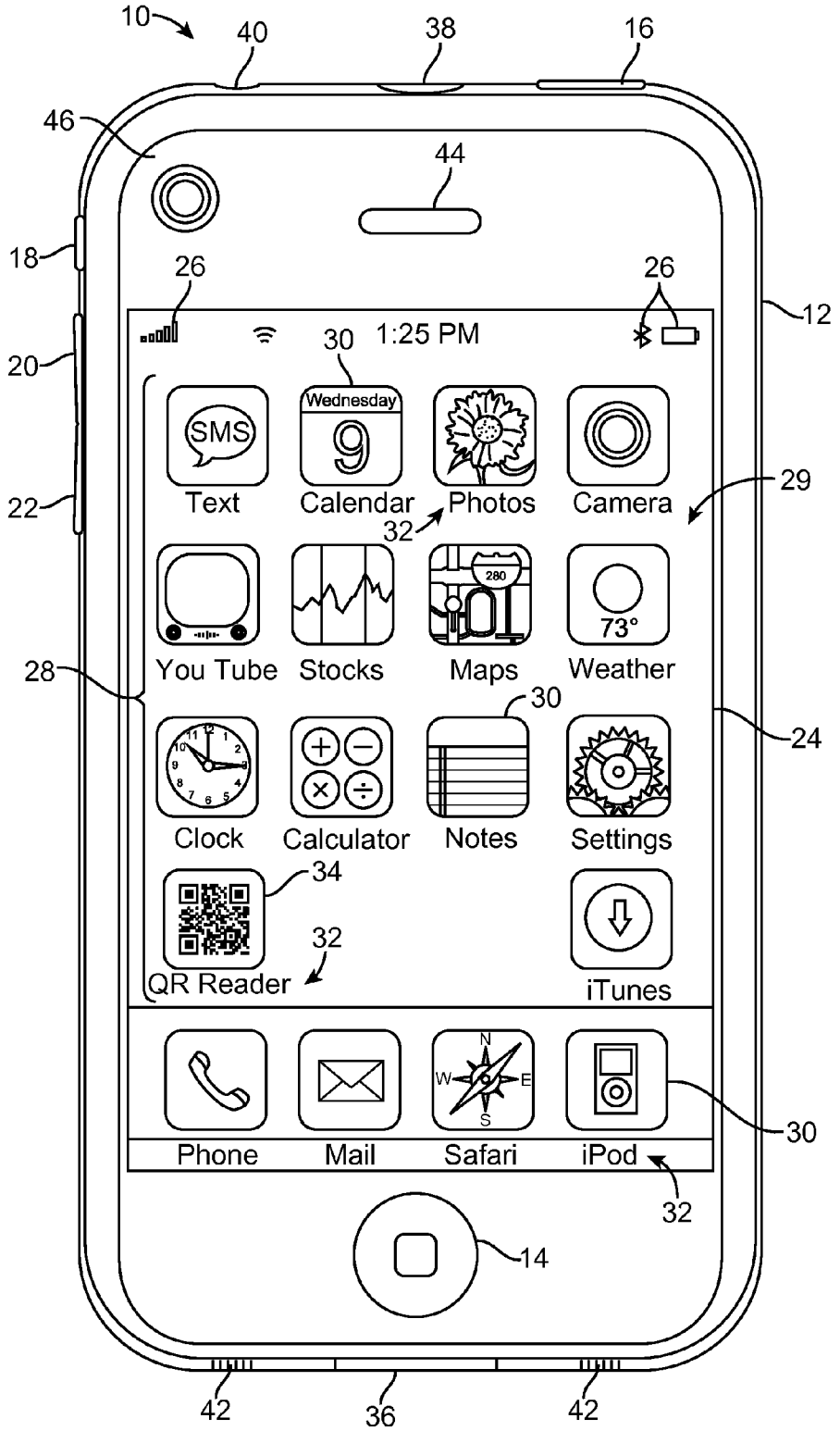

10
40
38
16
46
44
18
26
26
12
20
30
1:25 PM
Wednesday
9
SMS
Text
Calendar
Photos
Camera
29
22
32
280
73°
You Tube
Stocks
Maps
Weather
28
30
24
Clock
Calculator
Notes
Settings
34
32
QR Reader
iTunes
N
W
E
S
Phone
Mail
Safari
iPod
30
32
14
42
36
42

FIG. 1

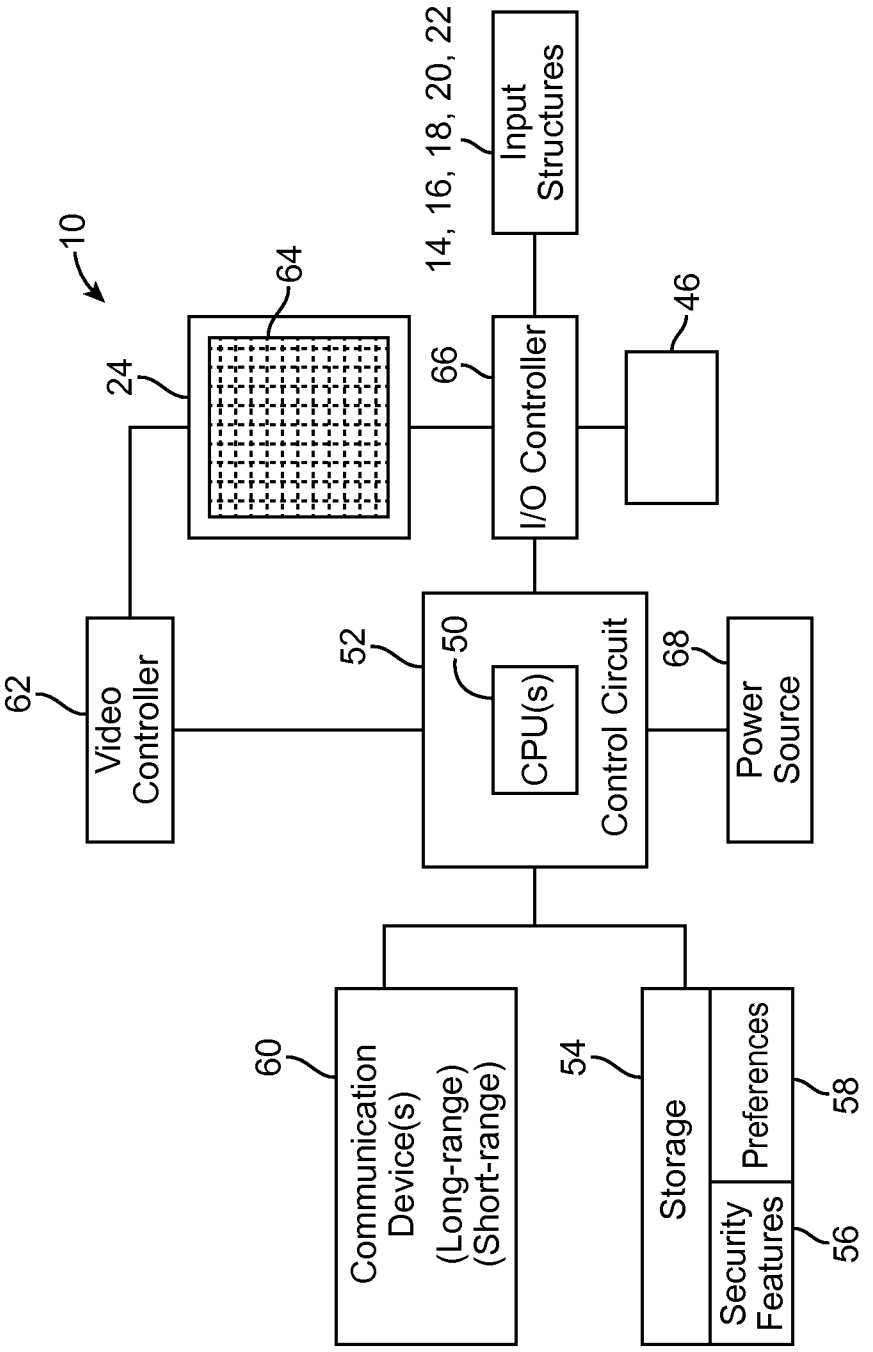

10
14, 16, 18, 20, 22
Input Structures
64
24
66
I/O Controller
46
62
Video Controller
52
50
CPU(s)
Control Circuit
68
Power Source
60
Communication Device(s) (Long-range) (Short-range)
54
Storage
Preferences
58
Security Features
56

FIG. 2

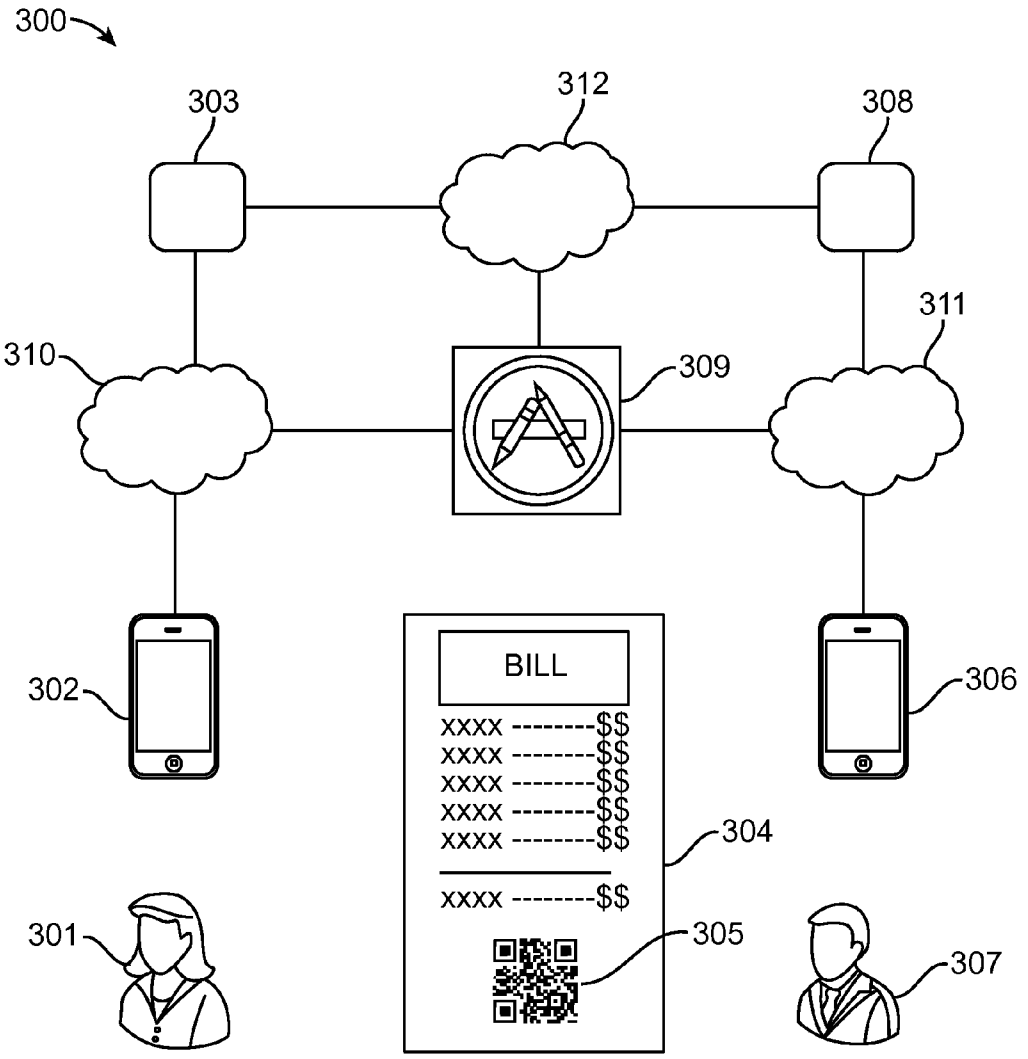

300
303
312
308
311
310
309
302
306
BILL
XXXX --------$$
XXXX --------$$
XXXX --------$$
XXXX --------$$
XXXX --------$$
304
XXXX --------$$
305
301
307

FIG. 3

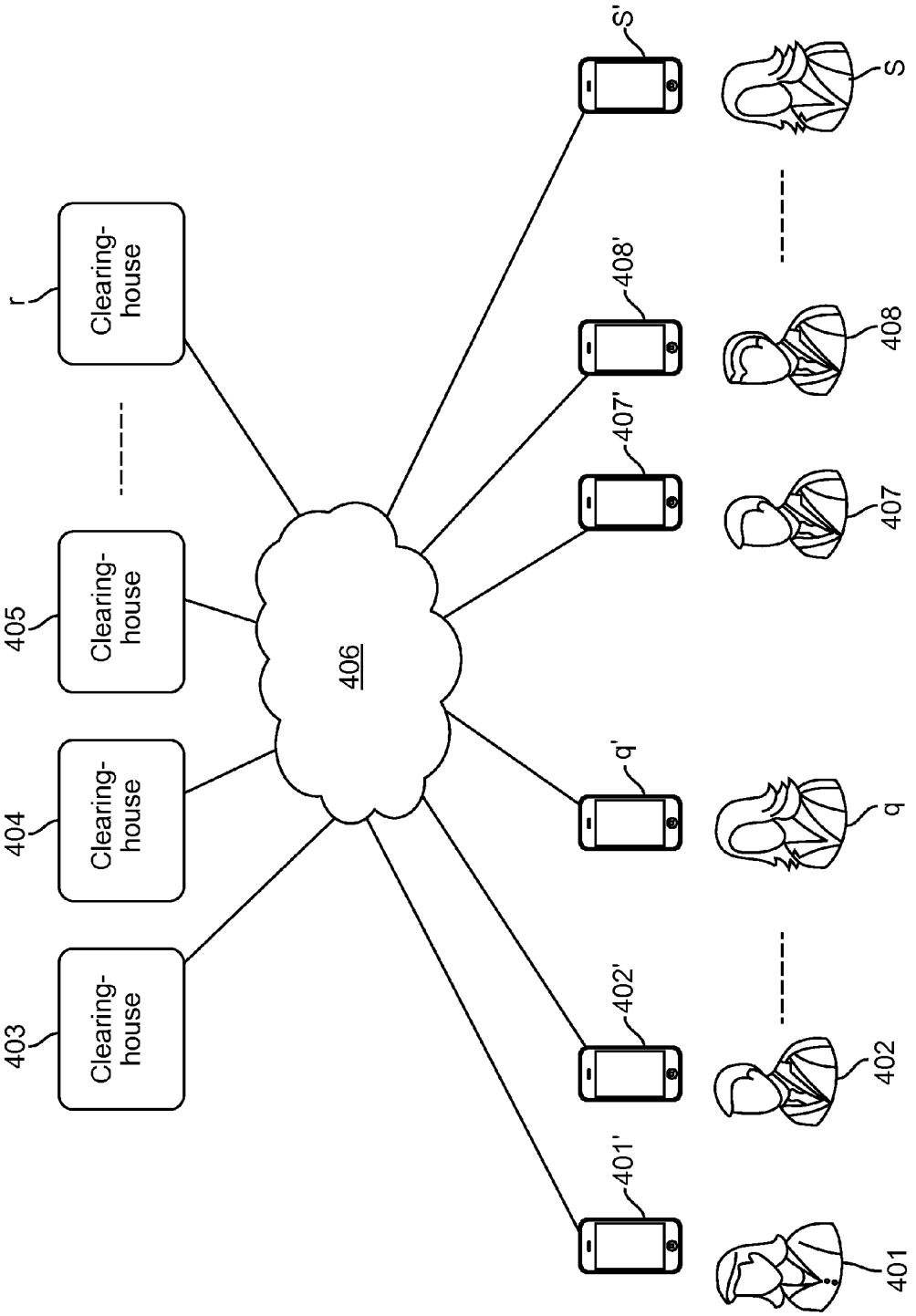

Clearing-house
r
Clearing-house
405
Clearing-house
404
Clearing-house
403
406
S'
408'
407'
q'
402'
401'
S
408
407
q
402
401

FIG. 4

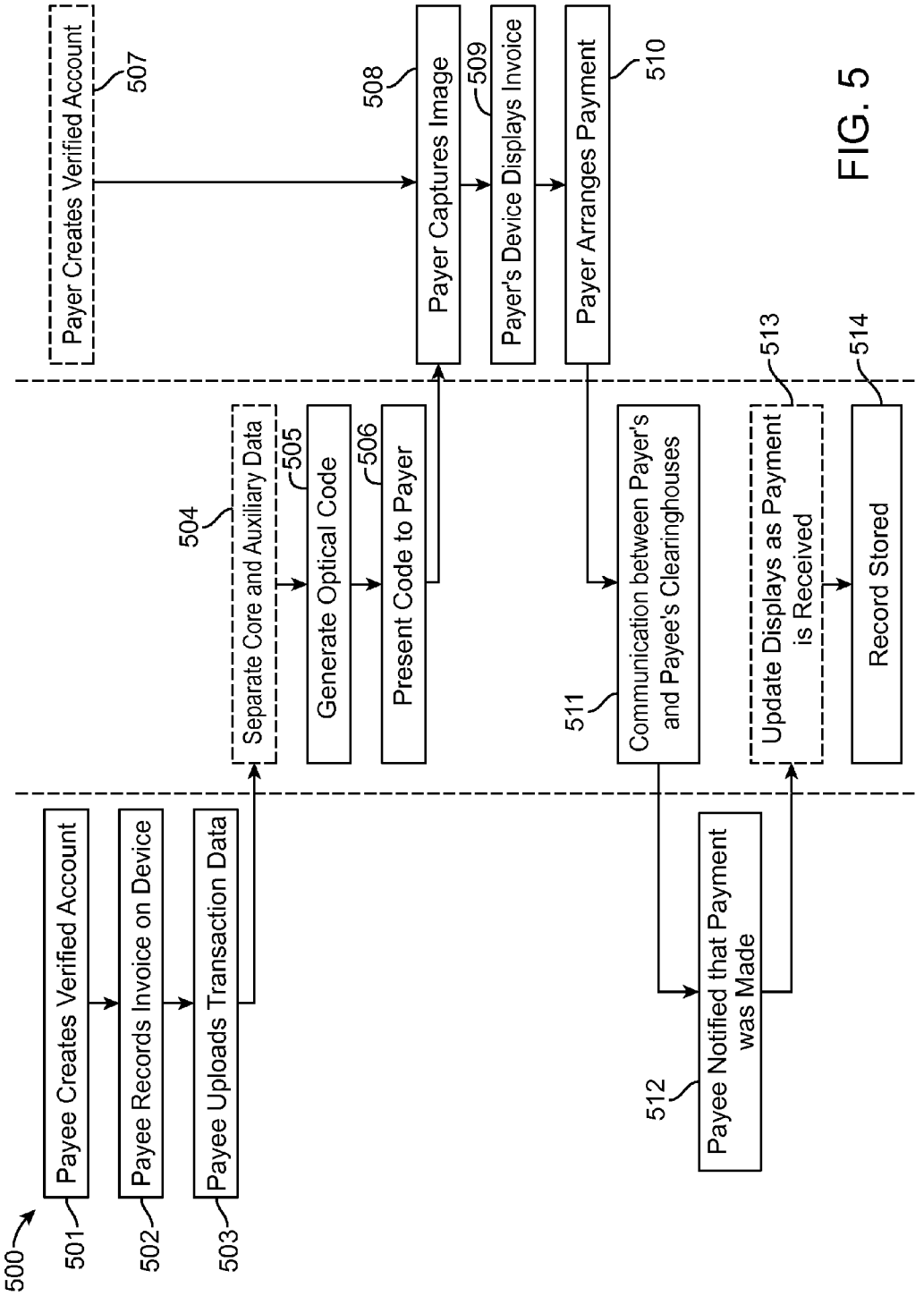

500
Payee Creates Verified Account
501
Payee Records Invoice on Device
502
Payee Uploads Transaction Data
503
Separate Core and Auxiliary Data
504
Generate Optical Code
505
Present Code to Payer
506
Payer Creates Verified Account
507
Payer Captures Image
508
Payer's Device Displays Invoice
509
Payer Arranges Payment
510
Communication between Payer's and Payee's Clearinghouses
511
Payee Notified that Payment was Made
512
Update Displays as Payment is Received
513
Record Stored
514

FIG. 5

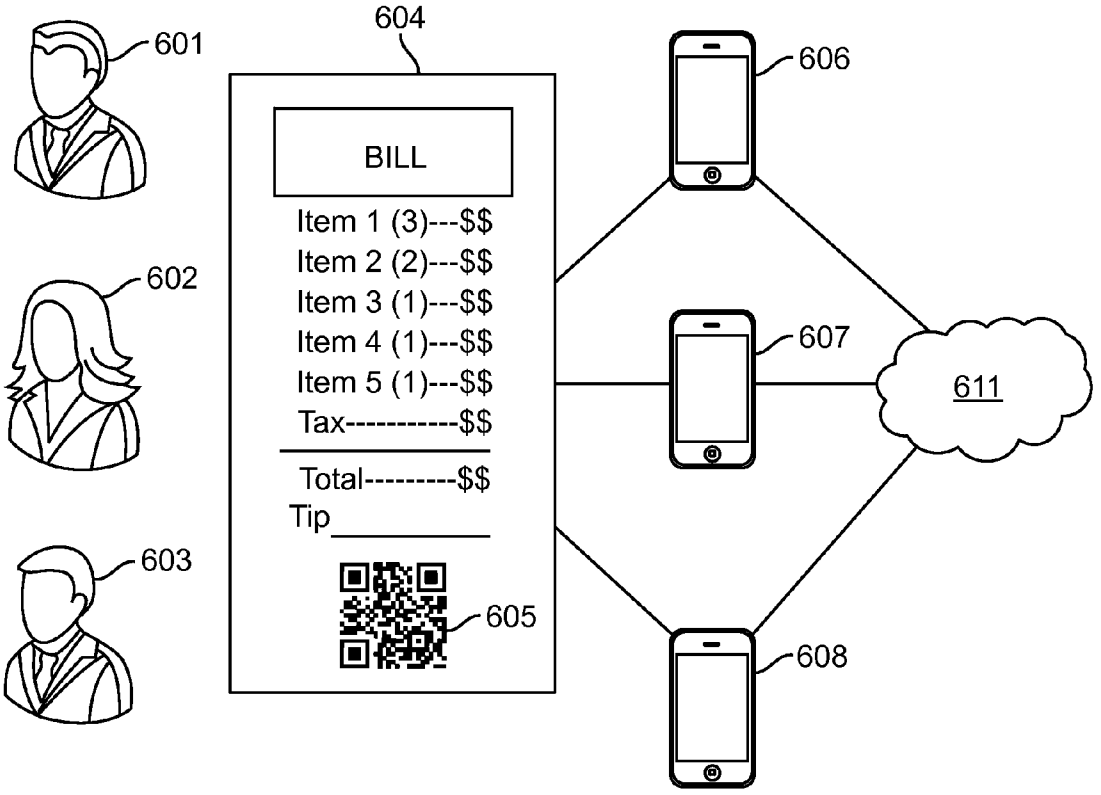
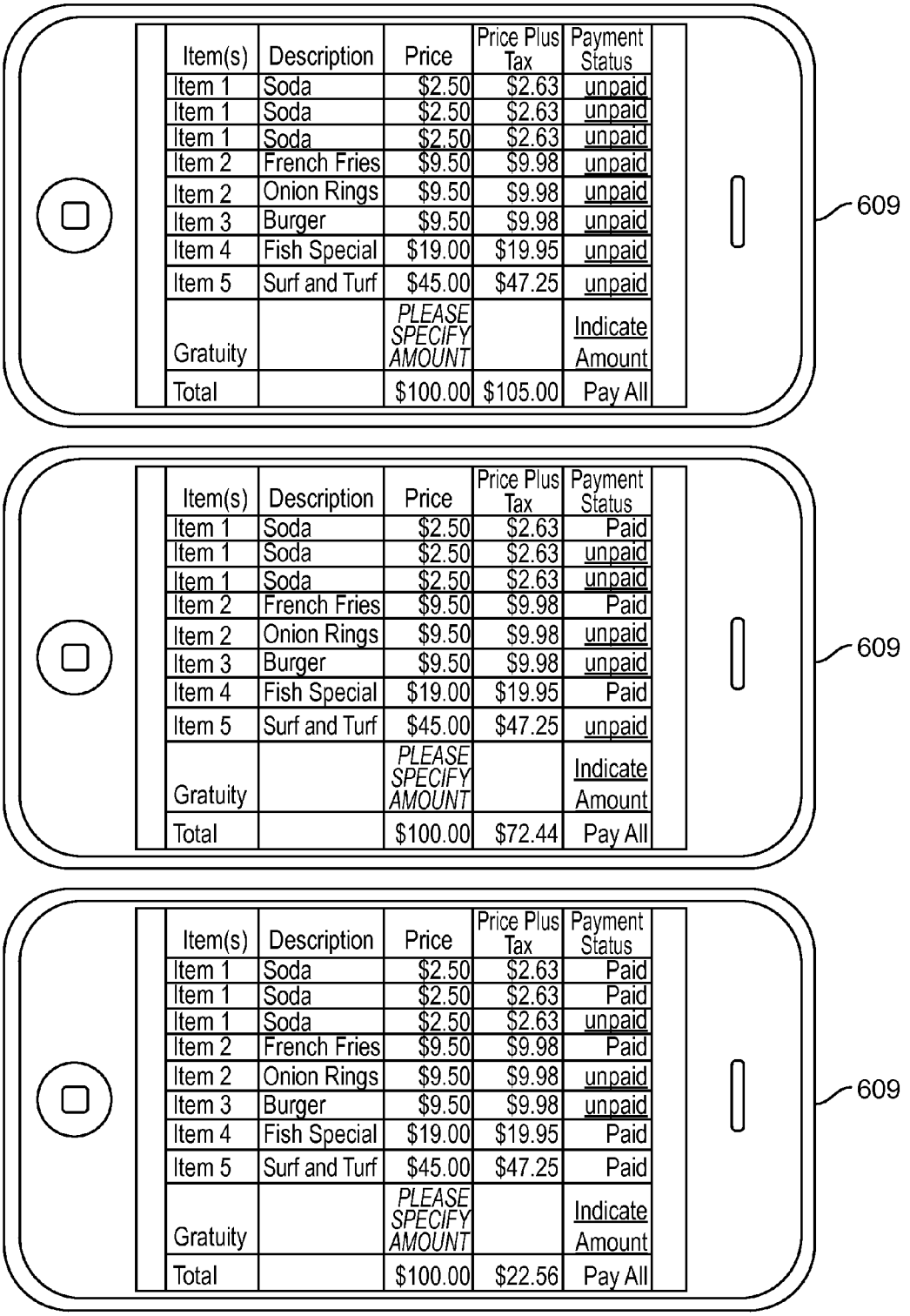

601
602
603
604
BILL
Item 1 (3)---$$
Item 2 (2)---$$
Item 3 (1)---$$
Item 4 (1)---$$
Item 5 (1)---$$
Tax----------$$
Total---------$$
Tip
605
606
607
608
611

FIG. 6



Item(s)	Description	Price	Price Plus Tax	Payment Status
Item 1	Soda	$2.50	$2.63	unpaid
Item 1	Soda	$2.50	$2.63	unpaid
Item 1	Soda	$2.50	$2.63	unpaid
Item 2	French Fries	$9.50	$9.98	unpaid
Item 2	Onion Rings	$9.50	$9.98	unpaid
Item 3	Burger	$9.50	$9.98	unpaid
Item 4	Fish Special	$19.00	$19.95	unpaid
Item 5	Surf and Turf	$45.00	$47.25	unpaid
Gratuity		*PLEASE SPECIFY AMOUNT*		Indicate Amount
Total		$100.00	$105.00	Pay All

Item(s)	Description	Price	Price Plus Tax	Payment Status
Item 1	Soda	$2.50	$2.63	Paid
Item 1	Soda	$2.50	$2.63	unpaid
Item 1	Soda	$2.50	$2.63	unpaid
Item 2	French Fries	$9.50	$9.98	Paid
Item 2	Onion Rings	$9.50	$9.98	unpaid
Item 3	Burger	$9.50	$9.98	unpaid
Item 4	Fish Special	$19.00	$19.95	Paid
Item 5	Surf and Turf	$45.00	$47.25	unpaid
Gratuity		*PLEASE SPECIFY AMOUNT*		Indicate Amount
Total		$100.00	$72.44	Pay All

Item(s)	Description	Price	Price Plus Tax	Payment Status
Item 1	Soda	$2.50	$2.63	Paid
Item 1	Soda	$2.50	$2.63	Paid
Item 1	Soda	$2.50	$2.63	unpaid
Item 2	French Fries	$9.50	$9.98	Paid
Item 2	Onion Rings	$9.50	$9.98	unpaid
Item 3	Burger	$9.50	$9.98	unpaid
Item 4	Fish Special	$19.00	$19.95	Paid
Item 5	Surf and Turf	$45.00	$47.25	Paid
Gratuity		*PLEASE SPECIFY AMOUNT*		Indicate Amount
Total		$100.00	$22.56	Pay All

FIG. 6 (Cont.)

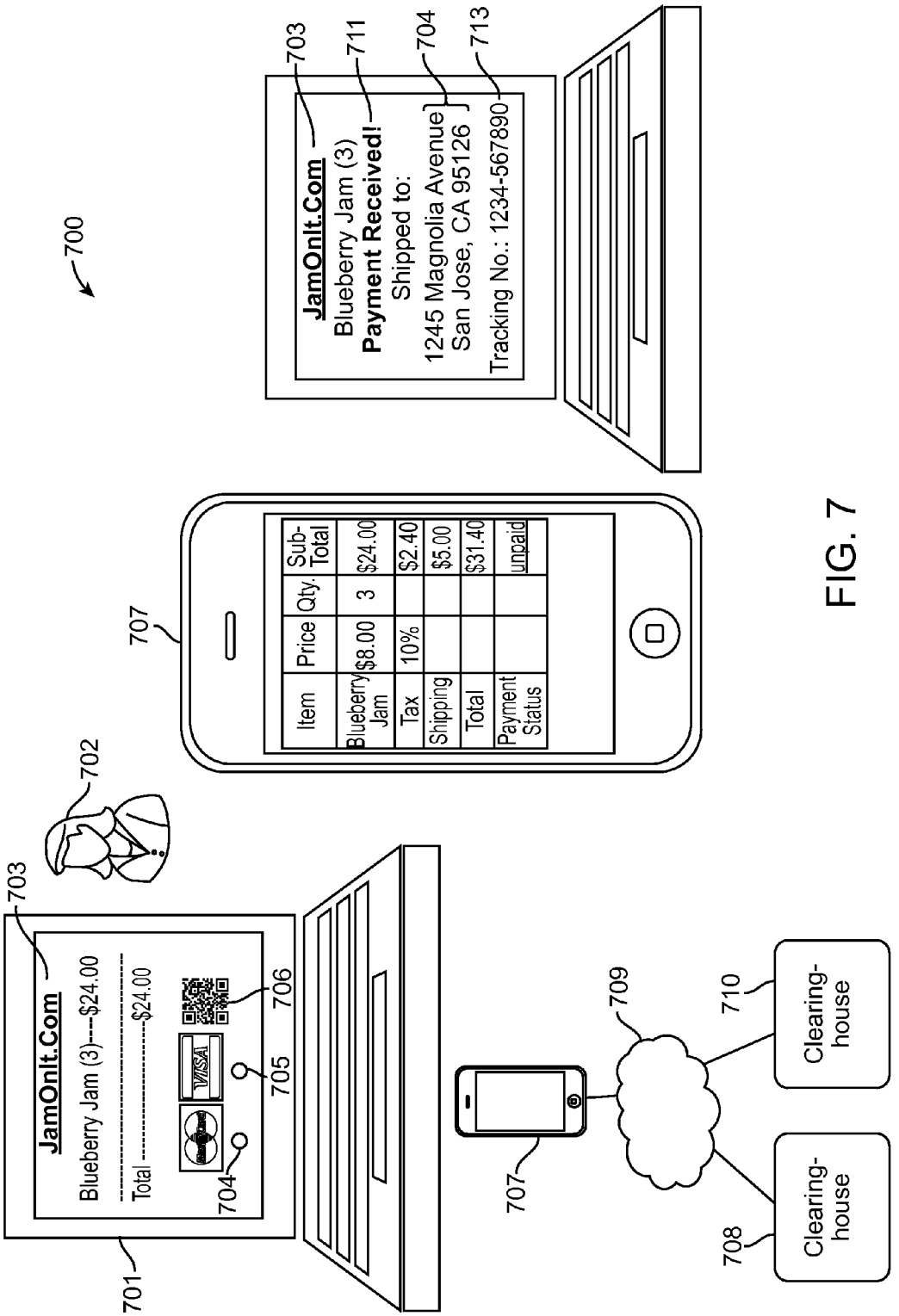

700
JamOnIt.Com
Blueberry Jam (3)
Payment Received!
Shipped to:
1245 Magnolia Avenue
San Jose, CA 95126
Tracking No.: 1234-567890
703
711
704
713
707
Item
Price
Qty.
Sub-Total
Blueberry Jam
$8.00
3
$24.00
Tax
10%
$2.40
Shipping
$5.00
Total
$31.40
Payment Status
unpaid
702
JamOnIt.Com
Blueberry Jam (3)---$24.00
Total ----------$24.00
VISA
703
701
704
705
706
707
709
710
Clearing-house
708
Clearing-house

FIG. 7

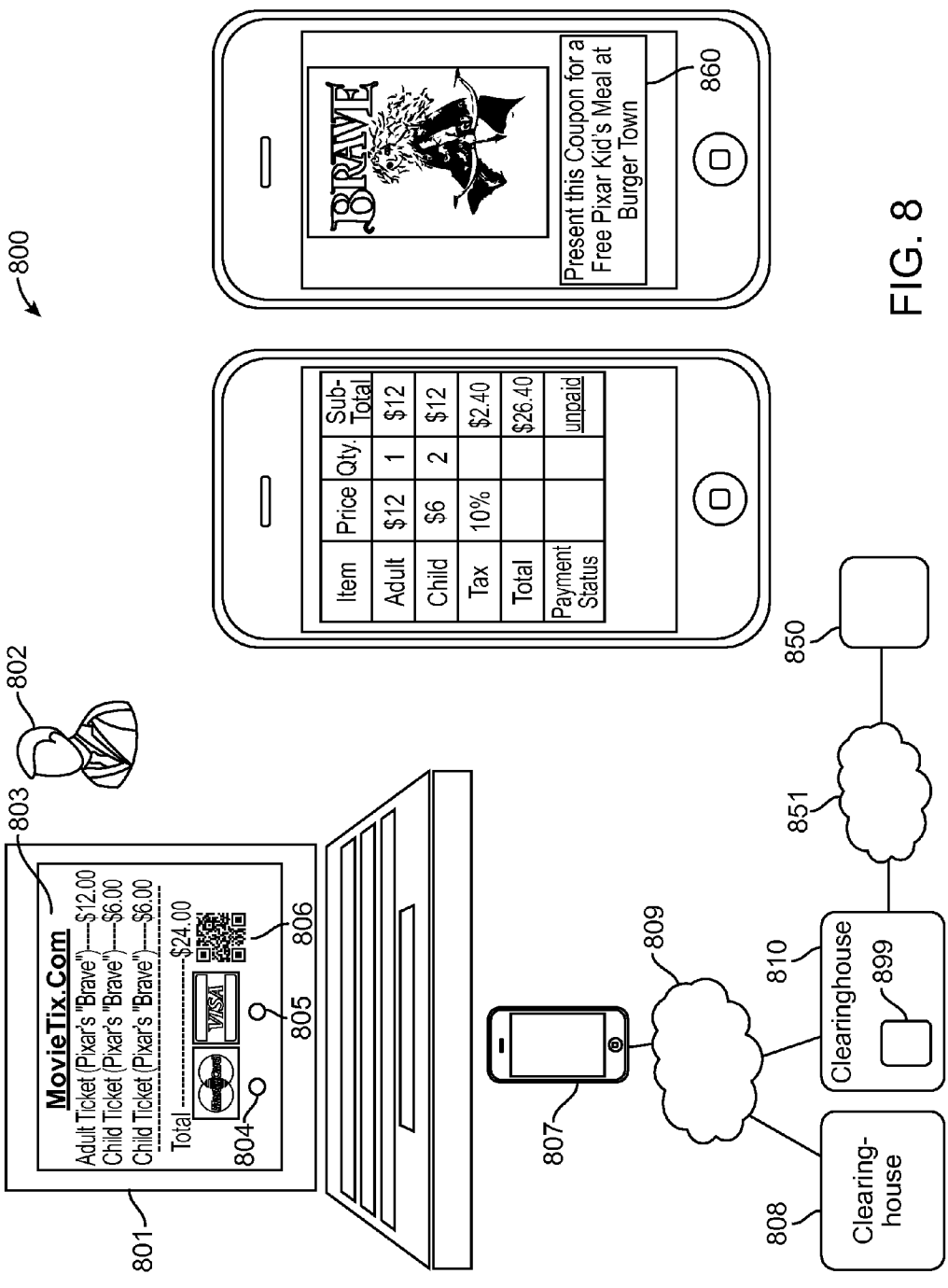

800
802
803
MovieTix.Com
Adult Ticket (Pixar's "Brave") ---- $12.00
Child Ticket (Pixar's "Brave") ---- $6.00
Child Ticket (Pixar's "Brave") ---- $6.00
Total ---- $24.00
804
805
806
801
807
809
808
Clearing-house
810
Clearinghouse
899
851
850
Item | Price | Qty. | Sub-Total
Adult | $12 | 1 | $12
Child | $6 | 2 | $12
Tax | 10% | | $2.40
Total | | | $26.40
Payment Status | | | unpaid
BRAVE
Present this Coupon for a Free Pixar Kid's Meal at Burger Town
860

FIG. 8

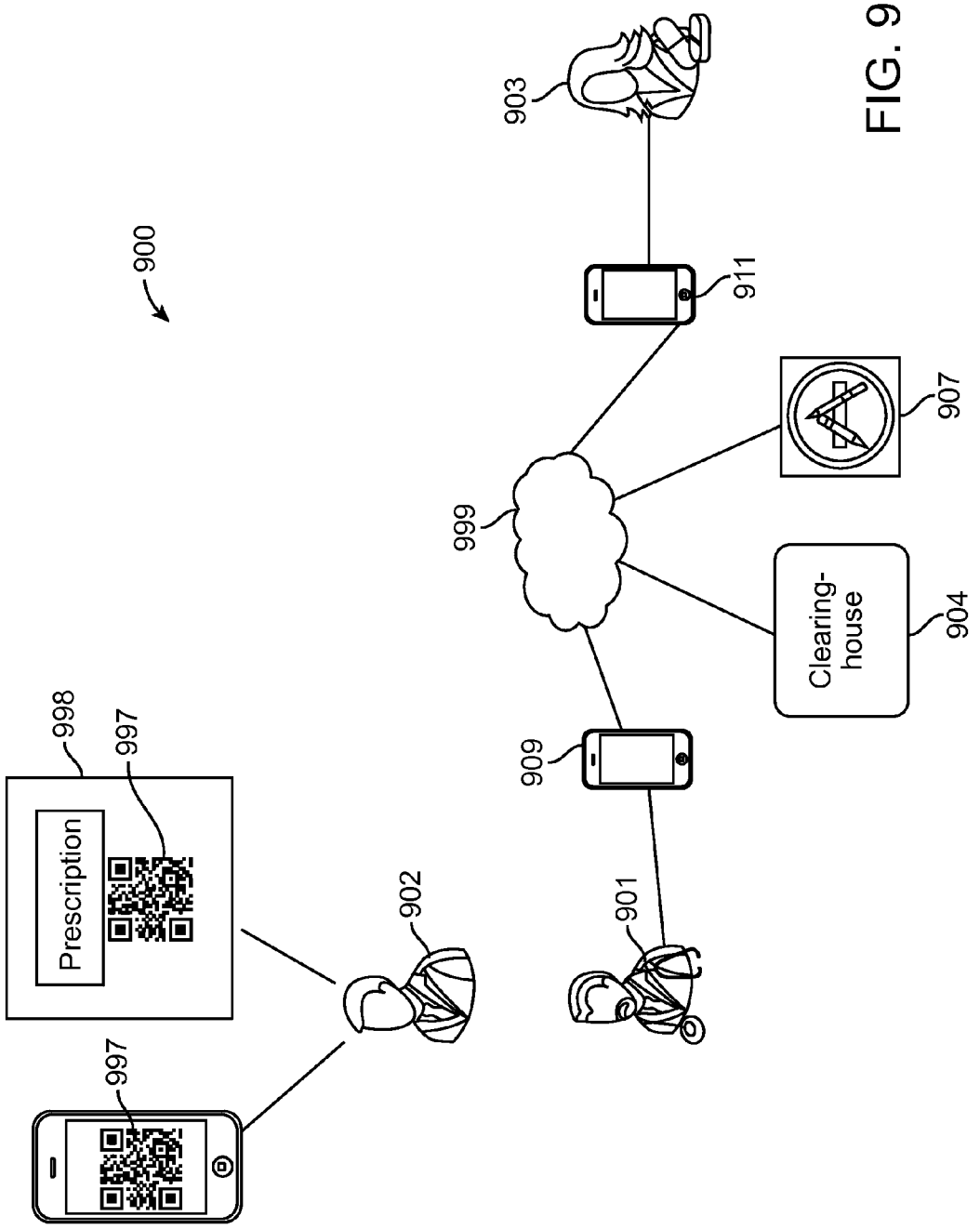

900
903
911
907
999
Clearing-house
904
909
901
902
998
997
Prescription
997

FIG. 9

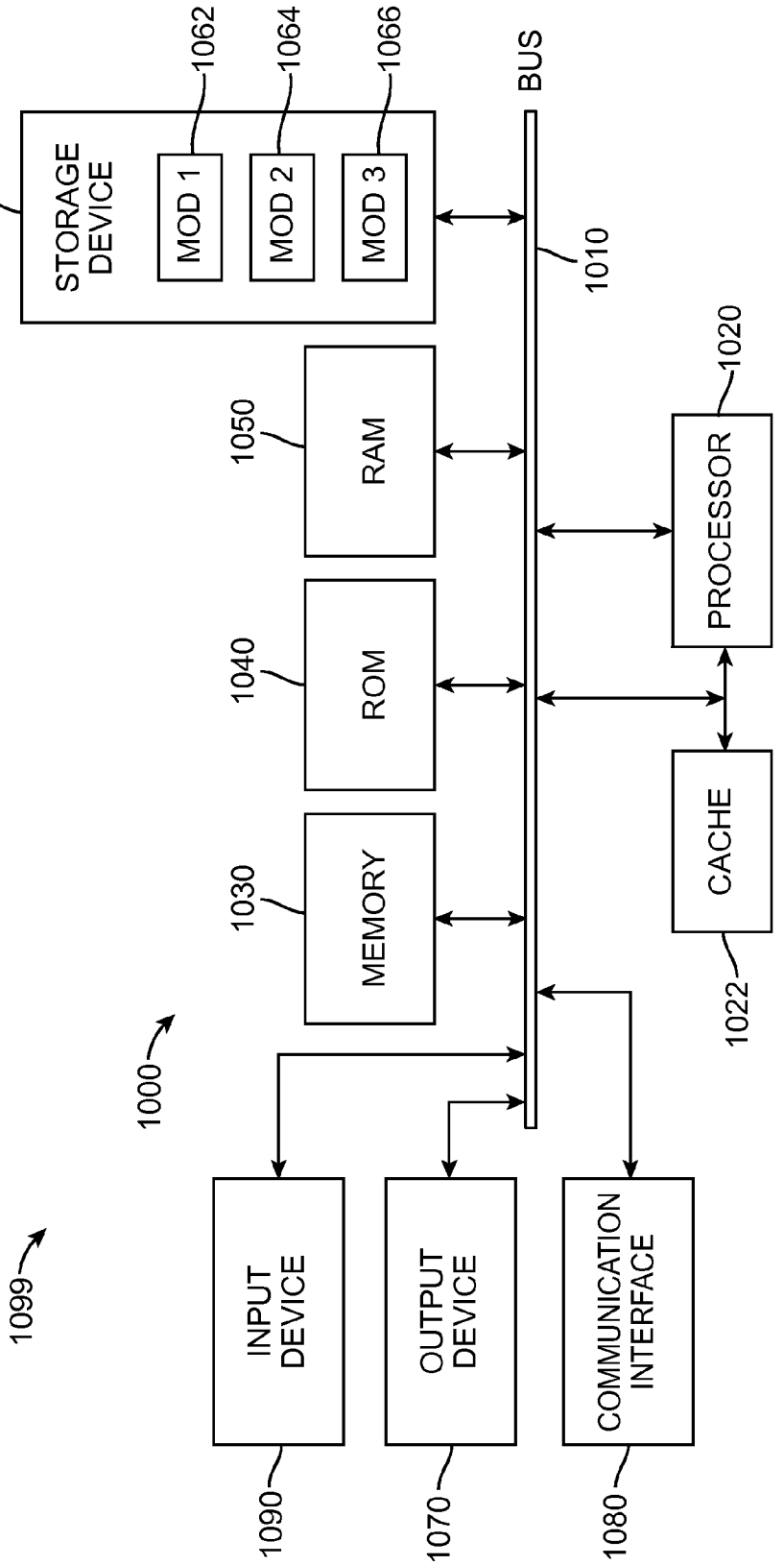

1099
1000
INPUT DEVICE
1090
OUTPUT DEVICE
1070
COMMUNICATION INTERFACE
1080
MEMORY
1030
ROM
1040
RAM
1050
CACHE
1022
PROCESSOR
1020
BUS
1010
STORAGE DEVICE
1060
MOD 1
1062
MOD 2
1064
MOD 3
1066

FIG. 10

EFFECTING PAYMENTS USING OPTICAL COUPLING

BACKGROUND

[0001] 1. Technical Field

[0002] The present technology relates generally to systems and methods for carrying out secure transactions. More specifically, the present technology relates to systems and methods for performing secure transactions using optical codes and optical code readers.

[0003] 2. Introduction

[0004] This section is intended to introduce the reader to various aspects of art that may be related to various aspects of the present techniques, which are described and/or claimed below. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present disclosure. Accordingly, it should be understood that these statements are to be read in this light, and not as admissions of prior art.

[0005] Many payment instruments currently exist and may be used to carry out a financial transaction between two or more parties. For example, payments may be made using cash, credit cards, debit cards, checks, electronic checks, and so forth. In recent years, the growth of electronic commerce may be at least partially attributed to the popularity of credit cards, debit cards, and other hard non-currency based payment instruments. Thus, while merchants generally continue to accept cash and other hard currency as a method of payment for goods and/or services, most merchants now also accept payments made using credit cards, debit cards, stored-value (e.g., pre-paid) cards, checks, and electronic checks. In particular, online merchants (e.g., those operating "virtual stores" on the Internet or World Wide Web) may rely heavily on the use of credit and debit cards.

[0006] Mobile devices, such as personal digital assistants and Smartphones, have become increasingly ubiquitous in our society. Indeed, attempts have been made to extend the functionality of these devices to carry out financial transactions. However, these attempts often require either a wired connection with a merchant (e.g., online wallets) or an electro-magnetic coupling with a designated reader (e.g., Bluetooth, Near Field Communication). Unfortunately, these types of mobile payment systems are vulnerable to privacy breaches and cannot interact with traditional paper bills and invoices. Accordingly, it is desirable to extend the benefits of a mobile payment system to situations involving traditional paper bills, invoices, prescriptions, etc. and also to ensure the privacy of the users of these novel systems.

SUMMARY

[0007] Additional features and advantages of the disclosure will be set forth in the description which follows, and in part will be obvious from the description, or can be learned by practice of the herein disclosed principles. The features and advantages of the disclosure can be realized and obtained by means of the instruments and combinations particularly pointed out in the appended claims. These and other features of the disclosure will become more fully apparent from the following description and appended claims, or can be learned by practice of the principles set forth herein.

[0008] In view of the concerns now recognized and stated above, some embodiments of the present technology preserve the anonymous aspects of cash transactions while performing electronic transactions by utilizing optical codes that link a client device with a clearinghouse that anonymizes the transaction. Some embodiments involve a clearinghouse establishing an account with a merchant, receiving merchant invoices along with a claim number, associating the invoice with the claim number, storing the invoice on a server, and encoding the claim number as an optical code. When the optical code is presented to a customer, the customer's device decodes the optical code, retrieves the invoice from the server using the claim number as a reference, and is presented with an interface for authorizing payment for the invoice in the clearinghouse. The clearinghouse then sends the merchant a confirmation that the invoice was paid; however, the clearinghouse does not give the merchant any information about the customer.

[0009] In some embodiments of the present technology, one or more parties to a transaction utilize mobile devices equipped with digital camera and software for decoding optical codes. For example, some embodiments of the present technology involve generating invoices containing Quick Response codes ("QR codes") and decoding the QR codes using a camera and QR recognition software.

[0010] Some embodiments of the present technology, involve an infrastructure of network-based clearinghouses for maintaining the anonymity of a plurality of customers and protecting their private and financial data. According to some embodiments, both merchants and customers maintain verified accounts with one or more clearinghouses. Similarly, some embodiments of the present technology involve methods for maintaining the anonymity of a plurality of customers and protecting their private and financial data. In some embodiments, transaction data is separated into core data and auxiliary data to further protect sensitive information.

[0011] Some embodiments of the present technology are particularly useful in scenarios involving multiple customers dividing a single invoice. According to these embodiments, the clearinghouse records individual contribution, provides updated invoices to customers as parts of an invoice are reconciled, and presenting a record of a fully reconciled invoice to the merchant.

[0012] Some embodiments of the present technology involve using optical codes in a variety of scenarios involving the transfer of sensitive information. For example, some embodiments of the present technology extend optical coupling to the medical field where prescription drug transcription errors are extremely dangerous and can be made very easily. Some embodiments involve clearinghouses being used to associate a claim number with a prescription, receive prescriptions generated by a medical professional, store the prescriptions using the claim number as a reference, and encode the claim number in an optical code. The optical code is transferred to a pharmacist whose device decodes the claim number, retrieves the prescription using the claim number, and is presented with the prescription information. Some embodiments can also involve notifying the prescribing doctor that the prescription was filled. Some embodiments can also involve the clearinghouse managing prescription refills.

[0013] This brief summary has been provided so that the nature of the technology may be understood quickly. A more complete understanding of the technology can be obtained by reference to the following descriptions of the preferred embodiments thereof in connection with the drawings, which together form a complete specification.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In order to describe the manner in which the above-recited and other advantages and features of the disclosure can be obtained, a more particular description of the principles briefly described above will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. Understanding that these drawings depict only exemplary embodiments of the disclosure and are not therefore to be considered to be limiting of its scope, the principles herein are described and explained with additional specificity and detail through the use of the accompanying drawings in which:

[0015] FIG. **1** is a front view of an electronic device in accordance with some embodiments of present technology;

[0016] FIG. **2** is a simplified block diagram of the device of FIG. **1** in accordance with some embodiments of the present technology;

[0017] FIG. **3** illustrates a system configured for enabling merchants and customers to conduct secure, cashless financial transactions according to some embodiments of the present technology;

[0018] FIG. **4** illustrates a system configured for enabling a plurality of merchants and a plurality of customers to conduct secure, cashless financial transactions according to some embodiments of the present technology;

[0019] FIG. **5** illustrates a method of performing an invoicing and confidential payment transaction between parties using optical coupling according to some embodiments of the present technology;

[0020] FIG. **6** illustrates a graphical representation of a group of diners splitting a bill using a payment system of optical coupling according to some embodiments of the present technology;

[0021] FIG. **7** illustrates a system for performing secure, optical-based financial transactions online according to some embodiments of the present technology;

[0022] FIG. **8** illustrates a system for performing secure, optical-based financial transactions and serving highly relevant promotional content according to some embodiments of the present technology;

[0023] FIG. **9** illustrates an exemplary system for a prescription medicine lifecycle management using optical coupling according to some embodiments of the present technology; and

[0024] FIG. **10** illustrates an exemplary computer system according to some embodiments of the present technology.

DETAILED DESCRIPTION

[0025] Various embodiments of the disclosure are discussed in detail below. While specific implementations are discussed, it should be understood that this is done for illustration purposes only. A person skilled in the relevant art will recognize that other components and configurations may be used without parting from the spirit and scope of the disclosure.

[0026] The present disclosure addresses the need in the art for mobile payment systems that are not vulnerable to privacy breaches and that can interact with traditional paper bills or invoices. Some embodiments of the present technology involve merchants generating optical codes in a clearinghouse which, when decoded by a customer device, provides the customer with a portal for reconciling an invoice through the clearinghouse. According to these embodiments, the customer maintains anonymity from the merchant because the customer never reveals personal or financial information to the merchant. Also, the merchant can be notified that the invoice has been fully satisfied. In some embodiments of the present technology, the parties to a transaction utilize mobile devices equipped with digital camera and software for decoding optical codes. FIG. **1** illustrates a mobile device equipped with a camera according to some embodiments of the present technology.

[0027] According to FIG. **1**, a handheld processor-based electronic device that may comprise a camera for issuing invoices and/or processing payments in accordance with the techniques briefly described above is illustrated and generally referred to by reference numeral **10**. While the techniques will be described below in reference to the illustrated handheld electronic device **10** (which may be a cellular telephone, a media player for playing music and/or video, a personal data organizer, or any combination thereof), it should be understood that the techniques described herein may be implemented using any type of suitable electronic device, including non-portable electronic devices, such as a desktop computer or a workstation.

[0028] As illustrated in FIG. **1**, the electronic device **10** may be a handheld device incorporating the functionality of one or more portable devices, such as a media player, a cellular phone, a personal data organizer, and so forth. Thus, depending on the functionalities provided by the electronic device **10**, a user may listen to music, play games, record video, take pictures, and place telephone calls, while moving freely with the device **10**. In addition, the electronic device **10** may allow a user to connect to and communicate through the Internet or through other networks, such as local or wide area networks. For example, the electronic device **10** may allow a user to communicate using e-mail, text messaging, instant messaging, or other forms of electronic communication. The electronic device **10** also may communicate with other devices using short-range connection protocols, such as Bluetooth and near field communication (NFC). By way of example only, the electronic device **10** may be a model of a MacBook®, iPod®, iPad®, or an iPhone®, available from Apple Inc. of Cupertino, Calif.

[0029] In the depicted embodiment, the device **10** includes an enclosure **12** that protects the interior components from physical damage and shields them from electromagnetic interference. The enclosure **12** may be formed from any suitable material such as plastic, metal or a composite material and may allow certain frequencies of electromagnetic radiation to pass through to wireless communication circuitry within the device **10** to facilitate wireless communication.

[0030] The enclosure **12** may further provide for access to various user input structures, depicted in FIG. **1** by reference numerals **14**, **16**, **18**, **20**, and **22**. By way of these user input structures, a user may interface with the device **10**, wherein each user input structure **14**, **16**, **18**, **20**, and **22** may be configured to control one or more device functions when pressed or actuated. By way of example, the input structure **14** may include a button that when pressed or actuated causes a home screen or menu to be displayed on the device. The input structure **16** may include a button for toggling the device **10** between one or more modes of operation, such as a sleep mode, a wake mode, or a powered on/off mode, for example. The input structure **18** may include a dual-position sliding structure that may mute or silence a ringer in embodiments where the device **10** includes a cell phone application. Fur-

ther, the input structures **20** and **22** may include buttons for increasing and decreasing the volume output of the device **10**. It should be understood that the illustrated input structures **14**, **16**, **18**, **20**, and **22** are merely exemplary, and that the electronic device **10** may include any number of user input structures existing in various forms including buttons, switches, control pads, keys, knobs, scroll wheels, and so forth, depending on specific implementation requirements.

[0031] The electronic device **10** may further include a display **24** configured to display various images generated by the device **10**. By way of example, the display **24** may be configured to display photos, movies, album art, and/or data, such as text documents, spreadsheets, text messages, and e-mail, among other things. The display **24** may also display various system indicators **26** that provide feedback to a user, such as power status, signal strength, call status, external device connections, or the like. The display **24** may be any type of display such as a liquid crystal display (LCD), a light emitting diode (LED) display, an organic light emitting diode (OLED) display, or other suitable display. In certain embodiments, the device **10** may include a touch sensitive element, such as a touch screen interface (not shown in FIG. **1**) disposed adjacent to the display **24** that may function as an additional user input structure (e.g., in addition to structures **14**, **16**, **18**, **20**, and **22**). By way of this touch screen interface, a user may select elements displayed on the display **24** such as, for example, by touching certain elements using the user's finger or a stylus.

[0032] As further shown in the present embodiment, the display **24** may be configured to display a graphical user interface ("GUI") **28** that allows a user to interact with the device **10**. The GUI **28** may include various graphical layers, windows, screens, templates, elements, or other components that may be displayed on all or a portion of the display **24**. For instance, the GUI **28** may display a plurality of graphical elements, depicted here generally as icons **30**. By default, such as when the device **10** is first powered on, the GUI **28** may be configured to display the illustrated icons **30** as a "home screen," represented herein by the reference numeral **29**. In certain embodiments, the user input structures **14**, **16**, **18**, **20**, and **22**, may be used to navigate through the GUI **28** and, accordingly, away from the home screen **29**. For example, one or more of the user input structures may include a wheel structure that may allow a user to select various icons **30** displayed by the GUI **28**. Additionally, the icons **30** may also be selected via the touch screen interface.

[0033] The icons **30** may represent various layers, windows, screens, templates, elements, or other graphical components that may be displayed in some or all of the areas of the display **24** upon selection by the user. Furthermore, the selection of an icon **30** may lead to or initiate a hierarchical screen navigation process. For instance, the selection of an icon **30** may cause the display **24** to display another screen that includes one or more additional icons **30** or other GUI elements. Also, as shown in the present embodiment, each graphical element **30** may have one or more textual indicators **32** associated therewith, which may be displayed on or near its respective graphical element **30** to facilitate user interpretation of each graphical element **30**. For example, the icon **34** may represent a Quick Response Code (hereinafter referred to as a "QR code") reader application and be associated with the textual indicator "QR Reader." It should be appreciated that the GUI **28** may include various components arranged in hierarchical and/or non-hierarchical structures.

[0034] When an icon **30** is selected, the device **10** may be configured to initiate, open, or run an application associated with the selected icon **30** and to display a corresponding screen. For example, when the icon **34** is selected, the device **10** may open the QR reader application. It should be understood that for each application provided on the device **10**, one or more respective screen or screens may be displayed on the display **24** that may include various user interface elements corresponding to a respective application.

[0035] The electronic device **10** may also include various input/output (I/O) ports, such as the illustrated I/O ports **36**, **38**, and **40**. These I/O ports may allow a user to connect the device **10** to or interface the device **10** with one or more external devices. For example, the input/output port **36** may include a proprietary connection port for transmitting and receiving data files, such as media files. The input/output port **38** may include a connection slot for receiving a subscriber identify module (SIM) card, for instance, where the device **10** includes cell phone functionality. The input/output port **40** may be an audio jack that provides for connection of audio headphones or speakers. As will appreciated, the device **10** may include any number of input/output ports configured to connect to a variety of external devices, such as to a power source, a printer, and a computer, or an external storage device, just to name a few. As will appreciated, the I/O ports may include any suitable interface type such as a universal serial bus (USB) port, serial connection port, FireWire port (IEEE-1394), or AC/DC power connection port.

[0036] Certain I/O ports may be configured to provide for more than one function. For instance, in one embodiment, the I/O port **36** may be configured to not only transmit and receive data files, as described above, but may be further configured to couple the device to a power charging interface, such as an power adaptor designed to provide power from a electrical wall outlet, or an interface cable configured to draw power from another electrical device, such as a desktop computer. Thus, the I/O port **36** may be configured to function dually as both a data transfer port and an AC/DC power connection port depending, for example, on the external component being coupled to the device **10** through the I/O port **36**.

[0037] The electronic device **10** may also include various audio input and output elements. For example, the audio input/output elements, depicted generally by reference numeral **42**, may include an input receiver, which may be provided as one or more microphones. For instance, where the electronic device **10** includes cell phone functionality, the input receivers may be configured to receive user audio input such as a user's voice. Additionally, the audio input/output elements **42** may include one or more output transmitters. Thus, where the device **10** includes a media player application, the output transmitters of the audio input/output elements **42** may include one or more speakers for transmitting audio signals to a user, such as playing back music files, for example. Further, where the electronic device **10** includes a cell phone application, an additional audio output transmitter **44** may be provided, as shown in FIG. **1**. Like the output transmitter of the audio input/output elements **42**, the output transmitter **44** may also include one or more speakers configured to transmit audio signals to a user, such as voice data received during a telephone call. Thus, the input receivers and the output transmitters of the audio input/output elements **42** and the output transmitter **44** may operate in conjunction to function as the audio receiving and transmitting elements of a telephone.

[0038] In some embodiments of the technology, an electronic device may include one or more front-, side-, and/or rear-facing cameras. In the illustrated embodiment, the electronic device **10** further includes a front-facing camera **46**.

[0039] Additional details of the illustrative device **10** may be better understood through reference to FIG. **2**, which is a block diagram illustrating various components and features of the device **10** in accordance with one embodiment of the present technology. As shown in FIG. **2**, the device **10** may include the above discussed display **24**, as well as a CPU **50**, control circuitry **52**, a storage device **54**, one or more communication interfaces **60**, a video controller **62**, a touch screen interface **64**, an I/O controller **66**, and a power source **68**.

[0040] The operation of the device **10** may be generally controlled by the central processing unit (CPU) **50** and the control circuit **52**. In cooperation, these elements may provide the processing capability required to execute an operating system, application programs, the GUI **28**, and any other functions provided on the device **10**. The CPU **50** may include a single processor or, in other embodiments, it may include a plurality of processors. By way of example, the CPU **50** may include "general purpose" microprocessors, a combination of general and application-specific microprocessors, instruction set processors, graphics processors, video processors, as well as related chips sets and/or special purpose microprocessors. The control circuit **52** may include one or more data buses for transferring data and instructions between components of the device **10**. The control circuit **52** also may further include on board memory (RAM) for caching purposes. Additionally, although not illustrated in FIG. **2**, the device **10** may include a standalone random access memory (RAM) in communication with the CPU **50** by way of one or more memory controllers, which may be integrated within the control circuit **52**.

[0041] Information used by the CPU **50** may be stored within a long-term storage device, represented by reference numeral **54**. The storage device **54** of the electronic device **10** may be utilized for storing data required for the operation of the CPU **50**, data to be processed or executed by the CPU **50**, as well as other data required by the device **10**, such as application and program data. For, example, the storage device **54** may be configured to store the firmware for the electronic device **10** that is used by the CPU **50**. The firmware may include an operating system, as well as other programs or drivers that enable various functions of the electronic device **10**, GUI functions, and/or processor functions. The storage device **54** may also store components for the GUI **28**, such as graphical elements, screens, and templates. Additionally, the storage device **54** may store data files such as media (e.g., music and video files), image data, application software, preference information (e.g., media playback preferences, general user preferences), financial account information, network connection information (e.g., information that may enable the device **10** to establish a wireless connection, such as a telephone or Internet connection), subscription information (e.g., information that maintains a record of podcasts, television shows or other media to which a user subscribes), telephone information (e.g., telephone numbers), and any other suitable data required by the device **10**. The long term storage **54** may be non-volatile memory such as read only memory, flash or solid state memory, a hard disk drive, or any other suitable optical, magnetic, or solid-state computer readable media, as well as a combination thereof.

[0042] The device **10** may include one or more network communication devices **60** for providing additional connectivity channels for receiving and transmitting information. For example, the communication device **60** may represent one or more network interface cards (NIC) and/or a network controller as well as various associated communication protocols. The communication device **60** may provide for various long-range communication interfaces, such as a wireless local area network (WLAN) interface (e.g., an IEEE 802.11x wireless network), a local area network (LAN) interface, or a wide area network (WAN) interface. By way of example, a WAN interface may permit a private and/or secure connection to a cellular data network, such as the Enhanced Data rates for GSM Evolution (EDGE) network or the 3G network (e.g., based on the IMT-2000 standard). The network communication device **60** may further provide a short message service (SMS) interface.

[0043] In certain embodiments, the electronic device **10** may include a service discovery networking protocol to establish a connection with an external device through a network interface. For example, both the device **10** and the external device may broadcast identification information using internet protocol standards (IP). In some embodiments, the external device may additionally broadcast information relating to the available services the external device is capable of providing (e.g., printing services for a networked printer). The devices may then use the identification information to establish a network connection, such as a PAN connection or a WLAN connection, between the devices. By way of example, a device identification protocol may be provided by Bonjour®, developed by Apple Inc.

[0044] User preference settings **58**, which may be stored in the storage device **54**, may further determine properties of the above-mentioned communication interfaces provided by the network communication device **60**. For instance, the preferences **58** may include a list of networks that the device **10** may connect to and may further govern the order or priority between the communication interfaces. Further, the communication preferences associated with the preferences **58** may be further dependent upon security features **56** available for each respective communication interface. The security features **56** may be stored in the storage device **54** and may include one or more cryptographic protocols, such as a secure sockets layer (SSL) protocol or a transport layer security (TLS) protocol, for establishing secure communications between the device **10** and an external device.

[0045] The security features **56** may also include a secure access-restricted storage area (e.g., within the storage device **54**) to limit access to the sensitive data, such as encryption keys, passcodes and passwords, digital certificates, or the like. Additionally, in some embodiments, the secure storage area **56**, in addition to storing the above-mentioned sensitive data, may be further protected by its own respective password or authorization "personal identification number" (PIN), for example, in order to prevent unauthorized access to the information stored therein.

[0046] The device **10** may also include the video controller **62**, which may be operatively coupled to the display **24** and configured to receive image data and to send voltage signals corresponding to the pixel values of the image data to the display **24**. The displayed image data may be representative of information received through the communication interface, as well as information contained in the storage device **54**. As will be understood by those skilled in the art, pixel values may be numerical assignments corresponding to respective pixel intensities. Thus, the display **24** may receive

the voltage signals from the video controller **62** as an input and produce an image corresponding to the voltage signals. For instance, an image produced by the signals provided by the video controller **62** may represent a screen of the GUI **28** described above with reference to FIG. **1**.

[0047] As discussed above, a user operating the device **10** may select various graphical elements which may represent applications or information that may be displayed through the GUI **28**. A touch screen interface **64** may be positioned in front of or behind the display **24** and may provide a user the ability to select graphical elements, such as the icons **30** displayed by the GUI **28** described above in FIG. **1**. The touch screen interface **64** may be configured to receive inputs based on a physical contact (e.g., touching the display **24**) either by the user or an object (e.g., stylus) being controlled or manipulated by the user, and to send "touch event" information to the CPU **50**. The CPU **50** may then process the detected touch event information and perform a corresponding action. For instance, referring briefly back to FIG. **1**, the "touching" of the icon **34** may be processed by the CPU **50** as an instruction to execute or initiate the corresponding electronic wallet application. The touch screen interface **64** may employ any suitable type of touch screen technology such as resistive, capacitive, infrared, surface acoustic wave, electromagnetic, or near field imaging. The touch screen interface **64** may also employ single point or multipoint sensing.

[0048] The I/O controller **66** depicted in FIG. **2** may provide an infrastructure for allowing a user to communicate with the CPU **50** through various input structures provided on the device **10**, such as the input structures represented by the reference numerals **14**, **16**, **18**, **20**, and **22** in FIG. **1**. The user input structures **14**, **16**, **18**, **20**, and **22** may be used in conjunction with, or independently of, the touch screen interface **64** to provide input information to the device **10**. The I/O controller **66** is also coupled with a camera **46**.

[0049] The power source **68** of the device **10** may include the capability to power the device **10** in both non-portable and portable settings. For example, in a portable setting, in order to facilitate transport and ease of motion, the device **10** may include an integrated power source **68** for powering the device **10**. The power source **68** may include one or more batteries, such as a Li-Ion battery, which may be user-removable or secured to the enclosure **12**. In certain embodiments, the proprietary connection I/O port **36** may be used to connect the device **10** to a power source for recharging the battery. In other embodiments, the one or more batteries may be non-integrated and may include one or more rechargeable or replaceable batteries. Further, in a non-portable setting, the power source **68** may include AC power, such as provided by an electrical outlet.

[0050] As discussed above, the device **10** includes a camera **46**. Accordingly, the present technology solves the problems identified above by making it possible to transfer sensitive information, transfer money, pay for goods and services, etc. using mobile devices equipped with a camera.

[0051] FIG. **3** illustrates a system **300** configured for enabling merchants and customers to conduct cash-less financial transactions using a paper bill, a mobile device equipped with a camera, an optical code, and one or more cloud-based clearinghouse according to some embodiments of the present technology. While specific mobile devices are described throughout this description, it will be apparent to those having ordinary skill in the art and the benefit of the disclosure that any device with the capability of capturing optical data and interfacing with a network can be used to achieve the same beneficial results.

[0052] As shown, the system **300** of FIG. **3** includes a merchant **301** operating a mobile device **302** and performing a transaction with a customer **307** also running a mobile device **306**. Before initiating a camera-based optical transaction, the merchant **301** must first create a verified account with a transaction clearinghouse **303** or similar institution and configure an application on her mobile device **302** to perform an optical-based transaction. In some embodiments of the technology, a necessary application resides on network-based application distribution platform **309**, such as iTunes® or the AppStore℠, available from Apple Inc. of Cupertino, Calif. Similarly, for a customer **307** to benefit from the merchant's ability to conduct optical payments, the customer also must have a verified account with an optical-based transaction clearinghouse **308** or similar institution and an appropriate application installed on his mobile device **306**.

[0053] As shown, the clearinghouse **303** and the clearinghouse **308** comprise separate institutions; however, those having ordinary skill in the art will appreciate that the clearinghouses can be the same institution or a subsidiary, partner, division, etc. of the same institution. Also shown are networks **310**, **311**, and **312** coupling merchants **301** and customers **307** to the clearinghouses **303**, **308** and to the network based application distribution platform **309**. Those having ordinary skill in the art will also readily understand the networks **310**, **311**, and **312** can be the same network or different networks.

[0054] Once the merchant **301** has configured her device **302** with the necessary application and has created a verified account, she can begin recording transactions, (i.e. bills, invoices, prescriptions, etc.) on her mobile device **302**. In some embodiments of the present technology, invoice creation comprises an individual simply listing an invoice amount and a note regarding what goods are being sold or leased or what services are being performed. In some embodiments, a more detailed invoice is created that includes auxiliary data such as type and quantity of items purchased. Although specific examples of invoices are described herein, it will be readily apparent to those with ordinary skill in the art having benefit of this disclosure that any type of agreement or contract can be memorialized using the present technology.

[0055] In some embodiments of the present technology, the application for performing an optical-based transaction obtained from the network-based application platform **309** comprises a graphical user interface for facilitating the process of invoice creation.

[0056] Once an invoice is created, the merchant **301** can upload the transaction data to the clearinghouse **303** along with a claim number that is recognizable by the clearinghouse **303**. The merchant **301** then presents a transaction receipt **304** (i.e. a bill) to the customer **307**—either in printed form or on a display device. The receipt **304** includes an optical code **305** that encodes the claim number and an identification of the clearinghouse **303** at which the transaction has been stored.

[0057] The customer **307** can then capture the optical code **305** on the receipt **304** and pull the data from clearinghouse **308** or clearinghouse **309**. If the merchant **301** and the customer **307** have different clearinghouses, the clearinghouse **308** and the clearinghouse **309** communicate with one another directly or via a network **312**. The customer **307** can then satisfy the receipt **304** through the clearinghouse **308**.

[0058] Some embodiments of the present technology involve the customer **307** satisfying the transaction via a

one-time payment to the clearinghouse **308**. According to these embodiments, the merchant **301** is told when the customer **307** satisfies the receipt **304**, but the customer's payment information is kept anonymous from the merchant **301**. Some embodiments of the present technology involve the customer **307** creating an account with the clearinghouse **308** for performing one or more banking and/or e-commerce services.

[0059] Some embodiments of the present technology involve many merchants and service providers and many customers performing transactions using optical coupling and one or more clearinghouses. FIG. **4** illustrates a system **400** configured for enabling a plurality of merchants and a plurality of customers to conduct financial transactions using devices equipped with a camera, an optical code, and one or more cloud-based clearinghouses according to some embodiments of the present technology. According to FIG. **4**, a plurality of merchants or service providers **401**, **402**, . . . , q communicate with one or more clearinghouses **403**, **404**, **405**, . . . , r via a network **406** and a mobile device **401'**, **402'**, . . . , q'. Likewise, a plurality of customers **407**, **408**, . . . , s communicate with the one or more clearinghouse **403**, **404**, **405**, . . . , r via the network **406** and a mobile device **407'**, **408'**, . . . , s'. According to the arrangement of FIG. **4**, an invoicing and confidential payment transaction system using optical coupling can be extended and scaled to a large group of users.

[0060] A method of performing a transaction using optical coupling is described in more detail in connection with FIG. **5**. FIG. **5** illustrates a method **500** of performing an invoicing and confidential payment transaction between parties using optical coupling according to some embodiments of the present technology. The method **500** begins with a payee creating an account with an on-line financial transaction clearinghouse **501**. In some embodiments of the present technology, creating an account involves registering the payee's identification information (i.e. business name, address, contact information, etc.), information regarding how to tender payment (i.e. bank account numbers, PayPal routing information, etc.), and account settings and preferences. Account creation can also involve the exchange of public and private encryption keys or similar cryptography methods. Similarly, the process of a payee creating an account can also involve one or more security measures to ensure that the payee is the owner of a financial account. For example, a clearinghouse might require that the payee confirm a nominal amount of money being withdrawn and subsequently deposited into his account before the account is verified.

[0061] After the payee creates an account, the method **500** continues with the payee memorializing an invoice **502** on a device. The case of merchants, this can include auxiliary data, such as type and quantity of items purchased. In the case of person to person to transactions, this may be as simple as a financial amount and a note concerning the transaction. For example, in a restaurant setting, a waitress can take a table's order and input the items into a wired terminal to memorialize the invoice. In another example, a service provider can memorialize an invoice as he provides services by inputting time entries into a mobile device. Those with ordinary skill in the art having the benefit of the disclosure will readily appreciate that a wide variety of input types and devices, now known or later developed, can be used to memorialize invoices.

[0062] Next, the payee finalizes the invoice and transfers the transaction data to a clearinghouse **503** along with a unique claim number that identifies the transaction. In some embodiments, the uniqueness of the claim number is ensured by electronically requesting a unique number from the clearinghouse. In some embodiments, the claim number is generated by a previously-agreed upon protocol between the clearinghouse and the payee. In some embodiments of the technology, the clearinghouse inspects a payee's encryption key to determine the authenticity of the transaction.

[0063] Optionally, the clearinghouse separates **504** the payee-submitted invoice into core data (such as the amount to be paid) and auxiliary data (such as the type and quantity of items) and posts them to separate servers. By doing so, the clearinghouse avoids having or re-submitting visibility into the actual goods that are being bought or sold. For example, suppose a couple shares a clearinghouse account and one partner wants to surprise the other with a gift. The merchant selling the gift can invoice the clearinghouse with the price and description, but the clearinghouse can strip the auxiliary description from the invoice so that when code is sent to the couple's shared account, it will merely reflect an amount to be paid without ruining the surprise. Such optional splitting can be used to enhance customer privacy. The clearing house (or optionally when there are multiple clearing houses, all clearing houses except trusted ones such as the one that the customer has an account with) do not have access to the auxiliary data and are unable to data-mine the customer's transactions or develop profiles of the actual products the customer purchases. Consequently, the server hosting the auxiliary data does not know the individual with whom the data is associated. So it may be able to suggest promotional material directly related to the transaction, but is unable to track and profile the customer since the server is unable to form connections between a multitude of unique claim numbers and the individual customers that are responsible for each transaction.

[0064] Once the clearinghouse has invoice information and a unique identifier, it generates an optical code **505** that, upon recognition, links a client device to the transaction details. Some embodiments of the present technology involve generating a Quick Response Code (hereinafter referred to as a "QR code") that is readable by a QR code reader application. However, those with ordinary skill in the art having the benefit of this disclosure will understand that any easily identifiable imaging scheme may be used instead of a QR code. For example, a code can simply be manually keyed in by a user. Additionally, a barcode could be used. Alternatively, an easily identifiable border may be displayed and the claim number may be simply presented in a standard font as human and computer readable characters and recovered from the image using optical character recognition. Alternately, a small but easily processed image may be presented as the claim token within a border that makes it easy to scan for imaging software. The key idea is that the claim number associated with the transaction is presented optically and recognized using a camera and imaging software.

[0065] The method **500** continues with the payee presenting the payer with a representation of the optical code **506** that encodes the unique claim number and designates the clearinghouse at which the claim has been filed. In some embodiments, the representation of the optical code comprises a paper receipt with the optical code. In some embodiments, the optical code is transmitted to a payer via an electronic medium and comprises an electronic representation of the optical code. In some embodiments, the electronic represen-

tation of the optical code is transmitted to the payer by presenting the payer with an electronic device that displays the optical code. In some embodiments, the electronic representation of the optical code is transmitted from a payee device to a payer device via email, SMS, MMS, etc. In some embodiments, the optical code is transmitted to a payer's device via electromagnetic coupling, such as a wireless network connection, Bluetooth connection, or near field communications coupling. The optical code may be accompanied with any or all auxiliary data.

[0066] Optionally, the payer creates an account **507** in advance of receiving a QR-embedded invoice. The method **500** continues with the payer capturing an image **508** of the optical code and converts it back to the transaction details. The payer uses secure communication with the clearinghouse to pull the core data and auxiliary data associated with the transaction. If the payer and payee have different clearinghouses, the different clearinghouses communicate with each other to supply the payer with the relevant data. The payer's clearinghouse then verifies the identity of who originated that unique claim number, i.e., they look up the owner of the account that the payment will be credited to ensure that the payment will go to the payee or someone authorized to take payments on the payee's behalf.

[0067] Next, the payer's device displays **509** the invoice data, the auxiliary data (i.e. the amount, type of goods, etc.) if any, and who the payment will go to. Accordingly, the user can visually verify the invoice to check that the quoted price is the price being charged. Additionally, the user can verify the identity of the party that they are making payment to, thereby avoiding paying a party impersonating the true seller. When the user is satisfied, he authorizes payment **510** using his device.

[0068] Some embodiments of the present technology involve an interface for allowing the payer to authorize partial payment. For example, the case of a restaurant bill for a group, each guest may individually scan the receipt using their own device and then just authorize the payment for the items they ordered, along with their share of taxes, gratuity etc.

[0069] Next, the payer's device signals authorization back to the clearinghouse. In the case of more than one clearinghouse, the method **500** facilitates communication and reconciliation between the multiple clearinghouses **511** and the one or more clearinghouses signal back to the payee that full or partial payment has been received in the payee's account **512**. Optionally, all devices involved in the transaction update their displays of the payment as it progresses **513**. Finally, the clearinghouse or clearinghouses record the fully-satisfied transaction **514**. In some embodiments, wither the payer's or the payee's device optionally saves the receipts for later use and records/returns etc. In some embodiments, only the core data is saved.

[0070] According to the present technology, it is not necessary for the payee to know the identity of the payer; rather, it is only necessary for the payee to be assured by the clearinghouse that the bill has been paid. In this way the technology preserves the anonymous nature of cash payment as far as the payer's privacy is concerned and at the same time records the payee's side of the transaction for record keeping such as for taxes. Additionally, no sensitive information is exchanged between the parties. There are no credit card numbers or personal information that can be stolen. The payee cannot store the payer's financial information. Indeed, once the transaction has been completed, the printed receipt may be discarded without the risk of theft or leaked personal information.

[0071] As explained above, the present technology preserves the anonymous nature of a cash payment and offers the convenience of mobile payment. An especially illustrative example of the utility and convenience of the present technology can be seen in the case of a group of people splitting a bill at a restaurant.

[0072] FIG. **6** illustrates a graphical representation of a group of diners **601**, **602**, **603** splitting a bill **604** using a payment system of optical coupling according to some embodiments of the present technology. According to FIG. **6**, a paper bill **604** is presented to the group of diners **601**, **602**, **603**. The paper bill **604** itemizes the diners' order, describes the items served, lists the price of the individual items, lists the sales tax associated with the bill, lists the total price, and provides the diners the opportunity to tip their server. Additionally, the paper bill **604** includes an optical code **605** printed thereon. According to the present technology, the diners can scan the optical code with a camera in their respective mobile devices **606**, **607**, **608** to access the billing information via a clearinghouse server (not shown) available via one or more networks **611** that the merchant has an account with.

[0073] According to the present technology, a diner's **601** mobile device **606** recognizes the optical code **605** and displays an electronic representation **609** of the bill **604** via an interface on the diner's **601** mobile device **606**. In some embodiments of the present technology, the electronic representation of the bill **604** is displayed to users via a browser-based interface. In some embodiments, the user pre-installs a dedicated optical code reader application configured for presenting electronic bills in an elegant and user-friendly interface. In some embodiments, the dedicated application is available for download from a network-based application platform, such as the AppStore^{SM}, available from Apple Inc. of Cupertino, Calif.

[0074] Like the paper bill **604**, the electronic representation of the paper bill **604** itemizes the diners' order, describes the items served, lists the price of the individual items, lists the sales tax associated with the items, lists the total price, and provides the diners the opportunity to tip their server. Additionally, according to some embodiments of the present technology, the electronic representation **609** of the paper bill **604** includes executable links that allow users to select items that they would like to pay for, indicate their share of the total gratuity that they would like to pay, or indicate that they want to pay for the entire bill.

[0075] In some embodiments of the present technology, the electronic representation **609** of the paper bill **604** dynamically adjusts as individual diners pay for items. For example, suppose that first diner **601** accepts the paper bill **604** and is the first to scan the optical code **605**. Using the executable links, the first diner **601** pays for his share of the bill and passes the paper bill **604** to another diner **602**. When the second diner **602** scans the optical code **605**, the electronic representation **609** will have dynamically adjusted to reflect the total amounts due minus the amounts from the items that the first user **601** paid for. Likewise, the second diner **602** pays her share and when the electronic representation **609** is displayed on the third diner's device **608**, the remaining portion of the unsettled bill is displayed.

[0076] In some embodiments of the present technology, the payee is notified when any payment on the bill **604** is made—either partial or full payment. In some embodiments, the payee is simply informed that the bill has been completely settled.

[0077] The exemplary scenario describes how the present technology benefits users in a commercial setting, i.e. a restaurant. However, the present technology also benefits consumers performing financial transactions on-line in a browser-based interface. FIG. **7** illustrates a system **700** for performing secure, optical-based financial transactions online according to some embodiments of the present technology. As shown, the system **700** includes a user computer **701** connected to the internet. Also shown, a user **702** finds items online that she would like to purchase. Upon checking out of an online store **703**, the user is typically presented with credit card payment options **704**, **705**. However, it is oftentimes the case that a user is skeptical of providing credit card information to an online store **703**, especially if the online store **703** does not have a well-known, positive reputation. Consequently, the present technology provides the user **702** with a more secure payment option in the form of an optical code **706**. According to these embodiments, the online store **703** never gains access to the user's **702** payment information, but merely receives verification that the user has indeed paid using the optical code **706**.

[0078] According to the system **700** of FIG. **7**, the online store **703** has a verified account with a clearinghouse **708** such that when a user **702** scans the optical code **706** using a camera on a network-connected device **707**, the clearinghouse **708** sends the user payment information via one or more network **709** to the network-connected device **707**. In some embodiments, the user already has a verified account with a clearinghouse **710** in which the clearinghouse **710** stores the user's payment information. Clearinghouses **707** and **710** can be the same or different entities. Next, the user **702** reconciles the payment using the network-connected device **707** by authorizing the clearinghouse **710** to make the payment without ever providing the online store **703** with sensitive financial information.

[0079] Also, in some embodiments of the present technology, the clearinghouse **710** contains a user profile for its users. For example, the clearinghouse **710** can store a user's **702** shipping address. Accordingly, when the user **702** authorizes payment to the online store **703**, the online store is automatically supplied with the user's shipping information. Once a payment is successfully completed using the network-connected device **707**, the online store **703** receives confirmation **711** that an item has been paid for and the user receives confirmation **712** that the items have been shipped and receives a tracking number **713**.

[0080] As explained herein, the present technology benefits users by protecting sensitive financial information in various point-of-sale transactions. However, due to the fact that these transactions oftentimes require a network-connected device, the present technology also allows for various new mechanisms for serving promotional content to users that is highly relevant and interactive.

[0081] FIG. **8** illustrates a system **800** for performing secure, optical-based financial transactions and serving highly relevant promotional content according to some embodiments of the present technology. As shown, the system **800** includes a user computer **801** connected to the internet. Also shown, a user **802** finds items online that he would like to purchase. Upon checking out of an online store **803**, the user is presented with credit card payment options **804**, **805** as well as a more secure payment option in the form of an optical code **806**.

[0082] The online store **803** has a verified account with a clearinghouse **808** such that when a user **802** scans the optical code **806** using a camera on a network-connected device **807**, the clearinghouse **808** sends the user payment information via one or more network **809** to the network-connected device **807**. In some embodiments, the user already has a verified account with a clearinghouse **810** in which the clearinghouse **810** stores the user's payment information. Clearinghouses **807** and **810** can be the same or different entities. Next, the user **802** reconciles the payment using the network-connected device **807** by authorizing the clearinghouse **810** to make the payment without ever providing the online store **803** with sensitive financial information.

[0083] Also, in some embodiments of the present technology, the clearinghouse **810** contains a user profile **899** with user information such as shipping address and user purchase data relating to the user's purchases. For example, in the illustrated example, the user profile stores information relating to the fact that the user **802** purchased a child's ticket to Pixar movie.

[0084] As explained above, some embodiments of the present technology involve serving highly relevant promotional content. Indeed, in some embodiments of the present technology, the clearinghouse **810** is connected to a promotional content delivery server **850** via a network **851**. Networks **809** and **851** can comprise the same or different networks. The promotional content delivery server **850** is configured to access user data from the clearinghouse **810** and is configured to select promotional content to deliver to the user by analyzing the user profile and past purchase data. For example, according to FIG. **8**, the clearinghouse **810** shares the fact that the user bought a child's ticket to a Pixar movie with the promotional content delivery server **850**. Using this information, the promotional content delivery server **850** is able to serve the user with a sales promotion **860** that is highly relevant to parents having children that enjoy Pixar movies. Indeed, such a highly relevant promotion could demand a very high cost per impression.

[0085] As described herein, one aspect of the present technology is the gathering and use of data available from various sources to improve the delivery of invitational content including, promotions, advertisements, or any other content that may be of interest to users. The present disclosure contemplates that, in some instances, this gathered data may include personal information data that uniquely identifies or can be used to contact or locate a specific person. Such personal information data can include demographic data, location-based data, telephone numbers, email addresses, twitter ID's, home addresses, or any other identifying information.

[0086] The present disclosure recognizes that the use of such personal information data in the present technology can be used to the benefit of users. For example, the personal information data can be used to better understand user behavior, facilitate and measure the effectiveness of advertisements, applications, and delivered content. Accordingly, use of such personal information data enables calculated control of the delivered content. For example, the system can reduce the number of times a user receives a given ad or other content and can thereby select and deliver content that is more meaningful to users. Such changes in system behavior improve the

user experience. Further, other uses for personal information data that benefit the user are also contemplated by the present disclosure.

[0087] The present disclosure further contemplates that the entities responsible for the collection, analysis, disclosure, transfer, storage, or other use of such personal information data should implement and consistently use privacy policies and practices that are generally recognized as meeting or exceeding industry or governmental requirements for maintaining personal information data private and secure. For example, personal information from users should be collected for legitimate and reasonable uses of the entity and not shared or sold outside of those legitimate uses. Further, such collection should occur only after the informed consent of the users. Additionally, such entities would take any needed steps for safeguarding and securing access to such personal information data and ensuring that others with access to the personal information data adhere to their privacy and security policies and procedures. Further, such entities can subject themselves to evaluation by third parties to certify their adherence to widely accepted privacy policies and practices.

[0088] Despite the foregoing, the present disclosure also contemplates embodiments in which users selectively block the use of, or access to, personal information data. That is, the present disclosure contemplates that hardware and/or software elements can be provided to prevent or block access to such personal information data. For example, in the case of advertisement delivery services, the present technology can be configured to allow users to select to "opt in" or "opt out" of participation in the collection of personal information data during registration for services. In another example, users can select not to provide location information for advertisement delivery services. In yet another example, users can configure their devices or user terminals to prevent storage or use of cookies and other mechanisms from which personal information data can be discerned.

[0089] The present disclosure also contemplates that other methods or technologies may exist for blocking access to their personal information data.

[0090] Therefore, although the present disclosure broadly covers use of personal information data to implement one or more various disclosed embodiments, the present disclosure also contemplates that the various embodiments can also be implemented without the need for accessing such personal information data. That is, the various embodiments of the present technology are not rendered inoperable due to the lack of all or a portion of such personal information data. For example, content can be selected and delivered to users by inferring preferences based on non-personal information data or a bare minimum amount of personal information, such as the content being requested by the device associated with a user, other non-personal information available to the content delivery services, or publically available information.

[0091] Besides point-of-sale transactions, the utility of the present technology can be extended to many scenarios involving the transfer of sensitive information. For example, in some embodiments of the present technology, a driver's license, social security card, birth certificate, immunization record, visa, etc. can be stored in connection with a claim number that is encoded as an optical code and retrieved from the cloud on demand.

[0092] In another example, the present technology can be extended to the medical field. Prescription transcription errors are extremely dangerous and can be made very easily. Also, patients may be embarrassed or be subject to discrimination if another person happens to see the contents of a paper prescription that the patient possesses. Consequently, the present technology provides solutions for doctors writing prescriptions, patients delivering them, and pharmacists dispensing medicine.

[0093] FIG. **9** illustrates an exemplary system **900** for a prescription medicine lifecycle management system that benefits from optical coupling according to some embodiments of the present technology.

[0094] The system **900** of FIG. **9** is configured for enabling doctors **901**, patients **902**, and pharmacists **903** to complete a prescription fulfillment lifecycle using an optical code, a plurality of devices **909**, **911** equipped with a camera and a code reading application, and one or more clearinghouses **904** available via one or more networks **999**. According to the system **900** if FIG. **9**, a doctor **901** diagnoses a patient **902** and prescribes medicine. A traditional prescription, that is prone to transcription error, can be avoided by the doctor using a computer device **909** coupled with a clearinghouse and software for encoding a claim number as an optical code and associating the optical code with the prescription. In some embodiments of the present technology, the doctor must first create a verified account with a clearinghouse **904**. In some embodiments of the present technology, the doctor interacts with the clearinghouse **904** via a browser-based interface. However, in some other embodiments, the doctor interfaces with the clearinghouse **904** via a stand-alone, dedicated application. In some embodiments of the technology, such an application resides on, and is available for download from a network-based application platform **907**, such as App-Store℠, available from Apple Inc. of Cupertino, Calif.

[0095] Once the doctor **901** has a verified account, the doctor **901** can upload prescription data to one or more cloud-based server along with a claim number that is recognizable by the clearinghouse **904**. The clearinghouse **904** associates the prescription with a claim number and encodes the claim number as an optical code, thereby concealing the contents thereof and the clearinghouse **904** sends the optical code back to the doctor **901**.

[0096] Next, the doctor **901** presents the prescription **998** embodied within an optical code **997**, to the patient **902**—either in printed form or on a display device. The patient **902** can now bring the encoded claim number to his pharmacist **903** to be decoded and the prescription filled. The pharmacist **903** also has a device **911** equipped with a camera and an optical code reader. Accordingly, the pharmacist **903** can use her device to decode the optical code **997**, access the prescription from the cloud, and read the prescription from the printed form **912** or on the patient's device **913**. When the pharmacist **903** scans and decodes the optical code **997**, the clearinghouse delivers the information to the pharmacist, and she is shown the contents of the prescription and any accompanying doctor notes associated therewith. Patient privacy can be enhanced because the doctor does not necessarily need to know which pharmacy was used to fill the prescription—whether it is a neighborhood pharmacy or a licensed pharmacy in another state or country Likewise, the pharmacy does not necessarily need to know which doctor has been making the prescriptions. Both the doctor and the pharmacist can trust the assurance of the cloud that the other professional has been verified to have the appropriate credentials and legal require-

ments. The patient can get the prescription from any legitimate source after considerations such as convenience and price.

[0097] In some embodiments, the clearinghouse is connected with a user profile database or an insurance database. In these embodiments, the encoded claim number is associated with prescription information that can include a user data, such as insurance data, a co-pay amount, etc.

[0098] In some embodiments, a prescription linked with an encoded claim number indicates a number of refills available for a particular medicine. In these embodiments, the pharmacist **903** can communicate back to the clearinghouse **904** that a prescription has been fulfilled and the clearinghouse deducts one refill from the total remaining refills. In some embodiments of the present technology, the clearinghouse **904** comprises or is part of a central prescription-tracking network that tracks all filled prescriptions. Consequently, a patient cannot visit a second doctor in attempt to get a second prescription for the same medication, thereby inhibiting prescription drug abuse.

[0099] Also in the medical field, it is oftentimes desirable to have medical information on hand. For example, many individuals carry a card that conveys emergency contact information, blood type, medical allergies, organ donation information, etc. Additionally, many individuals live with medical conditions that require them to carry explicit instructions for conveying life-saving information to first responders in the event of a foreseeable medical emergency. However, as society moves toward paperless records and electronic wallets, hard copies of medical information may become less common. Therefore, solutions are required for carrying medical information in a secure, private fashion. Accordingly, some embodiments of the present technology involve associating medical information with a claim number encoded as an optical code.

[0100] Some embodiments of the present technology involve associating medical information with a claim number encoded as an optical code and providing a way for medical professionals and first responders to access the information easily. More specifically, some embodiments of the present technology involve displaying an encoded claim number that is associated with the individual's medical information in a user interface on a mobile device. In the event of an emergency or other medical situation, a medical professional can decode the optical code using a code reader and access the necessary patient records.

[0101] However, mobile devices frequently have password locks that would prevent emergency responders from accessing the emergency contact information and other relevant medical information that may be present on a device. Therefore, in some embodiments of the invention, a mobile device is configured such that a locked device still displays an optical code directly on the locked screen or via a screen reachable even when locked. In some other embodiments, an optical code may be painted or etched at manufacturing time to the body of a mobile device. In some embodiments, the code is associated with a secure access controlled document that resides on a cloud. According to these embodiments, an emergency responder may use their own camera phone to scan the code from the locked device screen or body of someone who is incapacitated and the software on the responder's phone would send a claim for the document linked with the optical code number to the cloud. In some embodiments, the cloud then verifies the credentials of the emergency responder, who already has a pre-verified account on the cloud, and securely sends back the corresponding document which may include emergency contact information, medical history, current medication, drug allergies etc.

[0102] The systems and methods disclosed broadly herein are configured to be implemented on one or more computer systems. FIG. **10** illustrates an exemplary computer system **1099** for implemented the present technology according to some embodiments of the present technology. According to FIG. **10**, the computer system **1099** includes a general-purpose computing device **1000**, including a processing unit (CPU or processor) **1020** and a system bus **1010** that couples various system components including the system memory **1030** such as read only memory (ROM) **1040** and random access memory (RAM) **1050** to the processor **1020**. The system **1000** can include a cache **1022** of high speed memory connected directly with, in close proximity to, or integrated as part of the processor **1020**. The system **1000** copies data from the memory **1030** and/or the storage device **1060** to the cache **1022** for quick access by the processor **1020**. In this way, the cache provides a performance boost that avoids processor **1020** delays while waiting for data. These and other modules can control or be configured to control the processor **1020** to perform various actions. Other system memory **1030** may be available for use as well. The memory **1030** can include multiple different types of memory with different performance characteristics. It can be appreciated that the disclosure may operate on a computing device **1000** with more than one processor **1020** or on a group or cluster of computing devices networked together to provide greater processing capability. The processor **1020** can include any general purpose processor and a hardware module or software module, such as module **1 1062**, module **2 1064**, and module **3 1066** stored in storage device **1060**, configured to control the processor **1020** as well as a special-purpose processor where software instructions are incorporated into the actual processor design. The processor **1020** may essentially be a completely self-contained computing system, containing multiple cores or processors, a bus, memory controller, cache, etc. A multi-core processor may be symmetric or asymmetric.

[0103] The system bus **1010** may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. A basic input/output (BIOS) stored in ROM **1040** or the like, may provide the basic routine that helps to transfer information between elements within the computing device **1000**, such as during start-up. The computing device **1000** further includes storage devices **1060** such as a hard disk drive, a magnetic disk drive, an optical disk drive, tape drive or the like. The storage device **1060** can include software modules **1062**, **1064**, **1066** for controlling the processor **1020**. Other hardware or software modules are contemplated. The storage device **1060** is connected to the system bus **1010** by a drive interface. The drives and the associated computer readable storage media provide nonvolatile storage of computer readable instructions, data structures, program modules and other data for the computing device **1000**. In one aspect, a hardware module that performs a particular function includes the software component stored in a non-transitory computer-readable medium in connection with the necessary hardware components, such as the processor **1020**, bus **1010**, display **1070**, and so forth, to carry out the function. The basic components are known to those of skill in the art and appropriate variations are contemplated depending on the type of device,

such as whether the device **1000** is a small, handheld computing device, a desktop computer, or a computer server.

[0104] Although the exemplary embodiment described herein employs the hard disk **1060**, it should be appreciated by those skilled in the art that other types of computer readable media which can store data that are accessible by a computer, such as magnetic cassettes, flash memory cards, digital versatile disks, cartridges, random access memories (RAMs) **1050**, read only memory (ROM) **1040**, a cable or wireless signal containing a bit stream and the like, may also be used in the exemplary operating environment. Non-transitory computer-readable storage media expressly exclude media such as energy, carrier signals, electromagnetic waves, and signals per se.

[0105] To enable user interaction with the computing device **1000**, an input device **1090** represents any number of input mechanisms, such as a microphone for speech, a touch-sensitive screen for gesture or graphical input, keyboard, mouse, motion input, speech and so forth. An output device **1070** can also be one or more of a number of output mechanisms known to those of skill in the art. In some instances, multimodal systems enable a user to provide multiple types of input to communicate with the computing device **1000**. The communications interface **1080** generally governs and manages the user input and system output. There is no restriction on operating on any particular hardware arrangement and therefore the basic features here may easily be substituted for improved hardware or firmware arrangements as they are developed.

[0106] For clarity of explanation, the illustrative system embodiment is presented as including individual functional blocks including functional blocks labeled as a "processor" or processor **1020**. The functions these blocks represent may be provided through the use of either shared or dedicated hardware, including, but not limited to, hardware capable of executing software and hardware, such as a processor **1020**, that is purpose-built to operate as an equivalent to software executing on a general purpose processor. For example, the functions of one or more processors presented in FIG. **10** may be provided by a single shared processor or multiple processors. (Use of the term "processor" should not be construed to refer exclusively to hardware capable of executing software.) Illustrative embodiments may include microprocessor and/or digital signal processor (DSP) hardware, read-only memory (ROM) **1040** for storing software performing the operations discussed below, and random access memory (RAM) **1050** for storing results. Very large scale integration (VLSI) hardware embodiments, as well as custom VLSI circuitry in combination with a general purpose DSP circuit, may also be provided.

[0107] The logical operations of the various embodiments are implemented as: (1) a sequence of computer implemented steps, operations, or procedures running on a programmable circuit within a general use computer, (2) a sequence of computer implemented steps, operations, or procedures running on a specific-use programmable circuit; and/or (3) interconnected machine modules or program engines within the programmable circuits. The system **1000** shown in FIG. **10** can practice all or part of the recited methods, can be a part of the recited systems, and/or can operate according to instructions in the recited non-transitory computer-readable storage media. Such logical operations can be implemented as modules configured to control the processor **1020** to perform particular functions according to the programming of the module. For example, FIG. **10** illustrates three modules Mod**1** **1062**, Mod**2** **1064** and Mod**3** **1066** which are modules configured to control the processor **1020**. These modules may be stored on the storage device **1060** and loaded into RAM **1050** or memory **1030** at runtime or may be stored as would be known in the art in other computer-readable memory locations.

1. A method comprising:

receiving, in a network-based clearinghouse, a merchant receipt memorializing the sale of one or more goods or services and including a unique claim number and a payload with a description and an itemized price for each of the one or more goods or services;

associating, in the clearinghouse, the unique claim number with the merchant receipt;

providing, by the clearinghouse, the unique claim number to the merchant for: encoding into an optical code which, when decoded, provides a connection to an electronic representation of the merchant receipt, and presenting the optical code to one or more customer;

receiving, by the clearinghouse, payment authorization by the one or more customer of at least one of the one or more goods or services through the interface, wherein payment authorization is by way of the one or more customer interacting with the electronic representation of the merchant receipt,

automatically updating, in the clearinghouse, any remaining goods or services from the merchant receipt that still need to be paid; and

sending to the merchant, by the clearinghouse, the description and price for the remaining items that still need to be paid.

2. The method of claim **1**, further comprising:

separating, by the clearinghouse, the description and the itemized price for each of the one or more goods or services.

3. The method of claim **1**, wherein the merchant receipt is received in the clearinghouse through a mobile device software application.

4. The method of claim **1**, wherein an optical code comprises a Quick Response code.

5. The method of claim **1**, wherein the electronic representation of the merchant receipt comprises an interactive graphical user interface comprising a listing of the description of each of the one or more goods or services, the itemized price for each of the one or more goods or services, and one or more executable link allowing a customer to indicate a subset of items to authorize payment for.

6. The method of claim **1**, wherein receiving payment authorization in the clearinghouse further comprises receiving an indication from an additional clearinghouse, via a secure connection, that the customer authorized payment for one or more of the goods or services in the additional clearinghouse.

7. The method of claim **1**, further comprising:

connecting the clearinghouse and at least one promotional content server;

sending, by the clearinghouse, the description for at least one of the goods or services to the promotional content server;

receiving from the promotional content server, in the clearinghouse, promotional content selected based, at least partially, on the description for at least one item from the one or more items; and

serving the promotional content to the customer via the interface.

8. A method comprising:

receiving, in a network-based clearinghouse, a prescription generated by a medical professional on a first device, wherein the prescription includes a unique claim number, a description of the prescription, and an identification of a user authorized to receive the prescription;

associating, in the clearinghouse, the unique claim number with the prescription;

providing, by the clearinghouse, the unique claim number to a patient for: encoding into an optical code, which, when decoded, provides a connection to an electronic representation of the prescriptions, and presenting the optical code to a pharmacist;

receiving, in the clearinghouse, a request for the electronic representation of the prescription upon the pharmacist optically capturing the optical code and decoding the unique claim number;

receiving confirmation in the clearinghouse that the pharmacist filled the prescription; and

updating, in the clearinghouse, prescription fulfillment status.

9. The method of claim **8**, wherein the prescription further comprises additional instructions from the medical professional.

10. The method of claim **8**, wherein the prescription comprises re-fill information relating to a frequency and a number of times a prescription should be dispensed.

11. The method of claim **10**, further comprising:

upon fulfilling the prescription, updating re-fill information relating to the prescription in the clearinghouse.

12. The method of claim **8**, wherein the step of downloading, from the clearinghouse to the prescription based on the unique claim number, further comprises downloading copayment information relating to the user.

13. A non-transitory computer-readable medium comprising:

a medium configured to store computer-readable instructions thereon; and

the computer-readable instructions that, when executed by a processing device cause the processing device to perform a method, comprising:

receiving, in a network-based clearinghouse, a merchant receipt memorializing the sale of one or more goods or services and including a unique claim number and a payload with a description and an itemized price for each of the one or more goods or services;

associating, in the clearinghouse, the unique claim number with the merchant receipt; providing, by the clearinghouse, the unique claim number to the merchant for: encoding into an optical code which, when decoded, provides a connection to an electronic representation of the merchant receipt, and presenting the optical code to one or more customer;

receiving, by the clearinghouse, payment authorization by a customer of at least one of the one or more goods or services through the interface,

automatically updating, in the clearinghouse, any remaining goods or services from the merchant receipt that still need to be paid; and

sending to the merchant, by the clearinghouse, the description and price for the remaining items that still need to be paid.

14. The computer-readable medium of claim **13**, further comprising instructions that, when executed by a processing device cause the processing device to further perform:

separating, by the clearinghouse, the description and the itemized price for each of the one or more goods or services.

15. The computer-readable medium of claim **13**, wherein the merchant receipt is received in the clearinghouse through a mobile device software application.

16. The computer-readable medium of claim **13**, wherein the optical code comprises a Quick Response code.

17. The computer-readable medium of claim **13**, wherein the electronic representation of the merchant receipt comprises an interactive graphical user interface comprising a listing of the description of each of the one or more goods or services, the itemized price for each of the one or more goods or services, and one or more executable link allowing a customer to indicate a subset of items to authorize payment for.

18. The computer-readable medium of claim **13**, further comprising instructions that, when executed by a processing device cause the processing device to further perform:

receiving an indication from an additional clearinghouse, via a secure connection, that the customer authorized payment for one or more of the goods or services in the additional clearinghouse.

19. The computer-readable medium of claim **13**, further comprising instructions that, when executed by a processing device cause the processing device to further perform:

connecting the clearinghouse and at least one promotional content server;

sending, by the clearinghouse, the description for at least one of the goods or services to the promotional content server;

receiving from the promotional content server, in the clearinghouse, promotional content selected based, at least partially, on the description for at least one item from the one or more items; and

serving the promotional content to the customer via the interface.

20. A system for effecting payment between a merchant and a customer comprising:

a network-based platform for effecting transactions relating to sensitive information, the network-based platform comprising one or more clearinghouses;

a merchant device operatively coupled with at least one clearinghouse, the merchant device configured for:

generating a merchant receipt for a purchase of one or more items, the merchant receipt including a unique claim number and a payload with a description and a price for each of the one or more items; and

transmitting the merchant receipt to a clearinghouse; and

a customer device operatively coupled with at least one clearinghouse, the customer device comprising a camera and a software application configured for decoding optical codes, the customer device further configured for:

optically capturing a customer receipt upon receiving an optical code from the merchant and decoding the optical code;

determining the unique claim number from the optically captured customer receipt;

downloading, from the clearinghouse to the customer device, the merchant receipt based on the unique claim number;

displaying on the customer device, the description and price for each of the one or more items; and

authorizing, to the clearinghouse, the payment of at least one item from the one or more items;

wherein the network-based platform is further configured for informing the merchant that the customer has paid for at least one item from the one or more items.

21. The system of claim **20**, wherein the network-based platform is further configured for:

automatically updating, on the clearinghouse, any remaining items that still need to be paid; and

presenting, on the customer device, the description and price for the remaining items that still need to be paid.

22. The system of claim **20**, wherein the network-based platform is further configured for separating the payload into core data comprising the price for each of the one or more items and auxiliary data comprising the description of the one or more items.

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