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(12) **United States Patent**
Colby

(10) **Patent No.: US 11,347,949 B2**
(45) **Date of Patent: May 31, 2022**

(54) **CELLULAR DEVICE INCLUDING INDUCTIVE ANTENNA**

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(73) Assignee: **Mynette Technologies, Inc.**, Verdi, NV (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/522,697**

(22) Filed: **Nov. 9, 2021**

(65) **Prior Publication Data**

US 2022/0067312 A1 Mar. 3, 2022

Related U.S. Application Data

(63) Continuation of application No. 16/186,543, filed on Nov. 11, 2018, now Pat. No. 11,170,185, which is a (Continued)

(51) **Int. Cl.**

G06K 19/00	(2006.01)
G06K 7/10	(2006.01)
G06Q 20/32	(2012.01)
G06Q 20/22	(2012.01)
G06K 19/077	(2006.01)

(Continued)

(52) **U.S. Cl.**

CPC ***G06K 7/10158*** (2013.01); ***G06K 7/10316*** (2013.01); ***G06K 19/07709*** (2013.01); ***G06K 19/07758*** (2013.01); ***G06Q 20/227*** (2013.01); ***G06Q 20/3278*** (2013.01); ***G06Q 20/352*** (2013.01); ***G06Q 20/4012*** (2013.01); ***G07G 1/009*** (2013.01)

(58) **Field of Classification Search**

CPC G06K 7/10158; G06K 7/10316; G06K 19/07709; G06K 19/07758; G06Q 20/227; G06Q 20/3278

See application file for complete search history.

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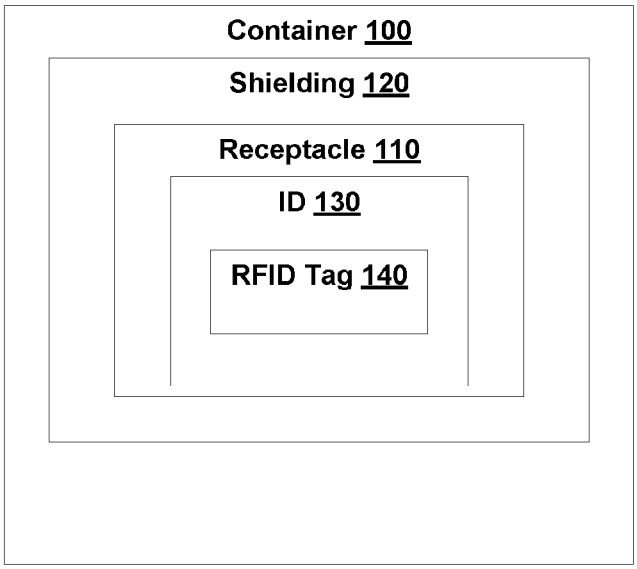
Primary Examiner — Jamara A Franklin

(74) *Attorney, Agent, or Firm* — Rimon Law, P.C.

(57) **ABSTRACT**

Various switchable RFID devices are disclosed. These switchable RFID devices may include one or more RFID tags and one or more switches. Some of these one or more switches are optionally wireless. In various embodiments, the switchable RFID devices include cellular phones, security devices, identity devices, financial devices, remote controls, and the like. The switchable RFID devices are optionally disposed in a cellular phone.

30 Claims, 35 Drawing Sheets



Related U.S. Application Data

continuation-in-part of application No. 15/418,726, filed on Jan. 28, 2017, now Pat. No. 10,503,940, which is a continuation of application No. 14/660,825, filed on Mar. 17, 2015, now Pat. No. 9,569,777, which is a continuation-in-part of application No. 13/481,104, filed on May 25, 2012, now abandoned, which is a continuation of application No. 12/777,474, filed on May 11, 2010, now abandoned, said application No. 14/660,825 is a continuation-in-part of application No. 13/084,433, filed on Apr. 11, 2011, now abandoned, which is a continuation of application No. 11/458,620, filed on Jul. 19, 2006, now Pat. No. 7,924,156, which is a continuation-in-part of application No. 11/382,052, filed on May 7, 2006, now abandoned, and a continuation-in-part of application No. 11/382,053, filed on May 7, 2006, now abandoned, and a continuation-in-part of application No. 11/382,054, filed on May 8, 2006, now abandoned, and a continuation-in-part of application No. 11/382,264, filed on May 8, 2006, now abandoned, and a continuation-in-part of application No. 11/382,265, filed on May 8, 2006, now abandoned, and a continuation-in-part of application No. 11/420,721, filed on May 26, 2006, now abandoned, and a continuation-in-part of application No. 11/382,050, filed on May 7, 2006, now abandoned, said application No. 14/660,825 is a continuation-in-part of application No. 14/468,110, filed on Aug. 25, 2014, now Pat. No. 9,495,852, which is a continuation of application No. 12/577,209, filed on Oct. 12, 2009, now Pat. No. 8,816,826, which is a continuation of application No. 11/468,026, filed on Aug. 29, 2006, now abandoned, which is a continuation-in-part of application No. 11/382,054, filed on May 8, 2006, now abandoned.

(60) Provisional application No. 60/700,884, filed on Jul. 19, 2005, provisional application No. 60/712,308, filed on Aug. 30, 2005, provisional application No. 60/715,641, filed on Sep. 10, 2005, provisional application No. 60/752,933, filed on Dec. 21, 2005, provisional application No. 60/758,751, filed on Jan. 13, 2006, provisional application No. 60/782,068, filed on Mar. 13, 2006, provisional application No. 60/744,154, filed on Apr. 30, 2006, provisional application No. 60/746,636, filed on May 6, 2006, provisional application No. 60/685,331, filed on May 27, 2005, provisional application No. 60/678,428, filed on May 6, 2005.

(51) **Int. Cl.**

G06Q 20/40	(2012.01)
G07G 1/00	(2006.01)
G06Q 20/34	(2012.01)

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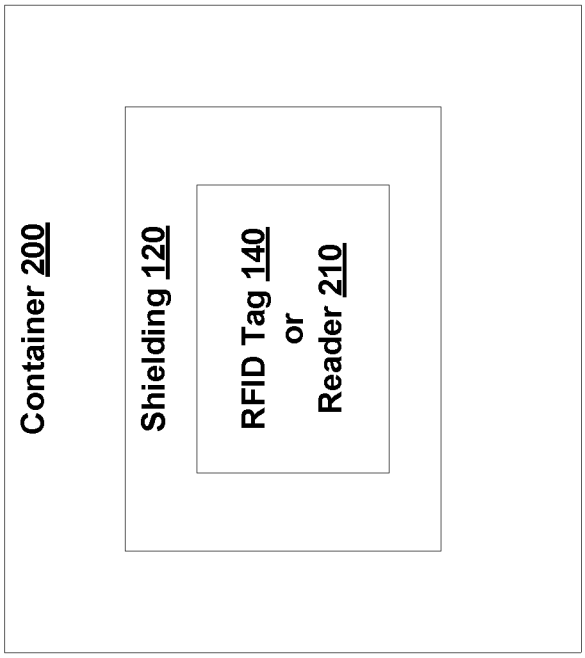

Container 200
Shielding 120
RFID Tag 140
or
Reader 210

FIG. 2

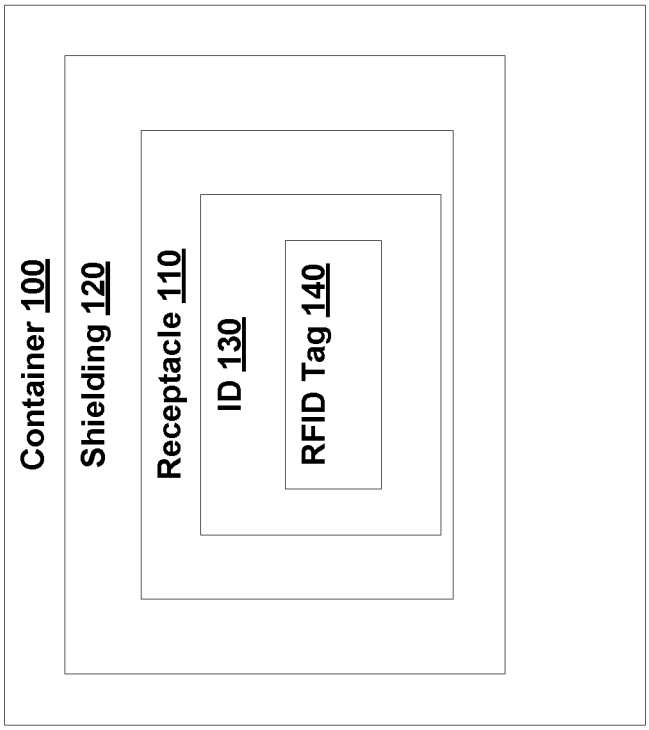

Container 100
Shielding 120
Receptacle 110
ID 130
RFID Tag 140

FIG. 1

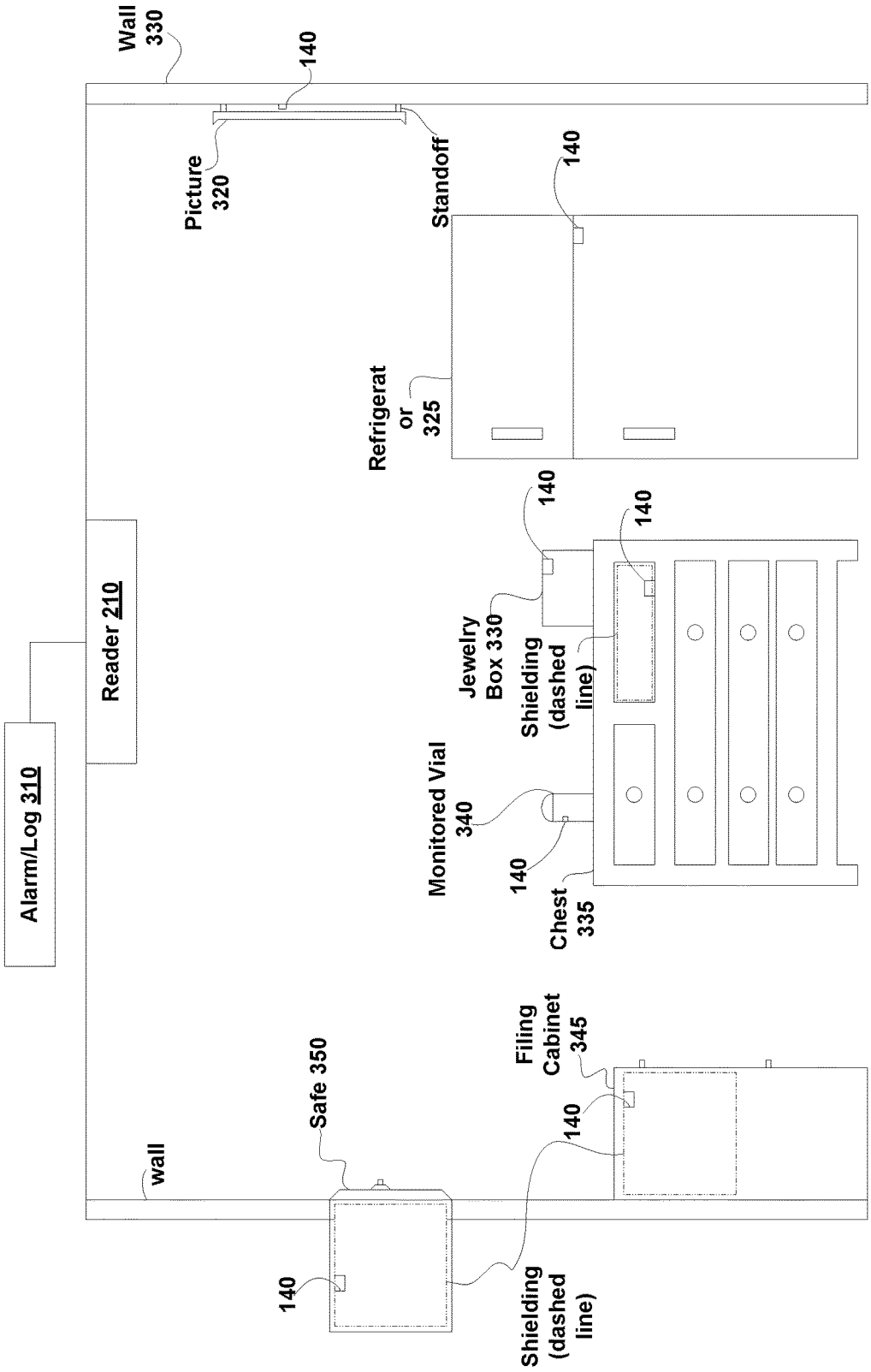

Wall 330
140
Picture 320
Standoff
140
Refrigerator 325
140
140
Jewelry Box 330
Shielding (dashed line)
Reader 210
Alarm/Log 310
Monitored Vial 340
140
Chest 335
Filing Cabinet 345
Safe 350
140
wall
140
Shielding (dashed line)

FIG. 3

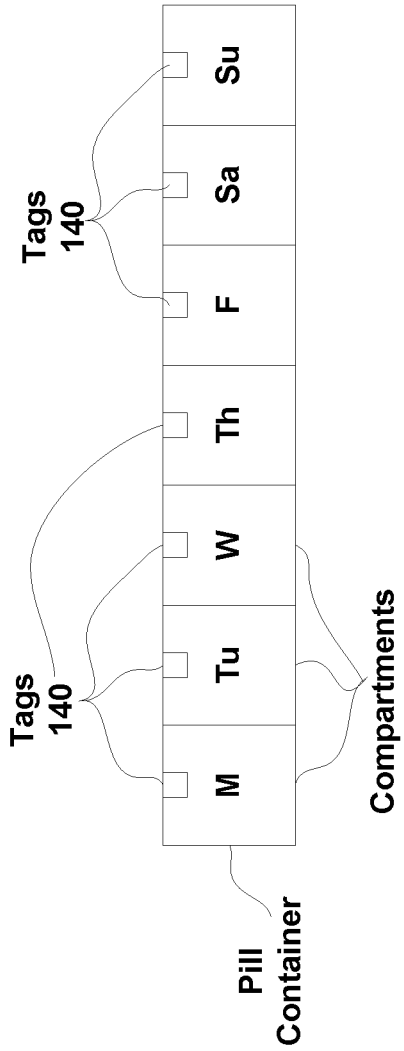

Su
Sa
F
Th
W
Tu
M
Tags
140
Tags
140
Compartments
510
Pill
Container

FIG. 5

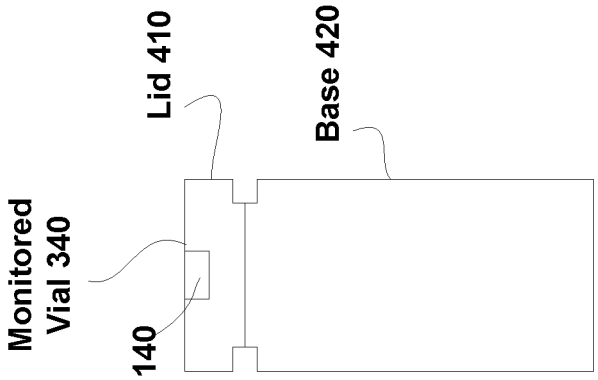

Monitored
Vial 340
140
Lid 410
Base 420

FIG. 4

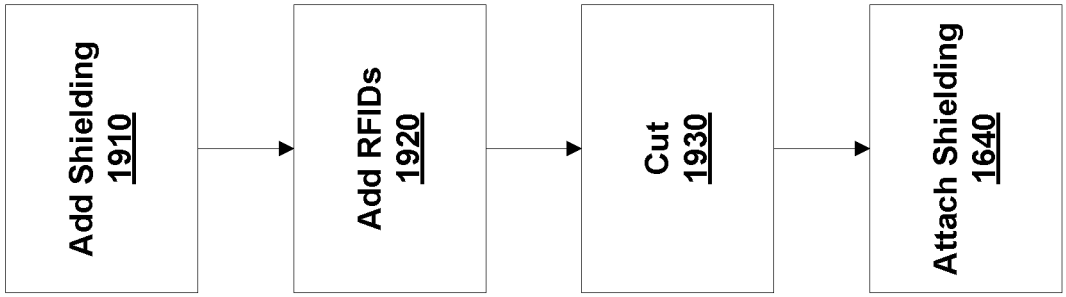

Add Shielding
1910
Add RFIDs
1920
Cut
1930
Attach Shielding
1640

FIG. 19

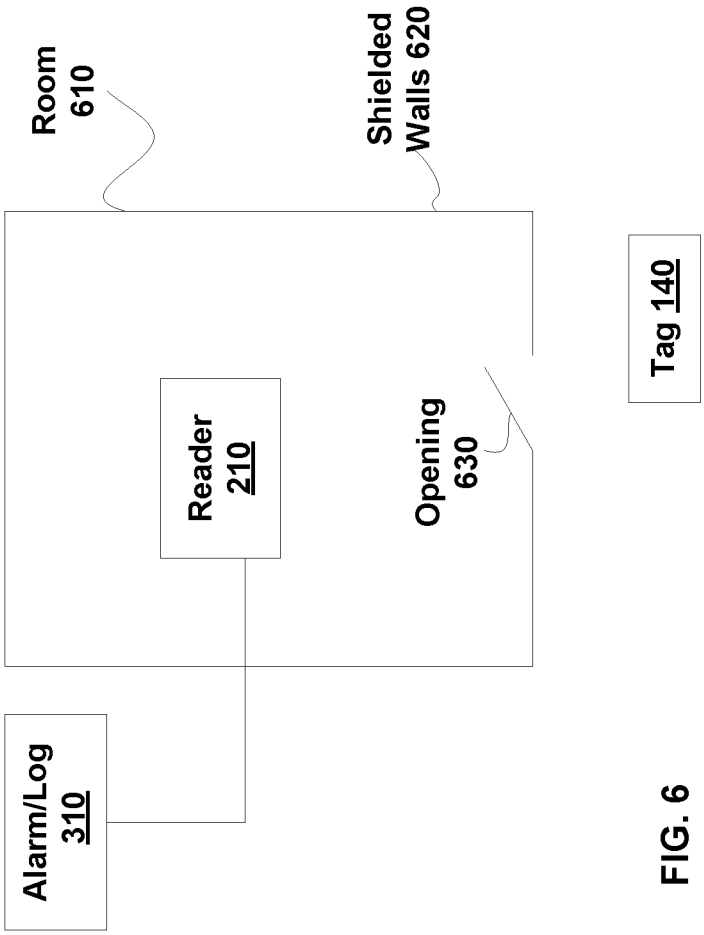

Room
610
Shielded
Walls 620
Tag 140
Reader
210
Opening
630
Alarm/Log
310

FIG. 6

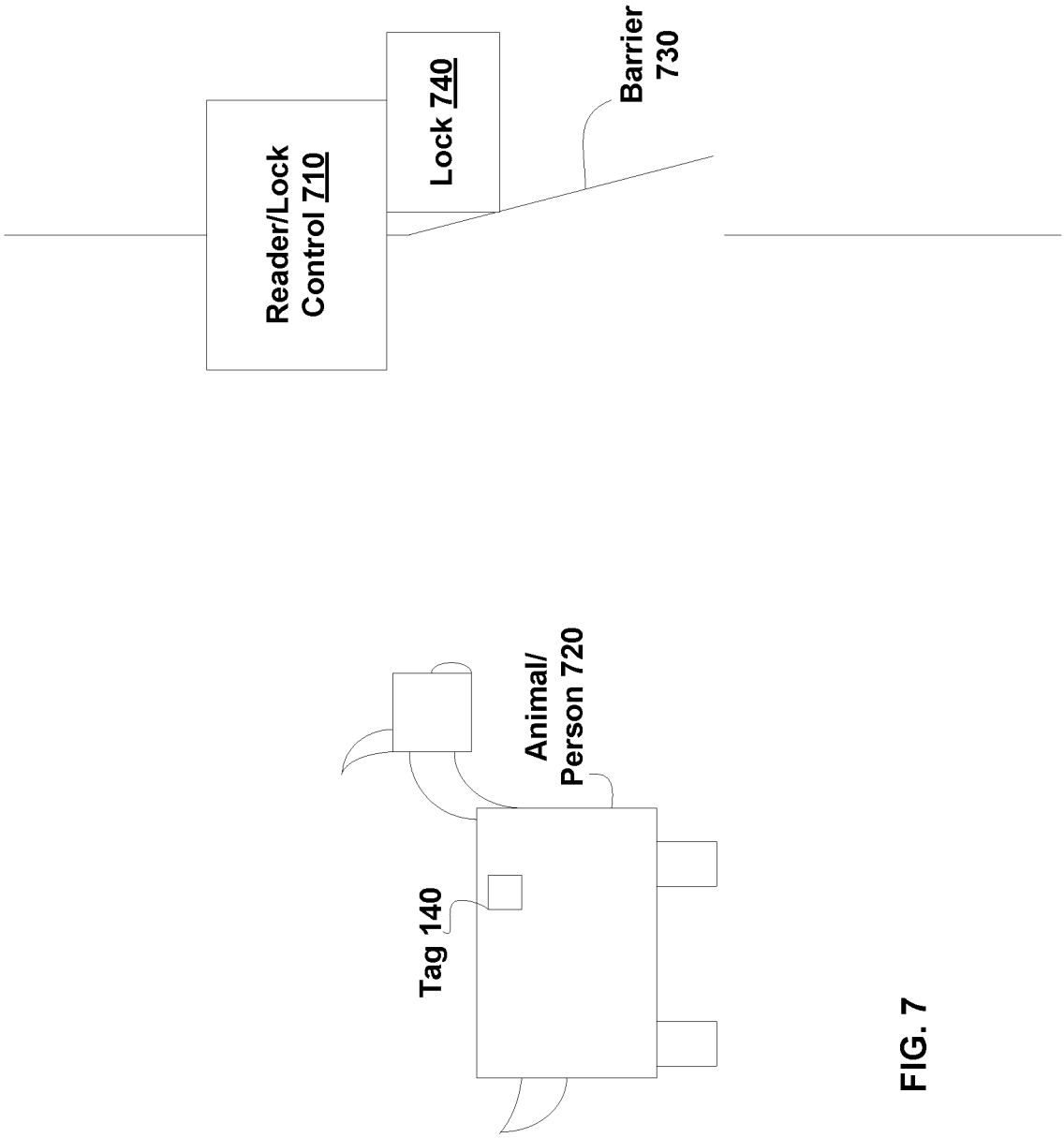

Reader/Lock Control 710
Lock 740
Barrier 730
Tag 140
Animal/ Person 720

FIG. 7

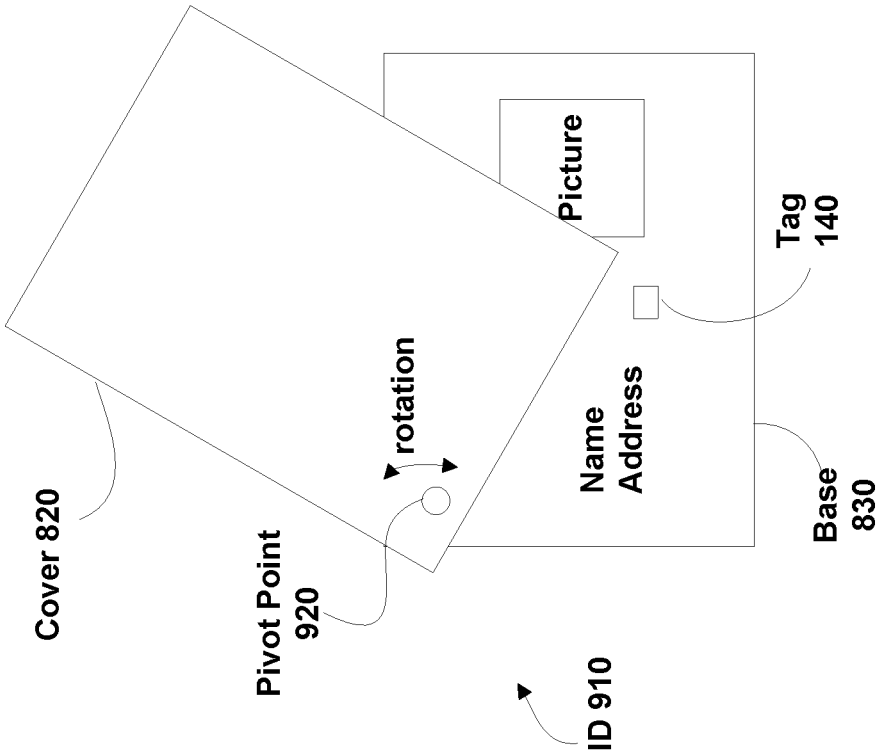

Cover 820
Pivot Point
920
rotation
Name
Address
Picture
Tag
140
Base
830
ID 910

FIG. 9

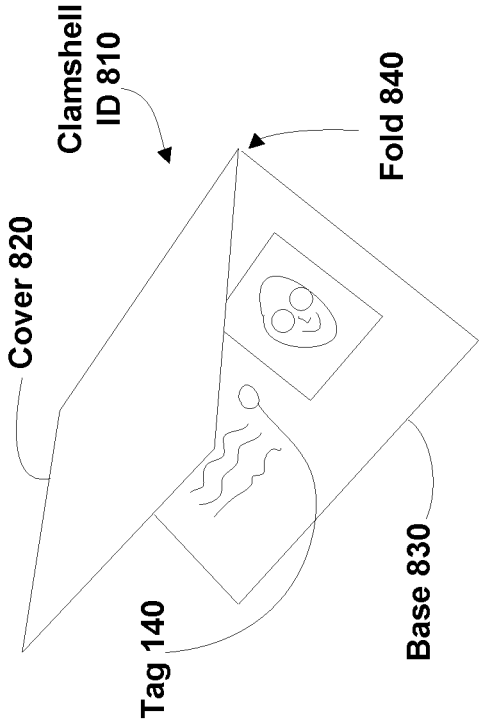

Clamshell
ID 810
Fold 840
Cover 820
Tag 140
Base 830

FIG. 8

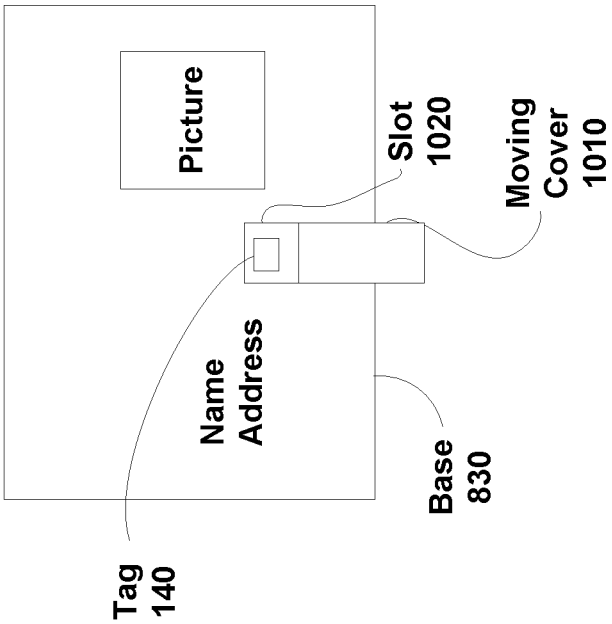


FIG.
10B

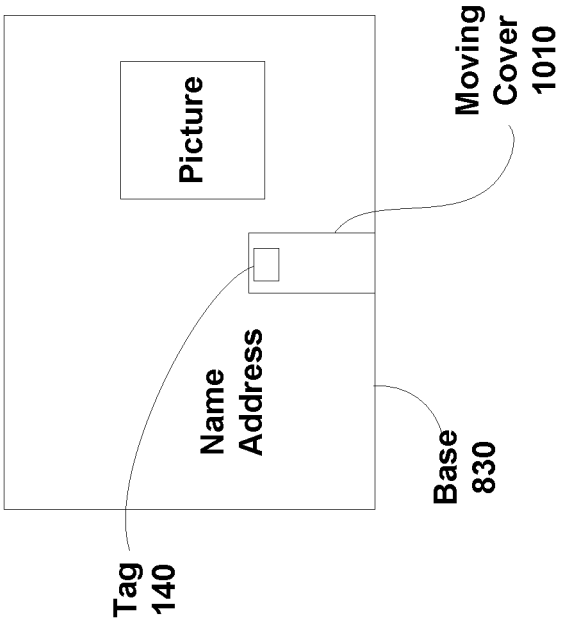


FIG.
10A

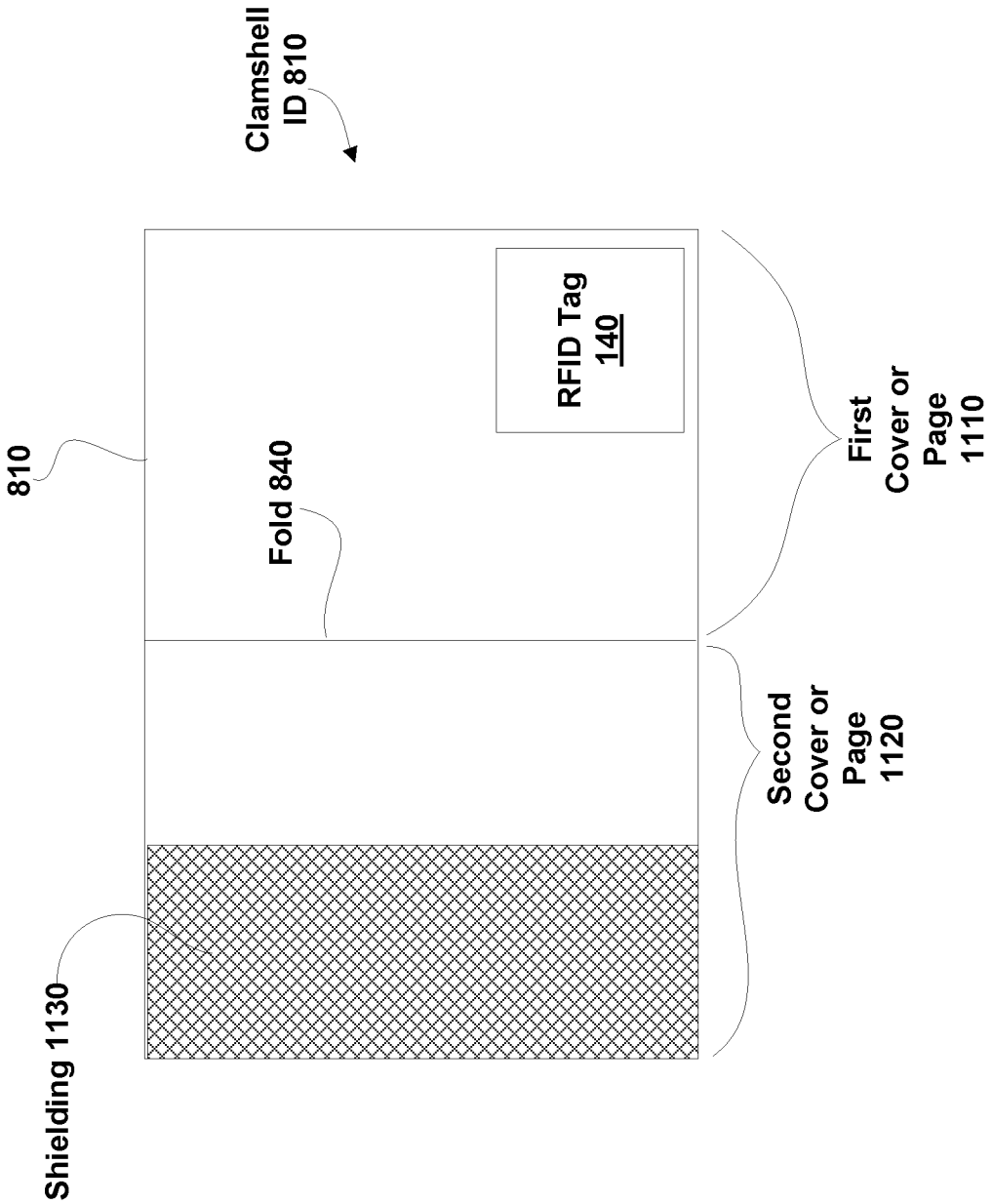

Clamshell
ID 810
810
Fold 840
RFID Tag
140
First
Cover or
Page
1110
Second
Cover or
Page
1120
Shielding 1130

FIG. 11

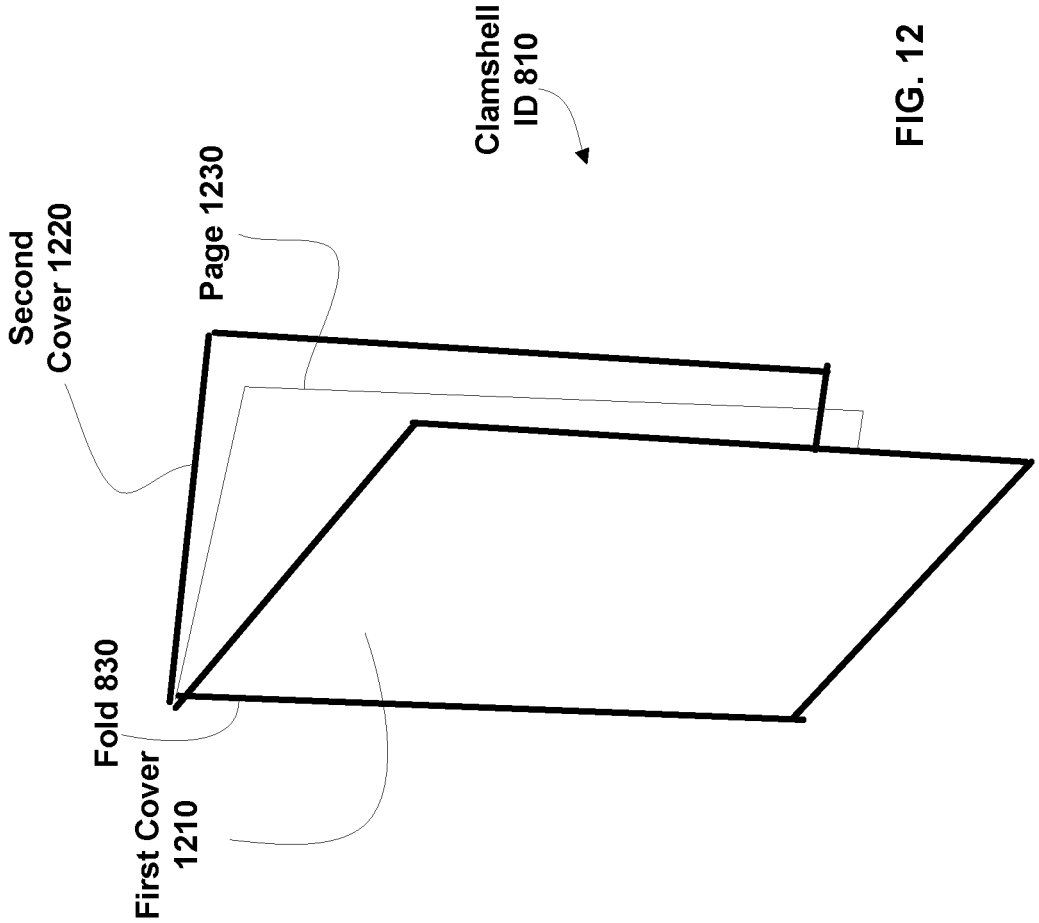

Second Cover 1220
Page 1230
Fold 830
First Cover 1210
Clamshell ID 810

FIG. 12

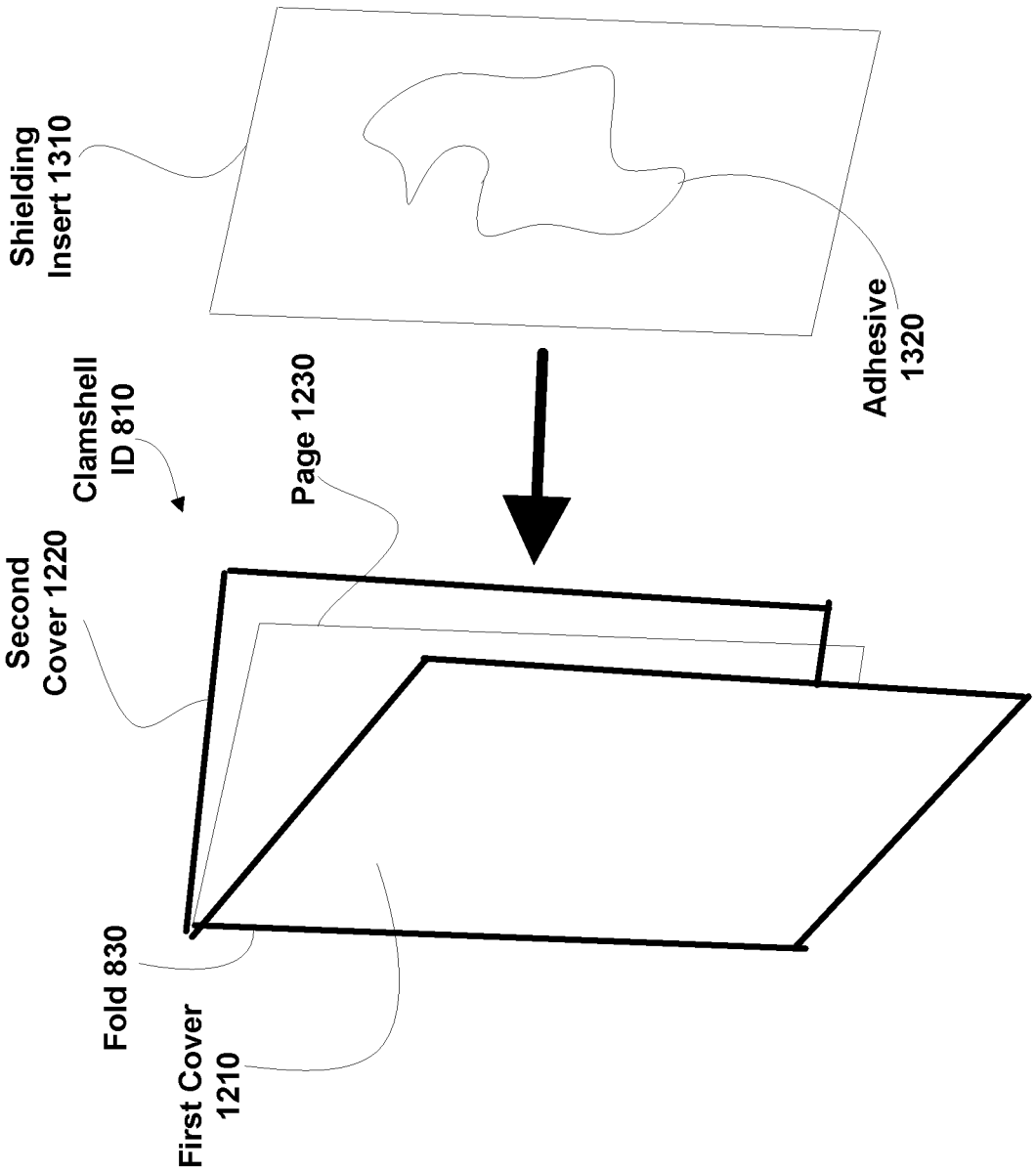

Shielding Insert 1310
Clamshell ID 810
Second Cover 1220
Fold 830
First Cover 1210
Page 1230
Adhesive 1320

FIG. 13

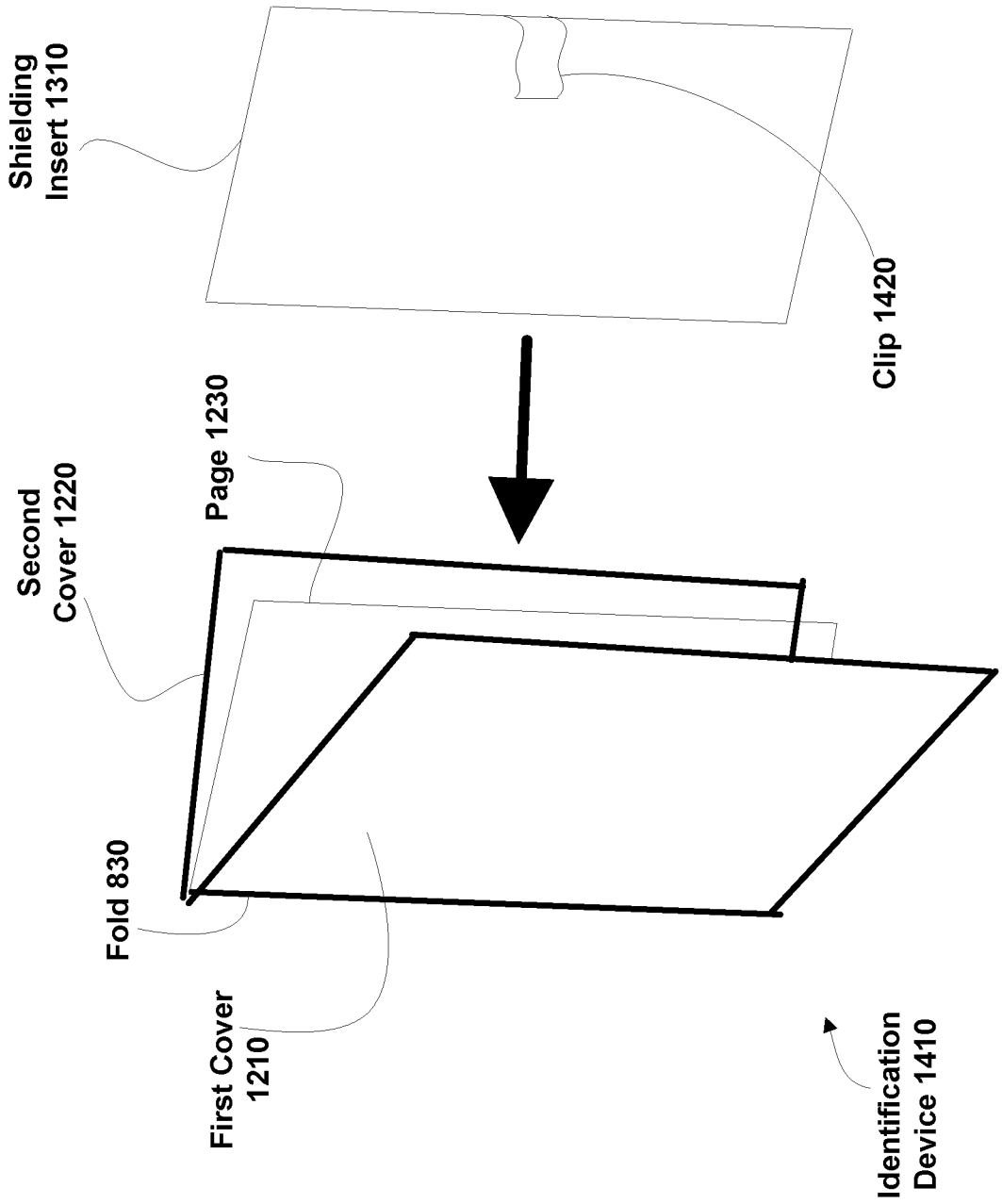

Shielding Insert 1310
Clip 1420
Page 1230
Second Cover 1220
Fold 830
First Cover 1210
Identification Device 1410

FIG. 14

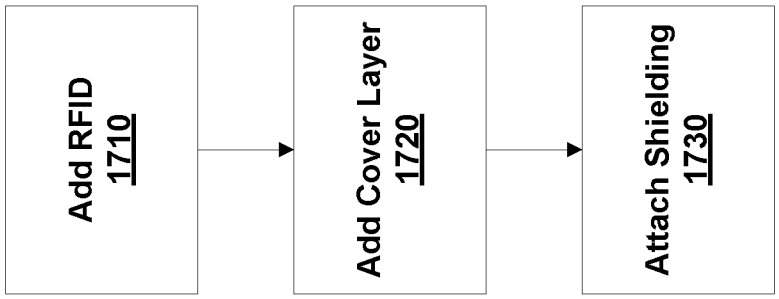


FIG. 17

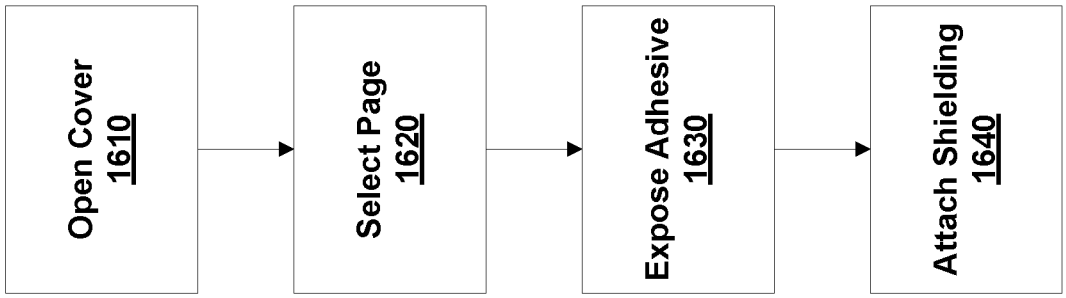


FIG. 16

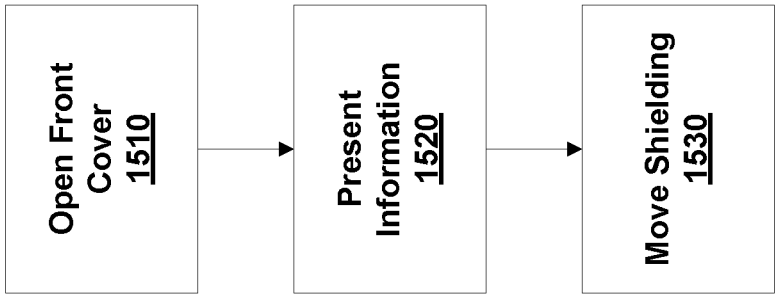


FIG. 15

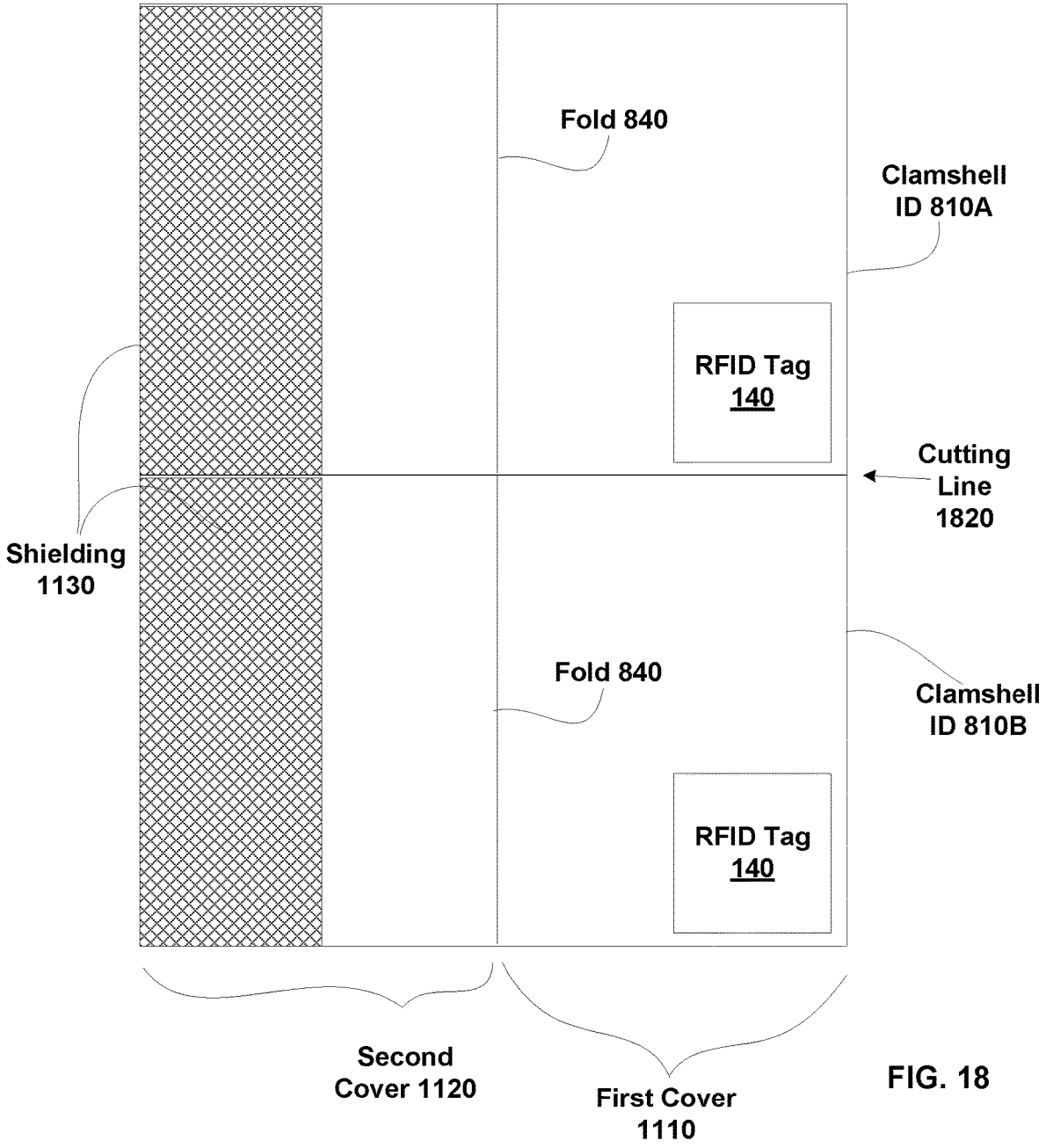

Fold 840
Clamshell
ID 810A
RFID Tag
140
Cutting
Line
1820
Shielding
1130
Fold 840
Clamshell
ID 810B
RFID Tag
140
Second
Cover 1120
First Cover
1110

FIG. 18

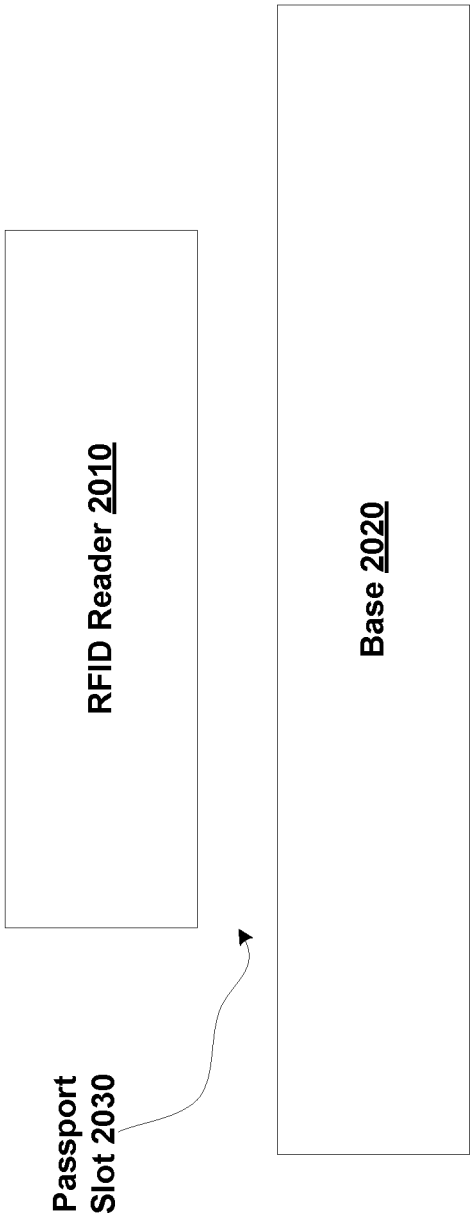


FIG. 20

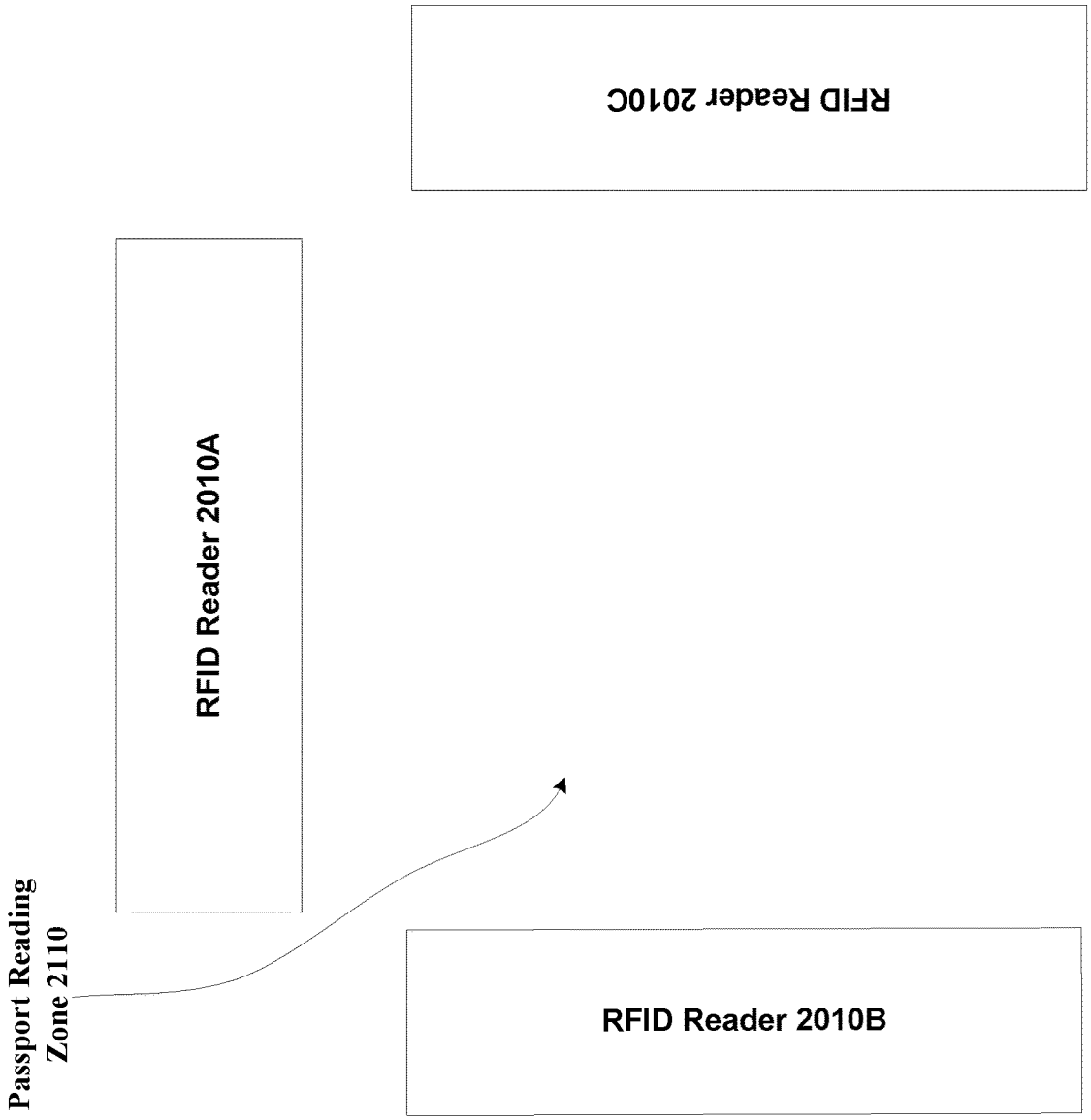

RFID Reader 2010A
Passport Reading Zone 2110
RFID Reader 2010B
RFID Reader 2010C

FIG. 21

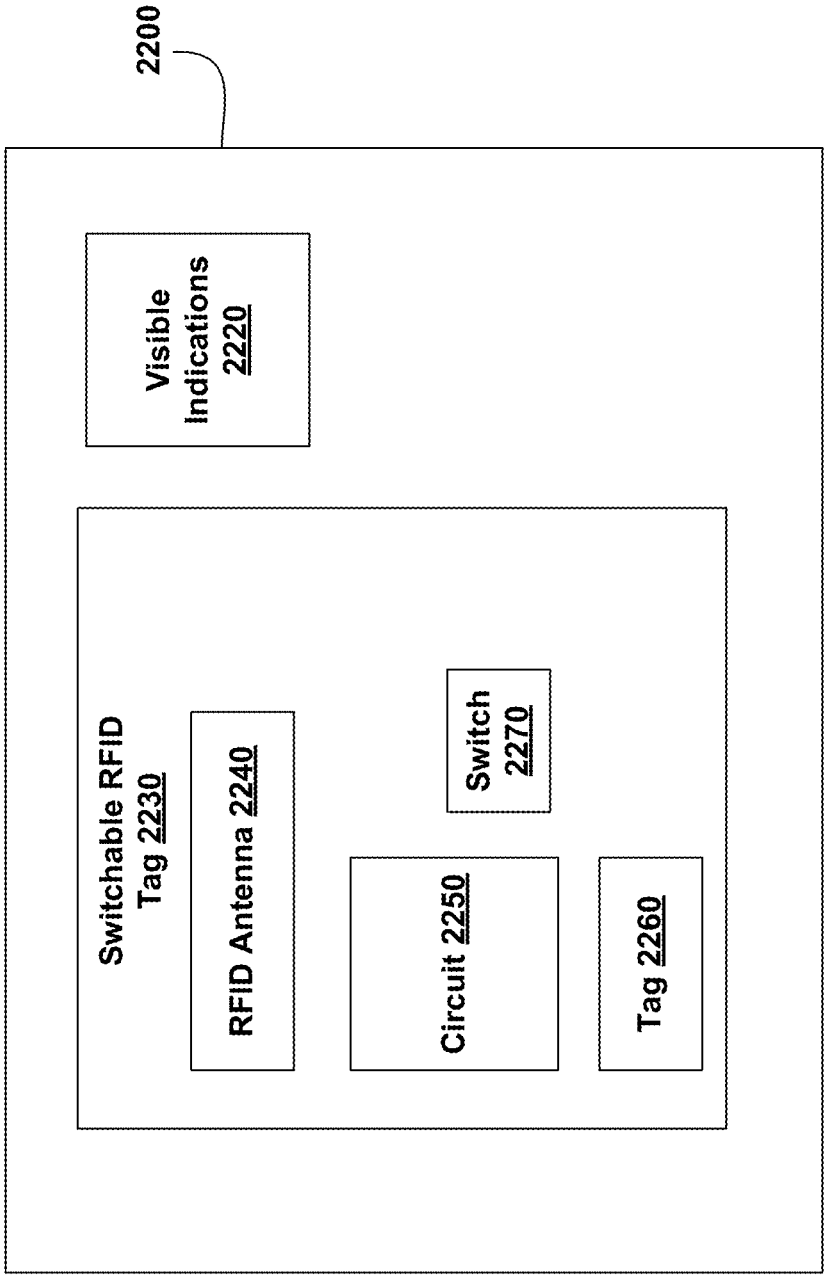

2200
Visible Indications 2220
Switchable RFID Tag 2230
RFID Antenna 2240
Circuit 2250
Switch 2270
Tag 2260

FIG. 22

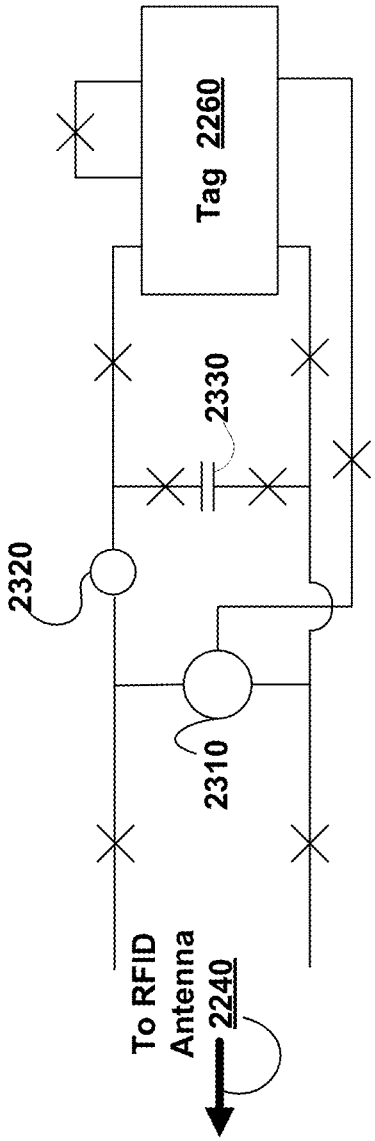
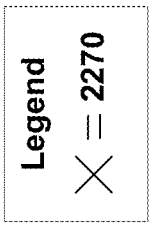

Tag 2260
2330
2320
2310
To RFID Antenna 2240

FIG. 23


Legend
= 2270

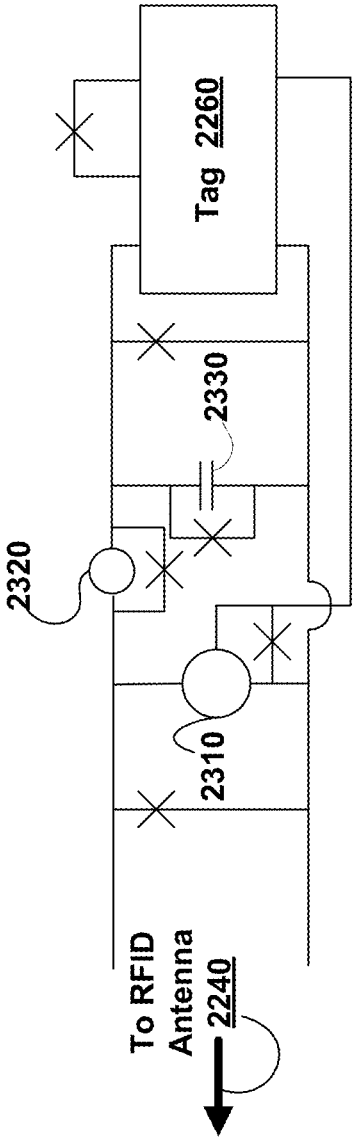
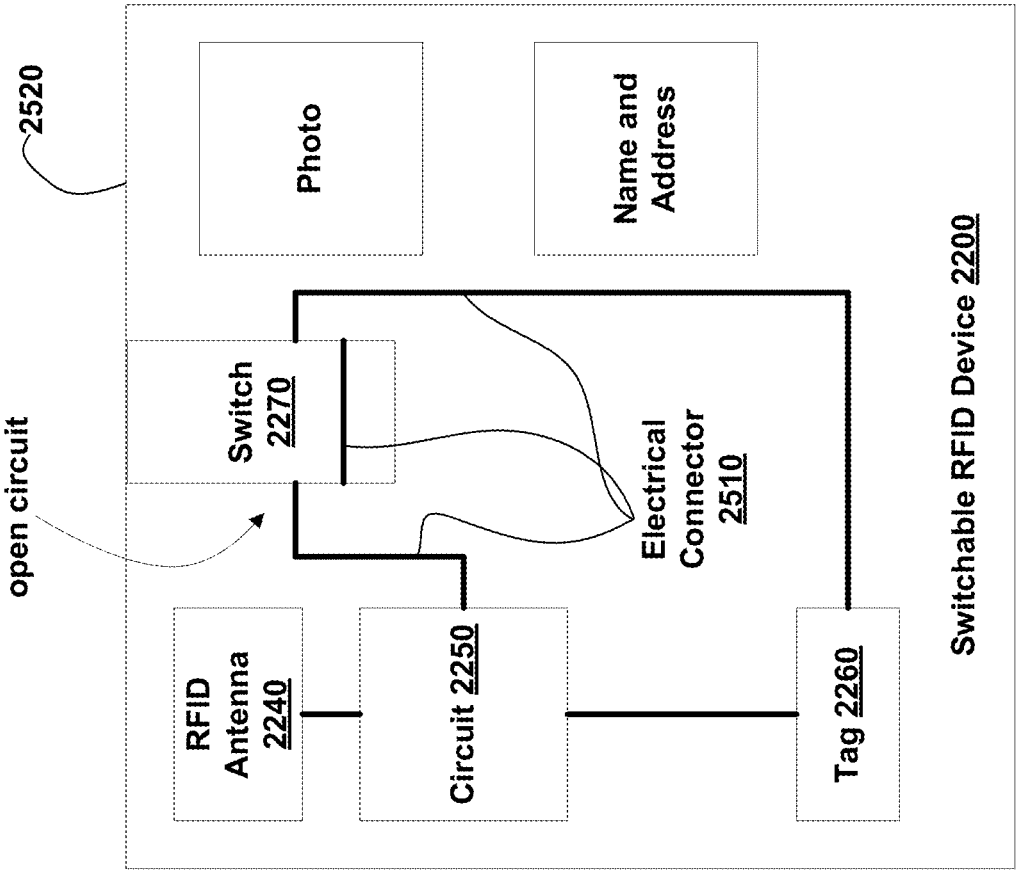

Tag 2260
2330
2320
2310
To RFID Antenna 2240

FIG. 24



OFF Position FIG. 25A

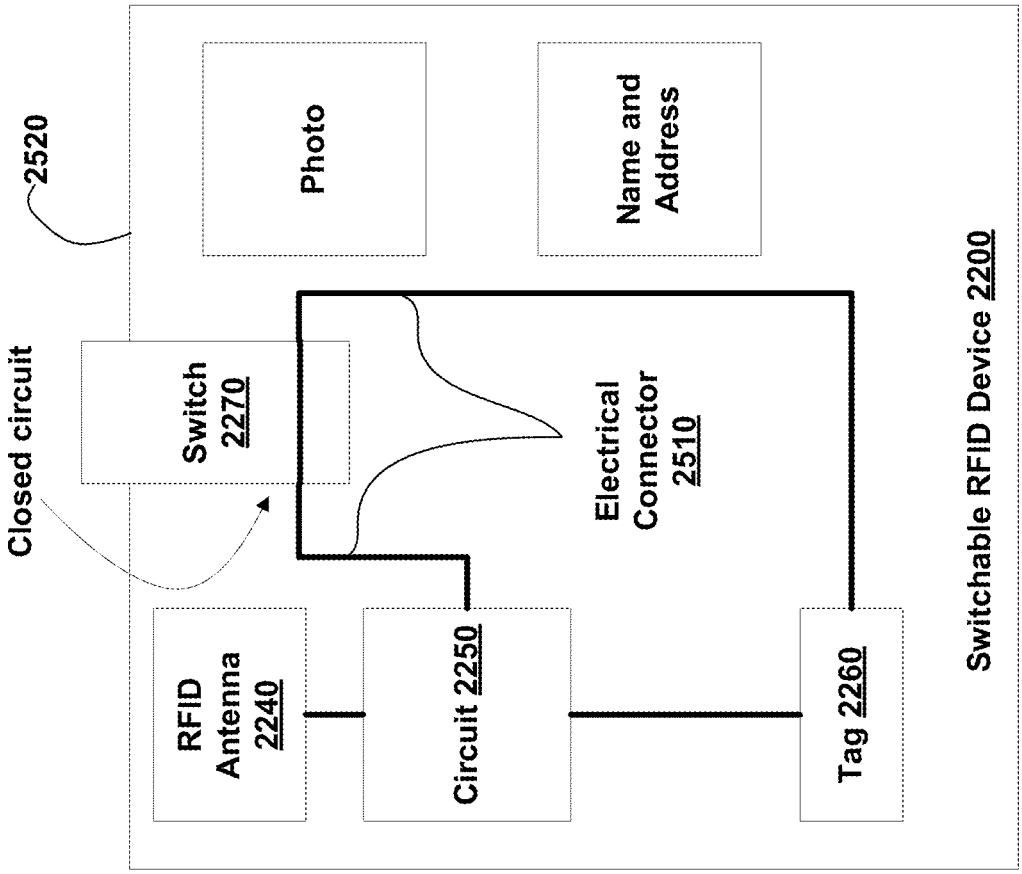


FIG. 25B ON Position

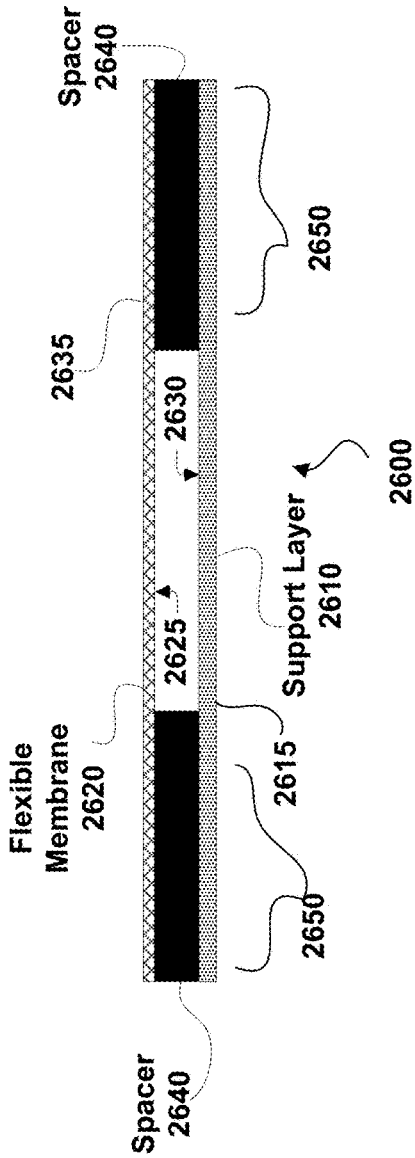


FIG. 26A
Membrane Switch (OFF)

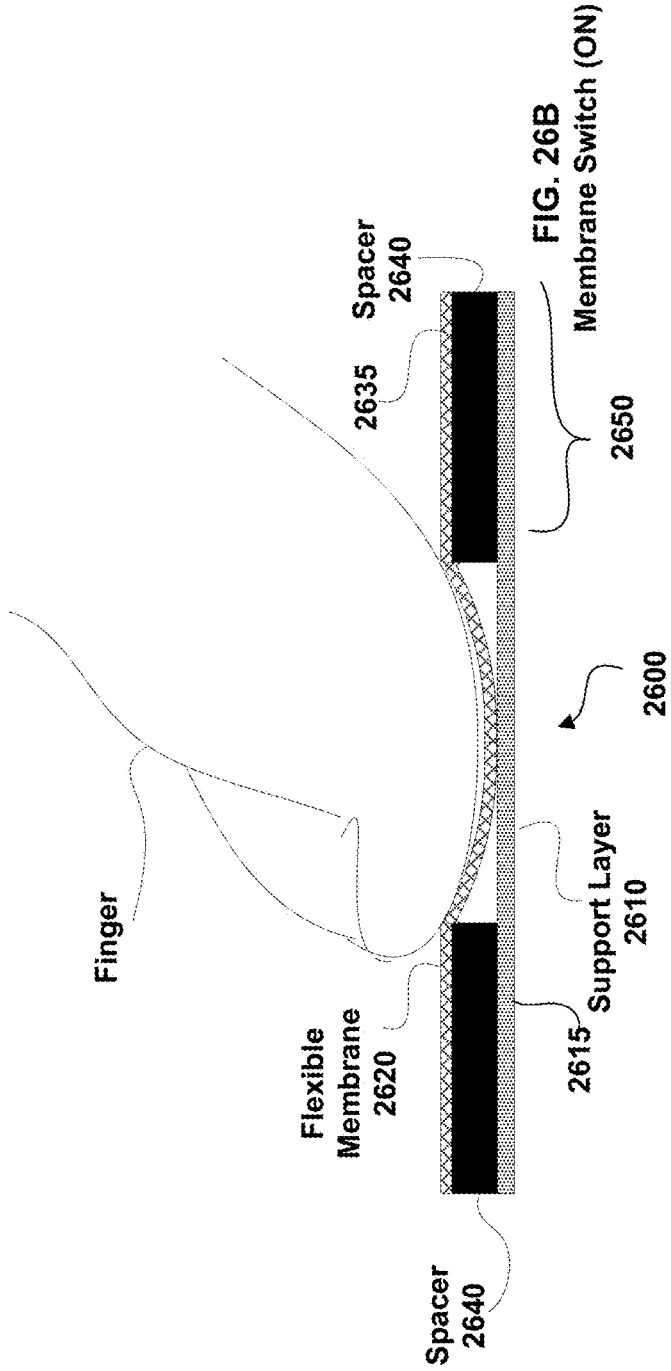


FIG. 26B
Membrane Switch (ON)

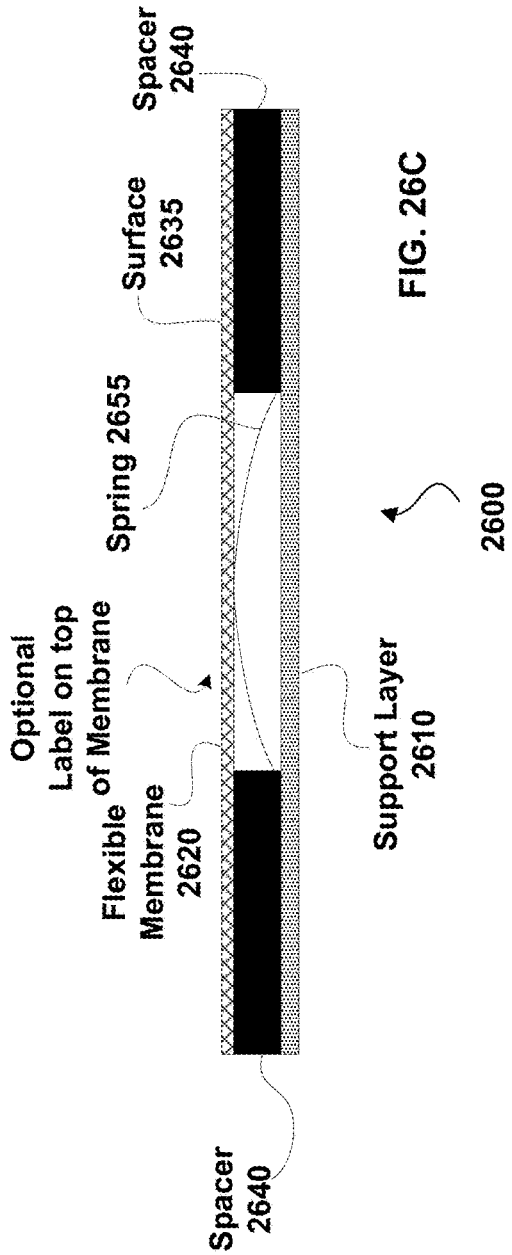


FIG. 26C

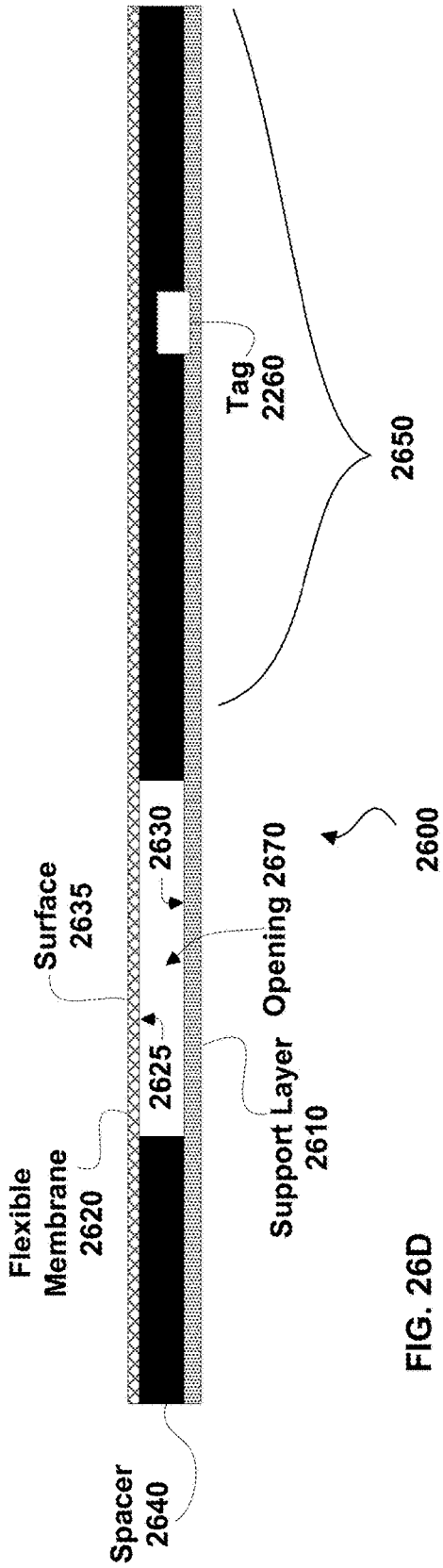


FIG. 26D

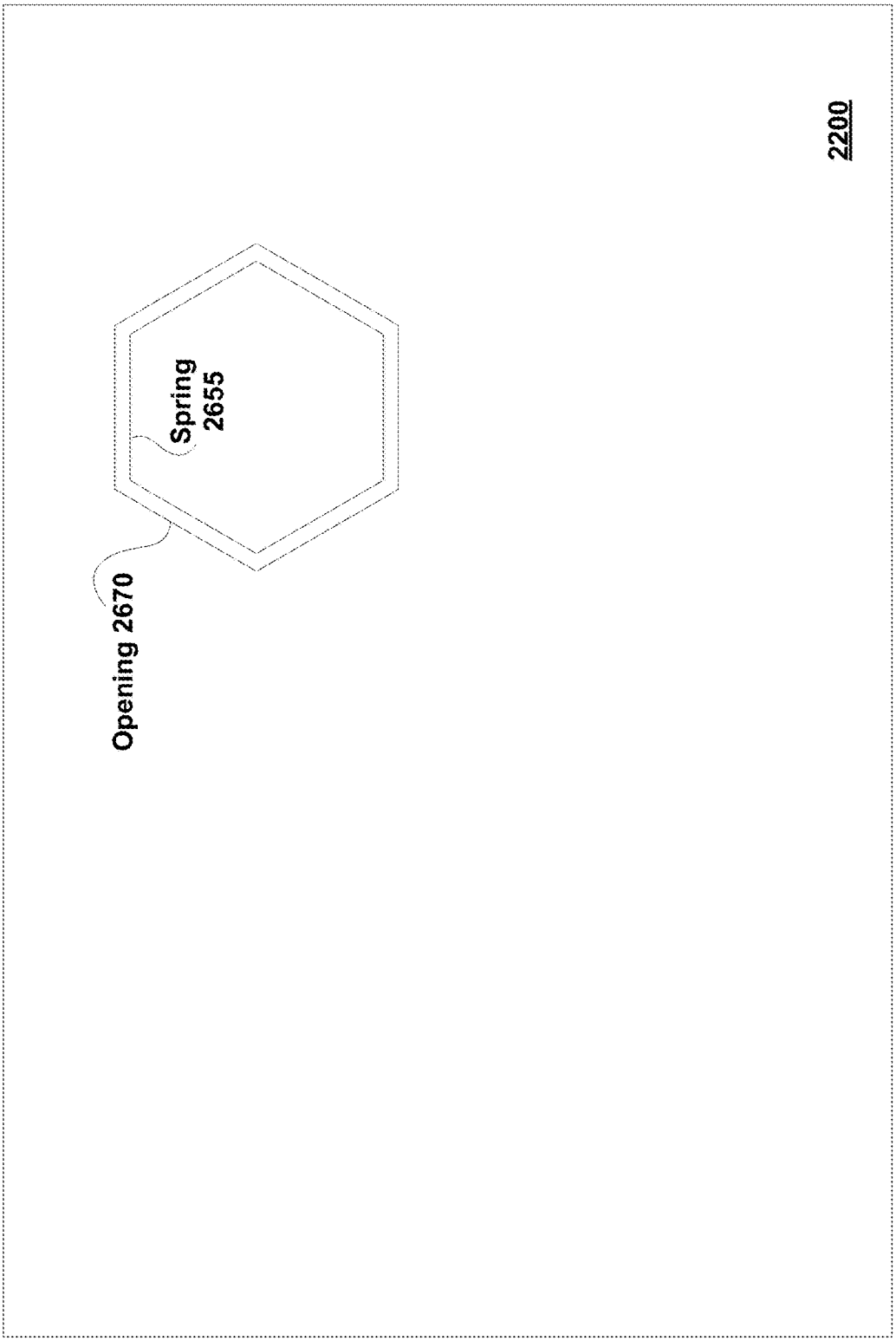


FIG. 27
(Top View)

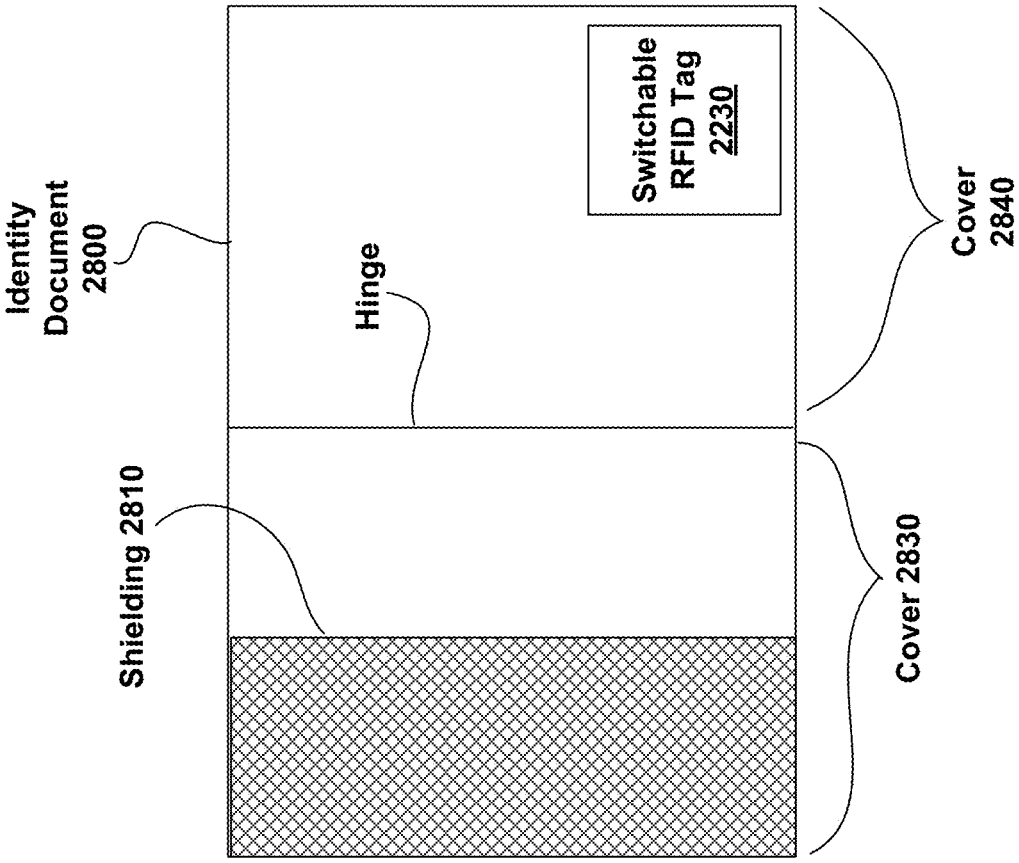

Identity Document 2800
Shielding 2810
Hinge
Switchable RFID Tag 2230
Cover 2830
Cover 2840

FIG. 28

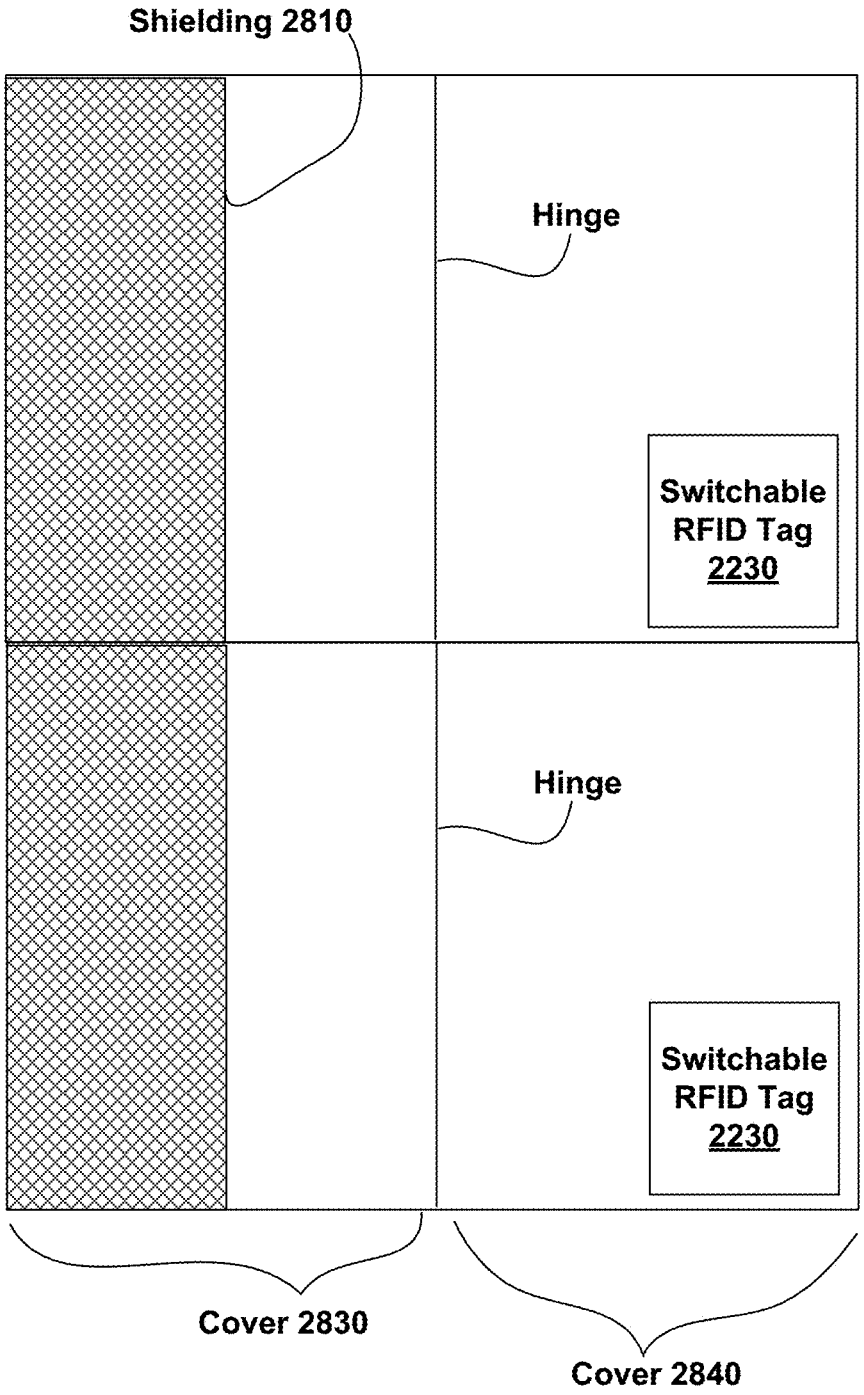

Shielding 2810
Hinge
Switchable
RFID Tag
2230
Hinge
Switchable
RFID Tag
2230
Cover 2830
Cover 2840

FIG. 29

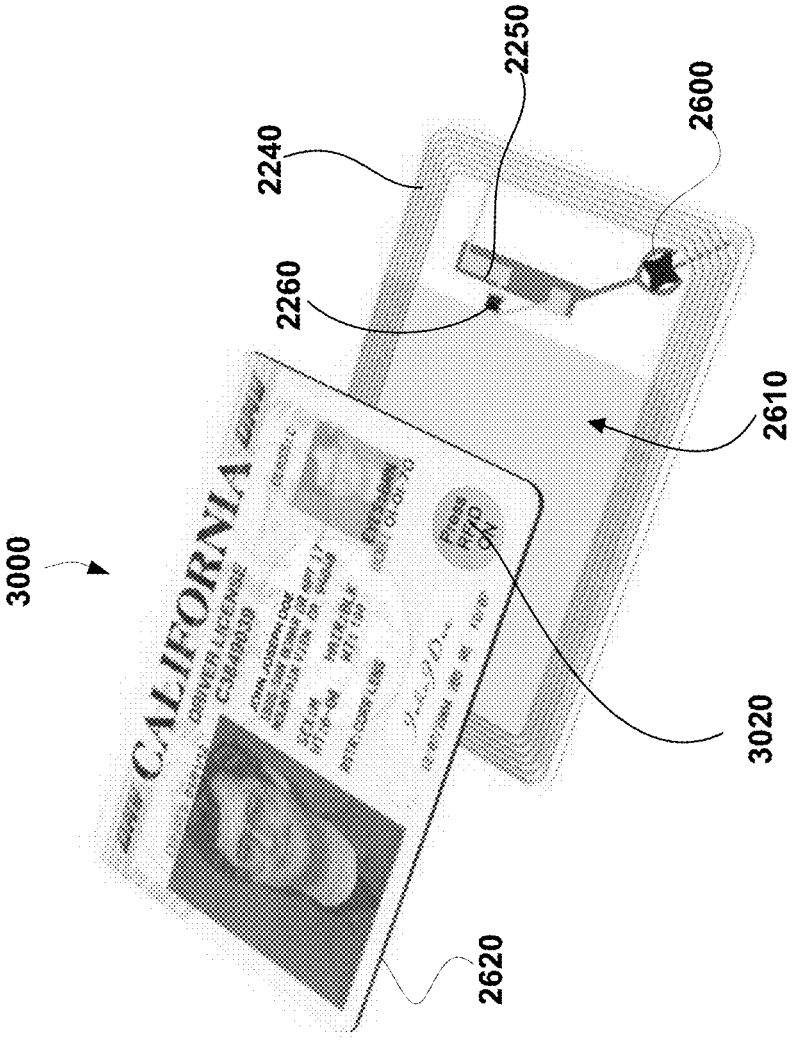


FIG. 30

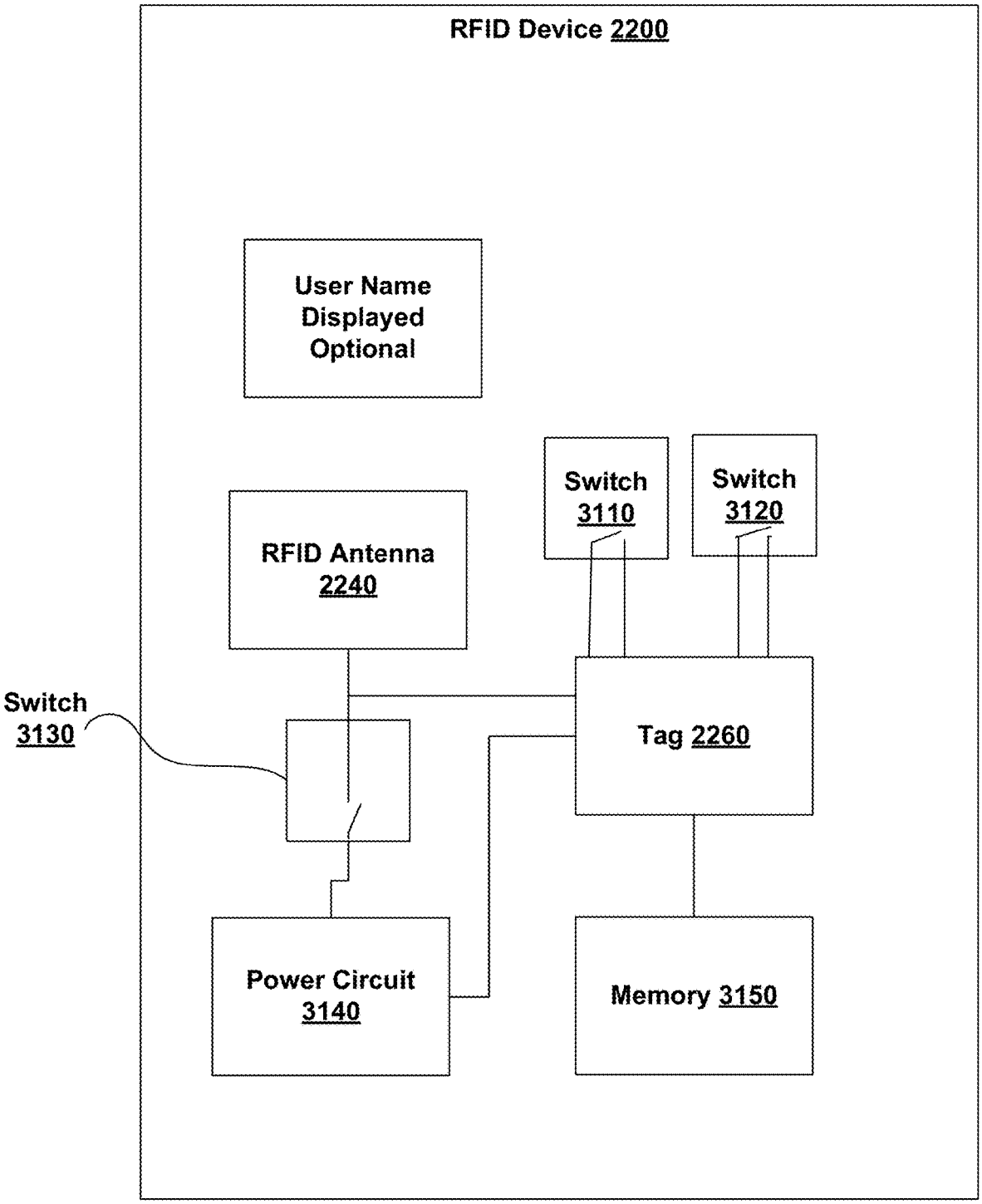

RFID Device 2200
User Name Displayed Optional
Switch 3110
Switch 3120
RFID Antenna 2240
Switch 3130
Tag 2260
Power Circuit 3140
Memory 3150

FIG. 31

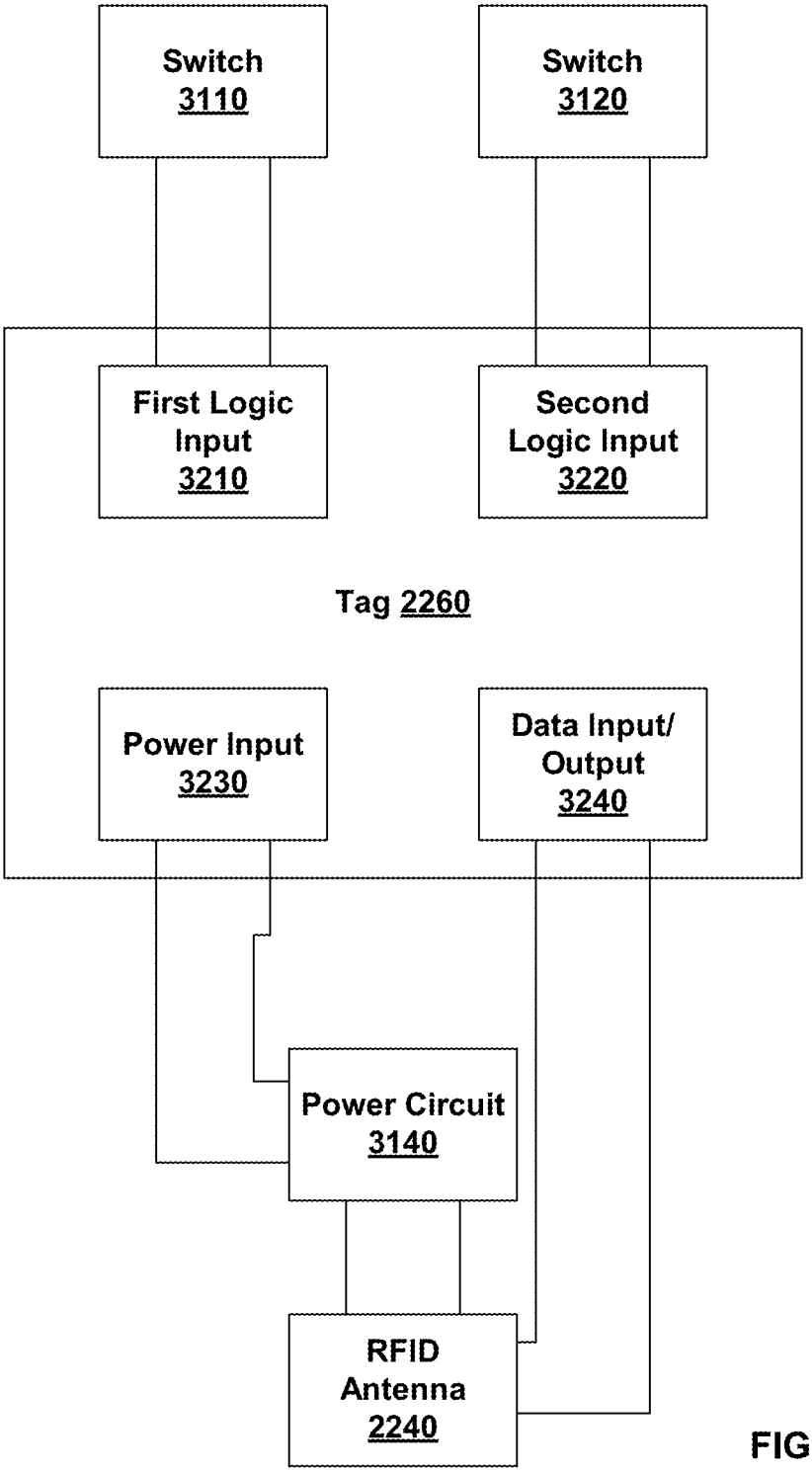

Switch
3110
Switch
3120
First Logic
Input
3210
Second
Logic Input
3220
Tag 2260
Power Input
3230
Data Input/
Output
3240
Power Circuit
3140
RFID
Antenna
2240

FIG. 32

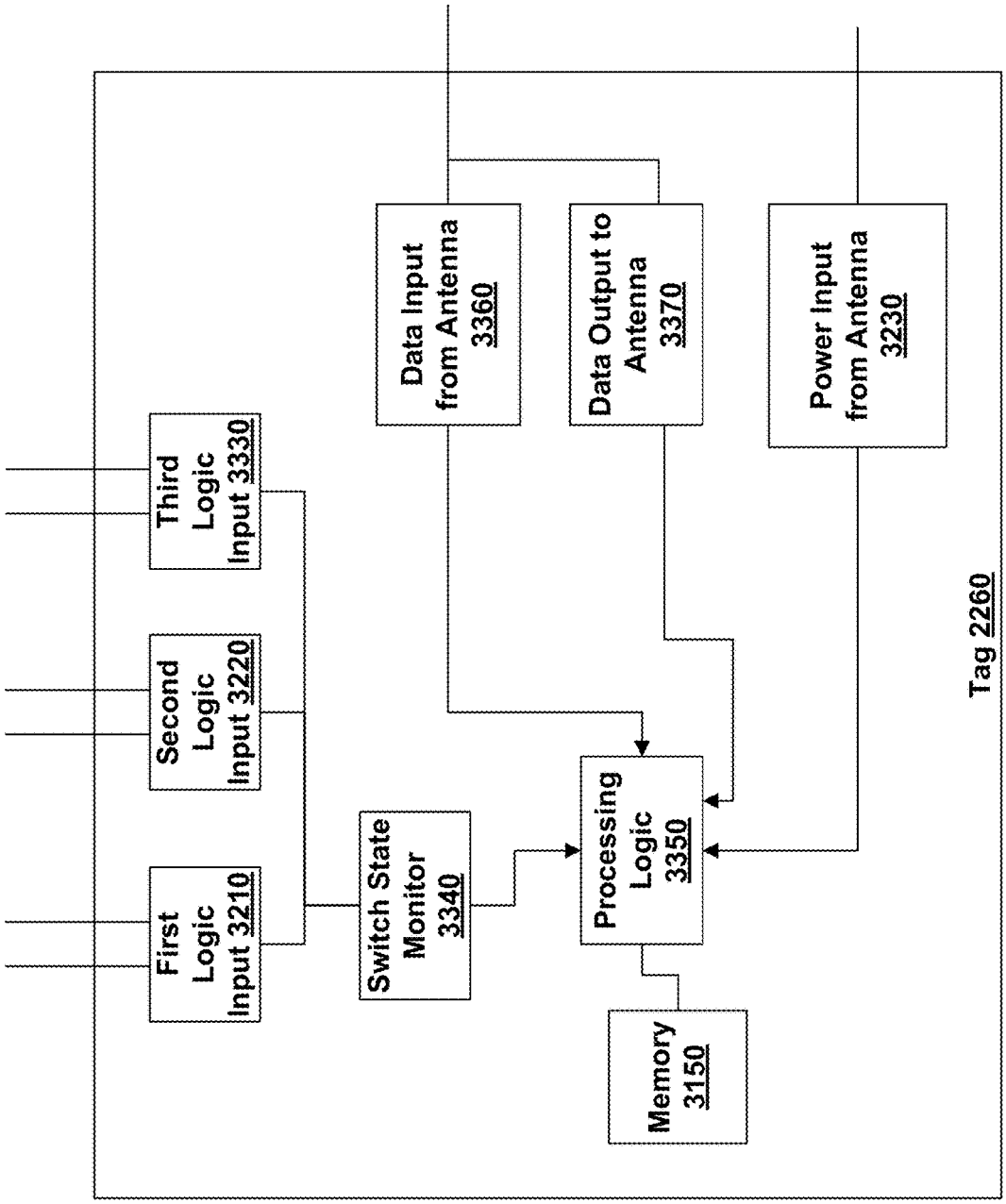

First Logic Input 3210
Second Logic Input 3220
Third Logic Input 3330
Switch State Monitor 3340
Data Input from Antenna 3360
Data Output to Antenna 3370
Power Input from Antenna 3230
Processing Logic 3350
Memory 3150
Tag 2260

FIG. 33

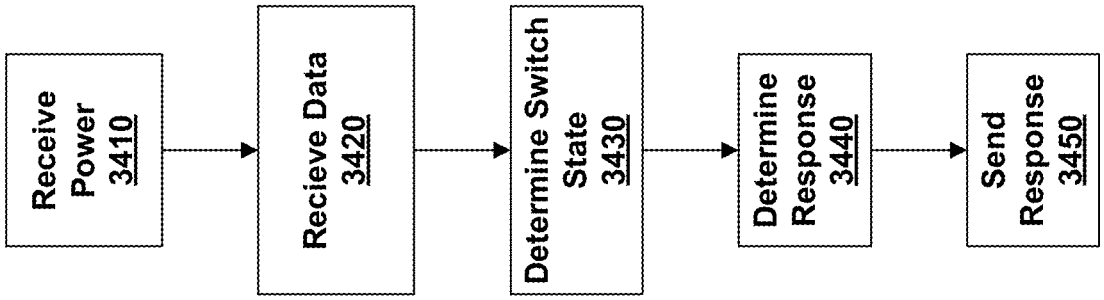

Receive Power 3410
Recieve Data 3420
Determine Switch State 3430
Determine Response 3440
Send Response 3450

FIG. 34

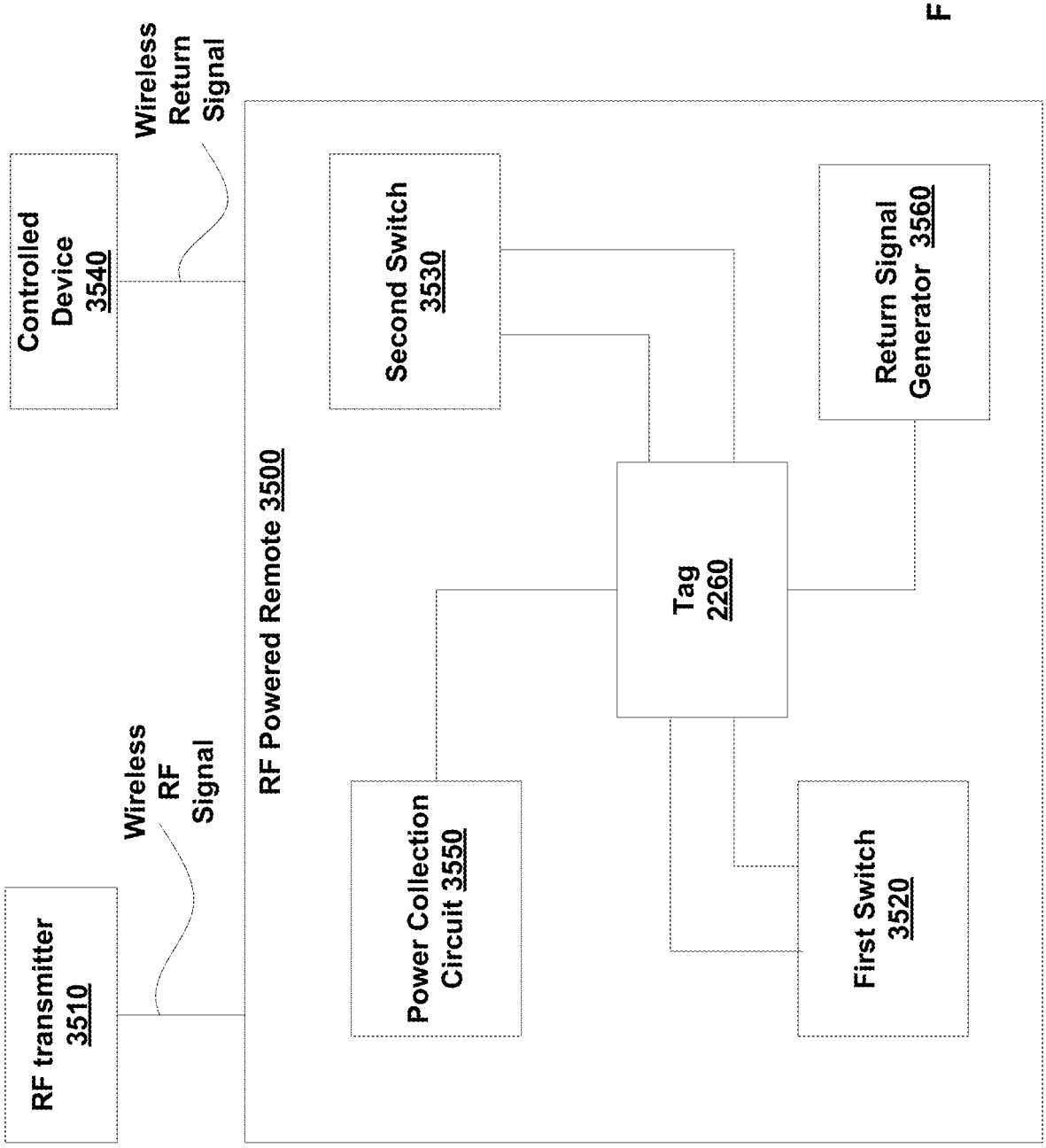

Controlled Device 3540
Wireless Return Signal
RF transmitter 3510
Wireless RF Signal
RF Powered Remote 3500
Second Switch 3530
Return Signal Generator 3560
Tag 2260
Power Collection Circuit 3550
First Switch 3520

FIG. 35

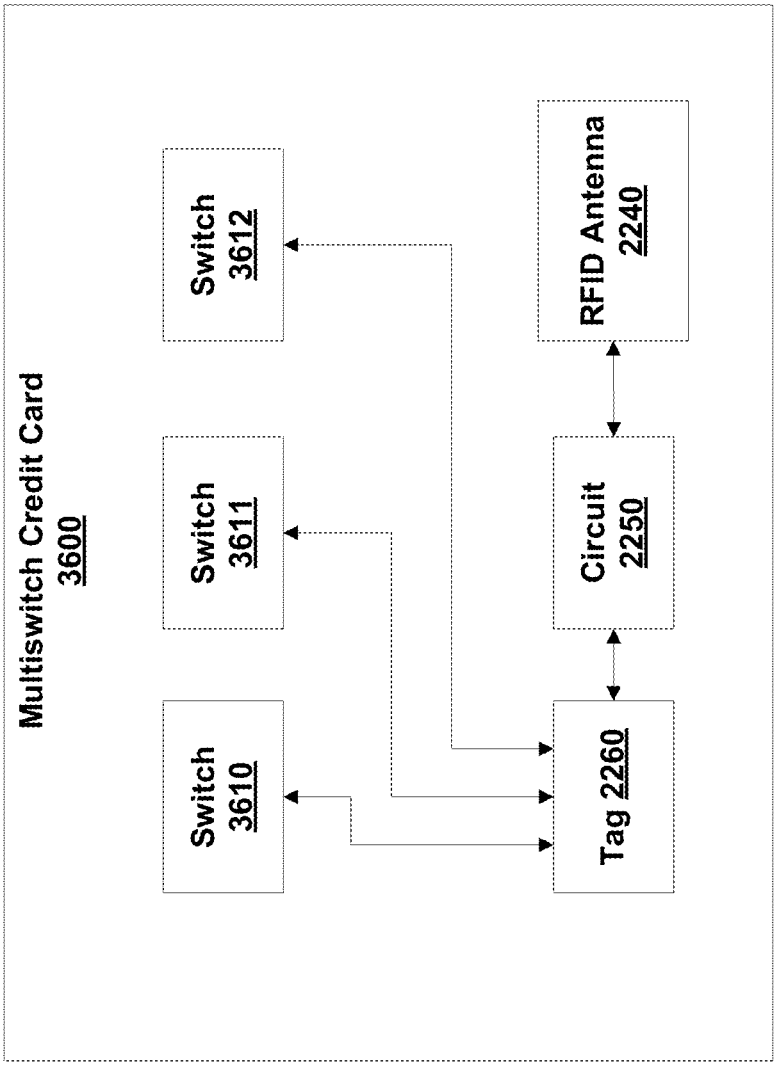

Multiswitch Credit Card
3600
Switch
3610
Switch
3611
Switch
3612
Tag 2260
Circuit
2250
RFID Antenna
2240

FIG. 36

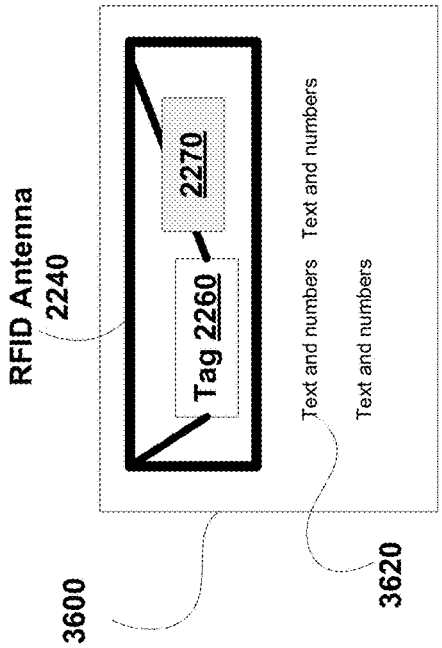


FIG. 37B

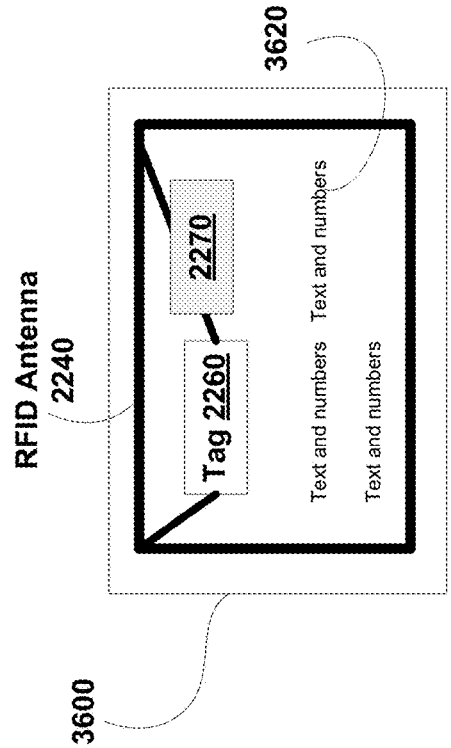


FIG. 37A

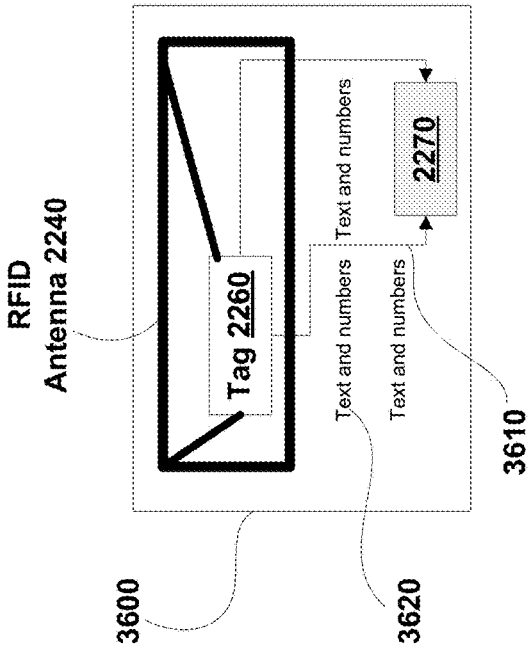


FIG. 37C

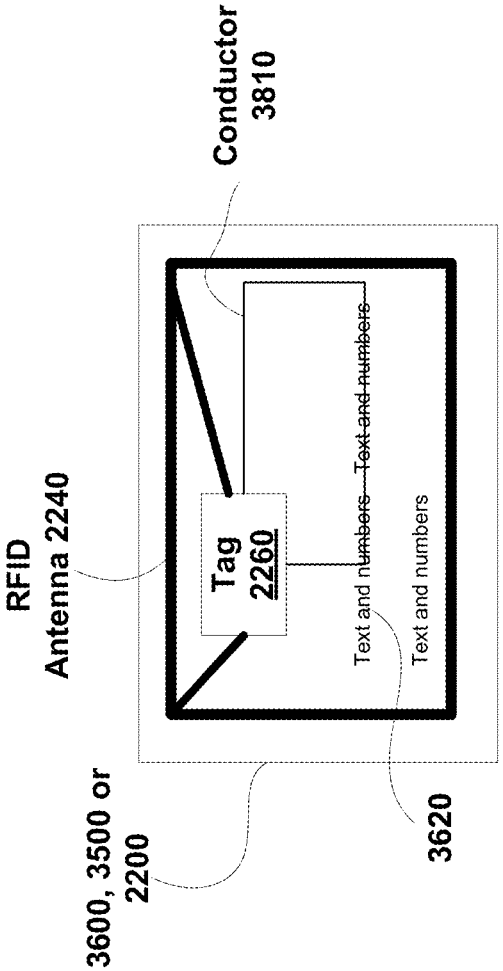

Conductor
3810
RFID
Antenna 2240
Tag
2260
Text and numbers
Text and numbers
Text and numbers
3600, 3500 or
2200
3620

FIG. 38

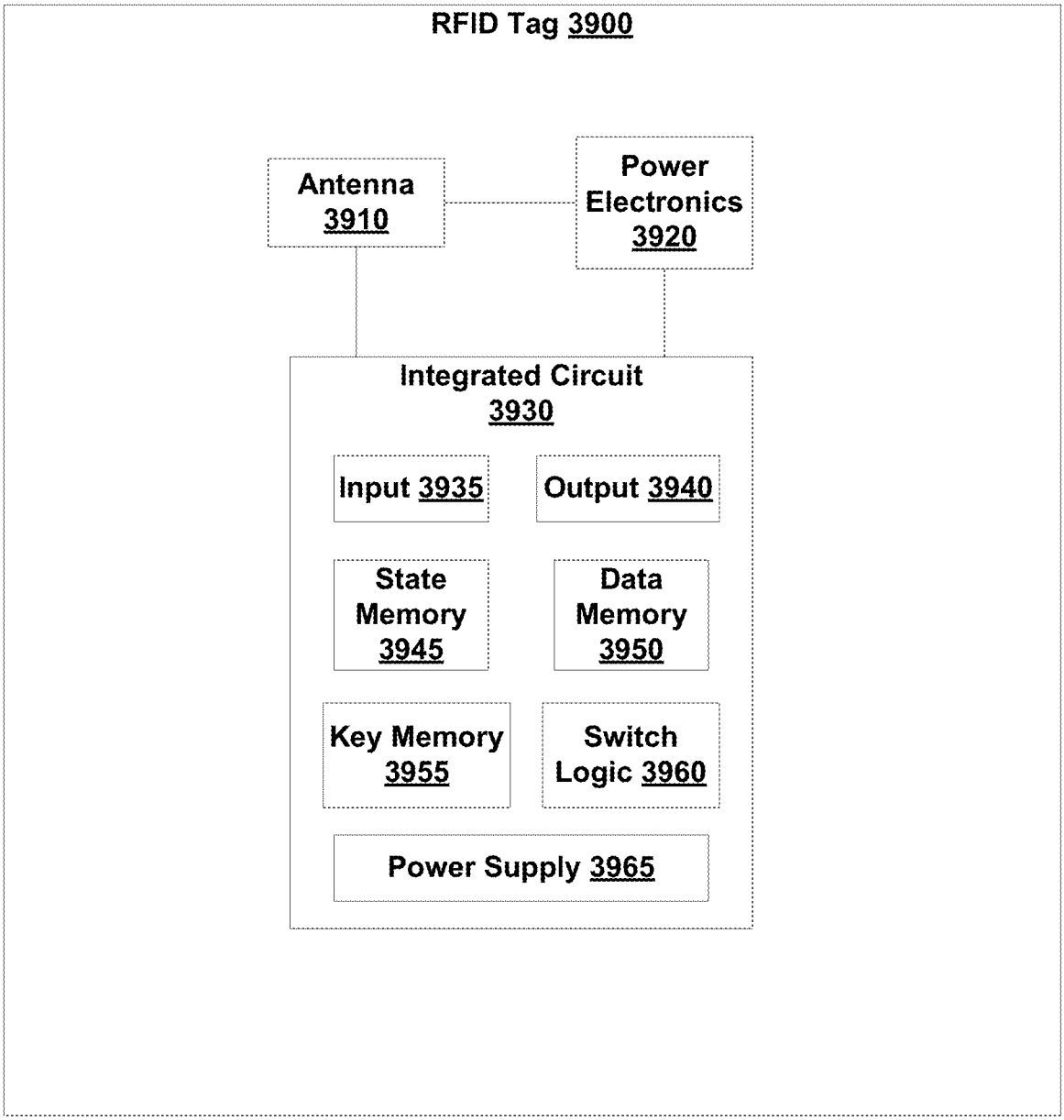

RFID Tag 3900
Antenna 3910
Power Electronics 3920
Integrated Circuit 3930
Input 3935
Output 3940
State Memory 3945
Data Memory 3950
Key Memory 3955
Switch Logic 3960
Power Supply 3965

FIG. 39

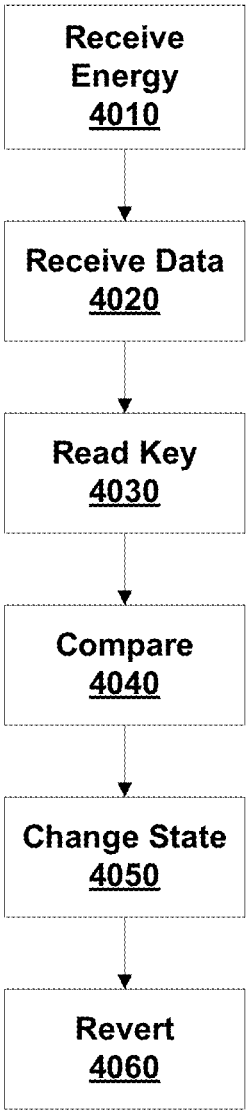

Receive Energy 4010
Receive Data 4020
Read Key 4030
Compare 4040
Change State 4050
Revert 4060

FIG. 40

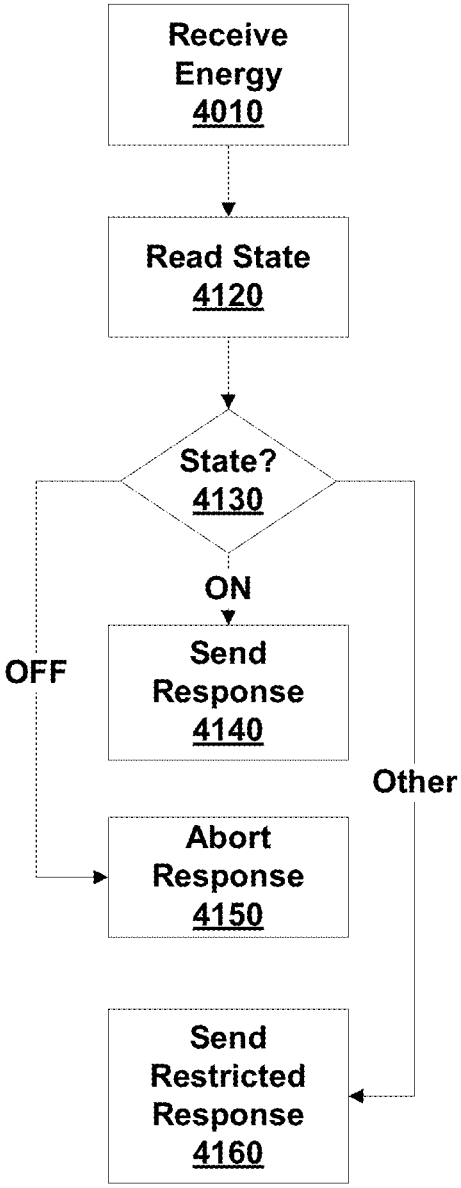

Receive Energy 4010
Read State 4120
State? 4130
ON
OFF
Other
Send Response 4140
Abort Response 4150
Send Restricted Response 4160

FIG. 41

CELLULAR DEVICE INCLUDING INDUCTIVE ANTENNA

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. non-provisional patent application Ser. No. 16/186,543 filed Nov. 11, 2018, which in turn is a continuation-in-part of U.S. non-provisional patent application Ser. No. 15/418,726 filed Jan. 28, 2017; which, in turn, is a continuation of U.S. non-provisional patent application Ser. No. 14/660,825 filed Mar. 17, 2015, which in turn is:

a continuation in part of US non-provisional patent application Ser. No. 13/481,104 filed May 25, 2012; which is in turn is a continuation of Ser. No. 12/777,474 filed May 11, 2010, which in turn is a continuation of Ser. No. 11/350,309 filed Feb. 7, 2006, now U.S. Pat. No. 7,719,425, and claims benefit of provisional patent applications:

60/678,428 filed May 6, 2005,
60/685,331 filed May 27, 2005,
60/700,884 filed Jul. 19, 2005,
60/712,308 filed Aug. 30, 2005,
60/715,641 filed Sep. 10, 2005,
60/752,933 filed Dec. 21, 2005, and
60/758,751 filed Jan. 13, 2006;

a continuation in part of US non-provisional patent application Ser. No. 13/084,433 filed Apr. 11, 2011 which in turn is a continuation of Ser. No. 11/458,620 filed Jul. 19, 2006, now U.S. Pat. No. 7,924,156 which is a continuation in part of:

Ser. No. 11/382,052 filed May 7, 2006,
Ser. No. 11/382,053 filed May 7, 2006,
Ser. No. 11/382,054 filed May 8, 2006,
Ser. No. 11/382,264 filed May 8, 2006,
Ser. No. 11/382,265 filed May 8, 2006, and
Ser. No. 11/420,721 filed May 26, 2006,

and claims benefit of provisional patent applications:

60/700,884 filed Jul. 19, 2005,
60/712,308 filed Aug. 30, 2005,
60/715,641 filed Sep. 10, 2005,
60/752,933 filed Dec. 21, 2005,
60/758,751 filed Jan. 13, 2006,
60/782,068 filed Mar. 13, 2006,
60/744,154 filed Apr. 3, 2006, and
60/746,636 filed May 6, 2006, and is

a continuation in part of Ser. No. 11/382,050 filed May 7, 2006, which claims benefit of provisional patent applications:

60/678,428 May 6, 2005, and
60/685,331 May 27, 2005; and

a continuation in part of U.S. non-provisional patent application Ser. No. 14/468,110 filed Aug. 25, 2014, which is a continuation of Ser. No. 12/577,209 Oct. 12, 2009, now U.S. Pat. No. 8,816,826, which claims benefit of Ser. No. 11/468,026 filed Aug. 29, 2006, Ser. No. 14/468,110 claims benefit of provisional patent applications:

60/700,884 filed Jul. 19, 2005,
60/712,308 filed Aug. 30, 2005,
60/715,641 filed Sep. 10, 2005,
60/752,933 filed Dec. 21, 2005,
60/758,751 filed Jan. 13, 2006,
60/782,068 filed Mar. 13, 2006,
60/744,154 filed Apr. 3, 2006, and
60/746,636 filed May 6, 2006, and

is a continuation in part of

CIP Ser. No. 11/382,052 filed May 7, 2006,

CIP Ser. No. 11/382,053 filed May 7, 2006,
CIP Ser. No. 11/382,054 filed May 8, 2006,
CIP Ser. No. 11/382,264 filed May 8, 2006,
CIP Ser. No. 11/382,265 filed May 8, 2006,
CIP Ser. No. 11/420,721 filed May 26, 2006, and
CIP Ser. No. 11/382,050 filed May 7, 2006 which claims benefit of provisional patent applications:
60/678,428 filed May 6, 2005, and
60/685,331 filed May 27, 2005.

The disclosures of the above provisional and nonprovisional patent applications are hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

The invention is in the fields of electronic passports, and more specifically in the field of electronic passports including shielding and/or switchable RFID tags.

Description of Related Art

Radio Frequency identity (RFID) tags are typically small, flexible, and low profile devices that can be affixed to items for electronic tracking and information storage purposes. An RFID tag can be read by an RFID reader when the RFID tag is brought within a certain vicinity of the reader that is broadcasting a radio frequency signal. In some cases, once within that vicinity, the RFID tag receives sufficient power from the radio frequency signal to permit it to transmit a return radio frequency signal using the received power. These RFID tags are referred to as passive RFID tags. In other cases the RFID tag has an independent power source for generating a return radio frequency signal. These RFID tags are referred to as active RFID tags. With either passive or active RFID tags, the return radio frequency signal may include an encoded copy of information stored within the RFID tag. As used herein, RFID tags include radio frequency contactless chips.

SUMMARY

The invention includes the use of shielding in relation to RFID tags. For example, some embodiments of the invention include shielded containers for storing devices including RFID tags. These devices can include identification devices such as passports, credit cards, or driver's licenses.

Some embodiments of the invention include shielded containers and RFID tags, the RFID tags configured for use in determining a state of the container. For example, detection of an RFID tag can be used to determine if the container is open or closed. These embodiments are optionally used in event logging or security.

Some embodiments of the invention include shielding attached to identification devices. This shielding may, for example, be included in a clamshell configuration, as a shielding insert, or as part of a page or cover.

Various embodiments of the invention include a container comprising an RFID tag configured for determining if the container is open or closed, and radio frequency shielding configured to shield a signal from the RFID tag responsive to whether the container is open or closed.

Various embodiments of the invention include a vehicle comprising a receptacle attached to the vehicle and configured to receive an identification device including an RFID tag, and a radio frequency shielding attached to the recep-

tacle and configured to shield the RFID tag when the identification device is placed within the receptacle.

Various embodiments of the invention include a purse comprising a receptacle configured to receive an identification device including an RFID tag, and a radio frequency shielding attached to the purse and configured to shield the RFID tag when the identification device is placed in the receptacle.

Various embodiments of the invention include a wallet comprising a receptacle configured to receive an identification device including an RFID tag, and a radio frequency shielding attached to the wallet and configured to shield the RFID tag when the identification device is placed in the receptacle.

Various embodiments of the invention include a shielded RFID device comprising an identity device including an RFID tag, and a cover physically attached to the device, the cover including a radio frequency shielding material configured to shield the RFID tag in a first position and to not shield the RFID tag in a second position.

Various embodiments of the invention include an identification device comprising a base including a surface configured to display identifying information, an RFID tag configured to transmit identifying information, and a cover including a radio frequency shielding material configured to shield the RFID tag when closed and to allow the RFID tag to communicate with a reader when open.

Various embodiments of the invention include a passport device comprising an RFID tag configured to transmit identifying information, a surface configured to visually display the identifying information, and an attached cover including a radio frequency shielding material configured to shield the RFID tag when the cover is closed, and configured to enable reading of the RFID tag when the cover is open.

Various embodiments of the invention include a passport device comprising a first cover part including identifying information on an inside surface, a second cover part separated from the first cover part by a fold, an RFID tag within the first cover or the second cover part, and a page between the first cover part and the second cover part, the page including shielding configured for shielding the RFID tag in a first position and not shielding the RFID tag in a second position.

Various embodiments of the invention include a driver's license device comprising an RFID tag configured to transmit identifying information, a surface configured to visually display the identifying information, and a cover including a radio frequency shielding material configured to shield the RFID tag in a first position, and configured to enable reading of the RFID tag in a second position.

Various embodiments of the invention include a credit card device comprising an RFID tag configured to transmit account information, an attached cover including radio frequency shielding and configured to move relative to the RFID tag, to shield the RFID tag in a first position, and not to shield the RFID that in a second position.

Various embodiments of the invention include a shielding device comprising a shielding material configured to be temporally attached to an identity device and to shield an RFID tag within the identity device, and an attachment mechanism configured for attaching the shielding material to the identity device.

Various embodiments of the invention include a passport reading system comprising an RFID reader, and a base disposed to form a slot between the base and the RFID reader, a width of the slot configured for passage of a passport in an open position such that shielding material within the passport does not interfere with communications between the RFID reader and an RFID tag included in the passport.

Various embodiments of the invention include a passport reading system comprising a first RFID reader, a second RFID reader, a third RFID reader, the first, second and third RFID readers surrounding a passport reading volume and being disposed such that at least one of the first, second and third RFID readers will be at a proper angle relative to an antenna of an RFID tag within a passport in the passport reading volume to read the RFID tag, and also disposed such that transmission between the RFID tag and the at least one of the first, second and third RFID readers is not prevented by shielding within the passport when the passport is open in the passport reading zone regardless of the angle of the shielding relative to the first, second and third readers.

Various embodiments of the invention include a system comprising a cover material configured for inclusion in a polarity of identity devices, a strip of shielding deposited on the cover material, a first RFID tag deposited on the cover material, a second RFID tag deposited on the cover material, and a cutting area configured to be cut in order to produce the plurality of identity devices, the cut including cutting of the strip of shielding and separation of the first RFID tag and the second RFID tag.

Various embodiments of the invention include a passport comprising an RFID tag configured to transmit identifying information, a surface configured to visually display the identifying information, and a cover including a first part and a second part separated by a fold, the first part including the RFID tag and the second part including a radio frequency shielding configured to shield the RFID tag when the cover is closed, and configured to allow reading of the RFID tag when the cover is open, the radio frequency shielding including metallic fibers disposed within the second part.

Various embodiments of the invention include a passport comprising a first cover part including identifying information including a photograph on an inside surface, a second cover part separated from the first cover part by a fold, an RFID tag within the first cover or the second cover part, and a page between the first cover part and the second cover part, the page including shielding configured for shielding the RFID tag in a first position and not shielding the RFID tag in a second position.

Various embodiments of the invention include a passport comprising a first cover part including an RFID tag disposed at least 5 mm from a fold, a second cover part separated from the first cover part by the fold and including shielding configured for shielding the RFID tag in a first position of the second cover part and not shielding the RFID tag in a second position of the cover part.

Various embodiments of the invention include a system comprising a cover material configured for inclusion in a polarity of identity devices, a strip of shielding deposited on the cover material, a first RFID tag deposited on the cover material, a second RFID tag deposited on the cover material, and a cutting area configured to be cut in order to produce the plurality of identity devices, the cut including cutting of the strip of shielding and separation of a location for depositing of the first RFID tag and a location for depositing of the second RFID tag.

Various embodiments of the invention include a method comprising depositing a radio frequency shielding material on a first part of a cover material, depositing at least a first radio frequency identity tag and a second radio frequency identity tag on a second part of the cover material, cutting the cover material through the radio frequency shielding,

and creating a fold in the flexible material, the fold separating the first part of the cover material from the second part of the cover material.

Various embodiments of the invention include a remotely powered RFID (radio frequency identity) tag having an electronically controlled switch. This switch is optionally a remotely (wirelessly) controlled switch. In some embodiments, when the switch is in an off state, the RFID tag will not transmit and when the switch is in an on state the RFID tag will transmit in response to an RF (radio frequency) signal. In some embodiments, the switch includes multiple on states in which different information or signals are transmitted responsive to the state of the switch. The RFID tag includes a memory configured to store the states of the RFID tag and an integrated circuit configured to determine whether to transmit responsive to the stored state of the RFID tag and a received RF signal.

Various embodiments of the invention include switchable RFID devices. These switchable RFID devices can include identity documents such as passports or driver's licenses, financial cards such as credit or debit cards, remote controls, security devices, access devices, communication devices, or the like. In some embodiments, more than one switchable RFID tag is included in a single RFID device. In various embodiments, one or more switches are used to change operation of an RFID tag from a responsive state to a non-responsive state, to change operation of an RFID tag from one responsive state to another responsive state, to enter data into an RFID device, to control an external device, or the like. In various embodiments, the switches are electronic, wireless, and/or mechanical.

Various embodiments of the invention includes an RFID tag comprising an antenna configured to receive data in a first RF signal, to receive energy from the first RF signal, and to transmit data in a second RF signal, the transmission of the second RF signal being powered by the energy received from the first RF signal; and an integrated circuit including an input configured to receive data from the antenna and to receive power resulting from the energy received from the antenna, an output configured to provide an RF signal to the antenna for transmission, a state memory configured to store an ON/OFF state of the RFID tag, a key memory configured for storing a key for changing the ON/OFF state stored in the state memory, and a switch logic configured to receive data from the input, to read the key from the key memory, to compare the received data with the read key, and to change the ON/OFF state stored in the state memory responsive to this comparison, the switch logic is further configured to determine whether or not to provide a second RF signal to the antenna for transmission, the determination being responsive to the ON/OFF state stored in the state memory.

Various embodiments of the invention include a method of changing an ON/OFF state of an RFID Tag, the method comprising receiving energy sufficient to power the RFID Tag through an RF antenna included in the RFID tag, receiving first data through the RF antenna, reading a key from a key memory, using an integrated circuit to compare the first data received through the RF antenna with the key read from the key memory, the integrated circuit powered by the received energy, and writing data to state memory responsive to the comparison, the data written to the state memory being configured to change the RFID tag from an OFF state in which the RFID tag will not transmit an RF signal to an ON state in which the RFID tag will transmit an RF signal.

Various embodiments of the invention includes a method of operating an RFID tag, the method comprising receiving energy sufficient to power the RFID tag through an RF antenna included in the RFID tag, reading a state from state memory, sending an RF response through the RF antenna unless the read state is an OFF state.

Various embodiments of the invention includes a method of operating an RFID tag, the method comprising receiving energy sufficient to power the RFID tag through an RF antenna included in the RFID tag, reading a state from state memory, sending an RF response through the RF antenna if the read state is an ON state, and disabling the RF response through the RF antenna if the read state is an OFF state.

Various embodiments of the invention includes a method of operating an RFID tag, the method comprising receiving energy sufficient to power the RFID tag through an RF antenna included in the RFID tag, reading a state from state memory, sending an RF response through the RF antenna only if the read state is an ON state.

Various embodiments of the invention includes a multilayer identity document comprising a first outer layer, an electrical conductor configured to conduct a current, a spacer layer including an opening configured to contain a switch activator, the switch activator configured to make and break an electrical connection to the electrical connector, and an inner layer disposed such that the spacer layer and switch activator are between the first outer layer and the second outer layer, the inner layer being configured to be pressed to activate the switch activator.

Various embodiments of the invention includes a switchable RFID tag comprising an antenna configured to receive an RF transmission, an integrated circuit configured to generate a response transmission, and a switch configured to turn on and of the ability of the integrated circuit to generate the response transmission, the switch being disposed such that it is surrounded by the antenna.

Various embodiments of the invention includes a system comprising a plurality of switches configured for a user to enter data, logic configured to transmit a first wireless signal responsive to the entered data, and a circuit configured to receive energy from a received second wireless signal and to power the logic and the transmission of the system using the received energy.

Various embodiments of the invention includes a system comprising logic configured to transmit a first wireless signal in response to a received second wireless signal, a wireless I/O configured to receive the second wireless signal and to transmit the first wireless signal, a memory configured to store an account number, the account number being included in the first wireless signal, a physical contact I/O configured for writing the account number to the memory, logic configured to allow writing of the account number to the memory if the account number is received via the physical contact I/O but if the account number is received via the wireless I/O, and a circuit configured to receive energy from the received second wireless signal and to power the logic and the transmission of the first wireless signal using the received energy.

Various embodiments of the invention includes a system comprising logic configured to transmit a first wireless signal in response to a received second wireless signal, a wireless I/O configured to receive the second wireless signal and to transmit the first wireless signal, the second wireless signal including an identification data associated with a reader, a memory configured to store a log of received identification data received from a plurality of readers, a physical contact I/O configured for uploading the log of

received identification data from the memory, logic configured to allow uploading of the log of received identification data from the memory via the physical contact I/O but via the wireless I/O, and a circuit configured to receive energy from the received second wireless signal and to power the logic and the transmission of the first wireless signal using the received energy.

Various embodiments of the invention includes a method comprising mounting a plurality of RFID antenna and RFID tags on a support, mounting a the support on a first side of a spacer, the spacer including opening **140** and optionally including one or more cavity to receive the RFID tags, mounting a cover layer on a second side of the spacer, and cutting the support and spacer to generate a plurality of RFID enabled financial Cards.

Various embodiments of the invention include a method comprising mounting an RFID antenna and RFID tag on a support, mounting a spacer on the support, the spacer being compliant (soft) so that the RFID tag can enter a plane of the spacer to form a cavity, allowing the spacer to harden, and mounting a cover layer on the spacer.

Various embodiments of the invention include a method of assembling an identity device, the method comprising depositing an integrated circuit, antenna and switch contacts on a support layer , and laminating the support layer, spacer and flexible membrane together, the spacer having a cavity in which the integrated circuit fits.

Various embodiments of the invention include a method of assembling an identity device, the method comprising depositing an integrated circuit, antenna and switch contacts on a support layer **150**, depositing spacer **120** on the support layer, spacer **120** covering the integrated circuit, and depositing a flexible membrane on the support layer, the flexible membrane or the support layer optionally including an image of a user. The Spacer is optionally configured to create a hermetic seal around the integrated circuit and/or the RFID antenna.

Various embodiments of the invention include a method comprising programming data to non-volatile memory of an RFID tag in a programmable mode, and changing a state of a switch coupled to the RFID tag so as to change the RFID tag from the programmable mode to a non-programmable mode.

Various embodiments of the invention include an RFID tag comprising an antenna configured to transmit data, a power circuit configured to provide power, an integrated circuit configured to receive power from the power circuit, to provide the data to the antenna, the integrated circuit including a non-volatile memory configured to store the data and a logic circuit configured to determine a state of a switch, the switch being configured to control whether the volatile memory can or cannot be programmed.

Various embodiments of the invention include an integrated circuit comprising a first logic input configured for determining a state of a switch, a power input configured to receive power from a radio frequency antenna, the received power being sufficient for powering the integrated and transmitting a data output signal via the radio frequency antenna, and a data output configured for generating the data output responsive to the state of the switch as determined by the first logic input.

Various embodiments of the invention include an Identity Device comprising an RFID antenna configured to receive power from and communicate with an RFID reader, a circuit configured to receive power from the RFID Antenna, a tag configured to be powered by power received through the RFID antenna and to generate a signal for transmission between the RFID antenna and the RFID reader, and a switch configured to repeatedly turn on and turn off detectability or readability of the tag.

Various embodiments of the invention include a locking mechanism comprising a RFID tag activation circuit configured to turn on a switchable RFID tag by operating a switch within the switchable RFID tag, an RFID reader configured to read the switchable RFID tag, and a lock configured to open responsive to the RFID reader.

Various embodiments of the invention include a method of operating an RFID tag, the method comprising activating a switch in order to turn on the detectability or readability of the RFID tag, the RFID tag powered by power received through an RFID antenna, and activating the switch in order to turn off the detectability or readability of the RFID tag. In some embodiments, the switch is configured to keep the readability of the RFID tag off until the switch is activated again. The switch optionally being included in an identity device.

Various embodiments of the invention include a method of operating a switchable RFID tag, the method comprising operating a switch to turn the RFID tag on, responsive to a first action of a user, receiving a signal at an RFID antenna, collecting power from the signal, using the collected power to power an integrated circuit, collecting data from the signal, processing the collected data using the integrated circuit, transmitting a signal generated by the integrated circuit in response to the collected data, using the RFID antenna, and operating the switch to turn the RFID tag off, responsive to a second action of a user.

Various embodiments of the invention include a switchable RFID tag comprising an RFID antenna configured to receive power from and communicate with an RFID reader, a tag configured to be powered by power received through the RFID antenna and to generate a signal for transmission between the RFID antenna and the RFID reader, and a switch configured to repeatedly turn on and turn off detectability or readability of the tag.

Various embodiments of the invention include a method of controlling an electronic device, the method comprising receiving a wireless RF signal from an RF transmitter, converting the received RF signal into electronic power, generating a wireless return signal using the electronic power, the wireless return signal configured to control the electronic device, placing a switch in a first position to turn on the generation of the wireless return signal, placing the switch in a second position to turn off the generation of the wireless return signal, and returning the switch to the first position to turn on the generation of the wireless return signal.

Various embodiments of the invention include a method of controlling an electronic device, the method comprising receiving a wireless RF signal from an RF transmitter; converting the received RF signal into electronic power; repeatedly changing a switch from a first position to a second position; and generating a wireless return signal using the electronic power, the wireless return signal configured to control the electronic device and being responsive to whether the switch is in the first position and the second position.

Various embodiments of the invention include a system comprising an antenna configured to receive a wireless RF signal from an RF transmitter, a power circuit configured to convert the RF signal into electronic power, a circuit configured to receive the electronic power and to send a wireless response signal in response to the RF signal, and a first

switch configured to repeatedly turn on and off a first operation of the circuit under control of a user.

Various embodiments of the invention include a method of receiving control instructions, the method comprising, generating a wireless RF signal, transmitting the wireless RF signal to a RF powered remote control device configured to send a wireless return signal responsive to the states of one or more switches, the return signal being generated and transmitted using power converted from the wireless RF signal, receiving the return signal, and determining the states of the one or more switches using the received return signal.

Various embodiments of the invention include a system comprising a RF transmitter configured to send a wireless RF signal, a controlled device, a RF powered remote control configured to be powered by the wireless RF signal and to send a wireless response signal to the controlled device responsive to a first switch, the first switch configured to be repeatedly turned on and off by a user.

Various embodiments of the invention include a method of operating an RFID tag, the method comprising receiving energy sufficient to power the RFID tag through an RF antenna included in the RFID tag, reading a state from state memory, and sending an RF response through the RF antenna unless the read state is an OFF state.

Various embodiments of the invention include a method of operating an RFID tag, the method comprising receiving energy sufficient to power the RFID tag through an RF antenna included in the RFID tag, reading a state from state memory, sending an RF response through the RF antenna if the read state is an ON state, and disabling the RF response through the RF antenna if the read state is an OFF state.

Various embodiments of the invention include a method of operating an RFID tag, the method comprising receiving energy sufficient to power the RFID tag through an RF antenna included in the RFID tag, reading a state from state memory, sending an RF response through the RF antenna only if the read state is an ON state.

Various embodiments of the invention include a communication device comprising: a 802.11 or cellular transmitter; a user interface configured for a user to enter data; and a switchable RFID tag including an active state and an inactive state and being configured to switch between the active state and the inactive state responsive to the data.

Various embodiments of the invention include communication device comprising: a 802.11 or cellular transmitter; a first slot configured to receive a first memory device having first data to be transmitted by a first RFID tag; a second slot configured to receive a second memory device having second data to be transmitted by the first RFID tag or a second RFID tag; and a user interface configured for a user to select whether to transmit the first data or the second data; the data optionally including financial account information or a digital key to a lock.

Various embodiments of the invention include a portable communication device such as a cellular telephone, a blackberry, a wireless personal digital assistant, or the like. The portable communication device includes an optionally switchable RFID tag configured to communicate with a local device via RFID technology as well as more distant devices using other RF technology such as Bluetooth, WiFi, WiMAX, 802.11 or cellular standards. The communication via the RFID tag is optionally at a different frequency than the communication using other technology. Two separate antennae are optionally used to communicate at these different frequencies. An electronically configurable antenna is optionally used to communicate at these different frequencies.

A user interface of the communication device is configured to control operation of the RFID tag. For example, the user interface may be used to turn on or off operation of the RFID tag, to enter security data into the RFID tag, to enter financial information (e.g., a credit or debit card number into the RFID tag, to enter an identifying number (e.g., telephone number) into the RFID Tag, or to enter account number into the RFID tag. The communication device may be configured for a user to enter the above data into the communication device using the user interface for later transmission (optionally encrypted) using the RFID Tag. For example, a user may enter a credit card number that is later transmitted in an encrypted form to an RFID reader.

In Various embodiments, the communication device is configured to receive one or more memory devices configured to store data such as financial or account information. For example, in some embodiments the communication device includes a plurality of slots configured to receive memory having credit card data stored thereupon. In these embodiments, the memory is used to provide the data to the communication device. A particular communication device is configurable to operate with respect to different financial accounts dependent on which particular memories have been inserted into the slots. Thus, a user may receive a first memory issued by a first bank and a second memory issued by a second bank, and install both the first memory and the second memory into the communication device. The user interface of the communication device may then be used to select which account (e.g., the first bank or second bank accounts) should be used for a particular transaction. For example, activating a first switch may result in a transaction being debited from a first account and activating a second switch may result in a transaction being debited from a second account. In some of these embodiments, the use of RFID is optional. For example, the transactions may be performed using cellular RF transmissions from a cellular telephone.

In some embodiments, the memory device may be configured to fit both a financial card including an RFID tag for transmission of data stored in the memory device, and also to fit within one of one or more slots within a cellular phone or similar communication device. In these embodiments, the memory device is optionally configured to act as a key allowing whatever device it is attached to to engage in a financial transaction.

In some embodiments, the memory devices are each packaged with an optionally switchable RFID tag. Thus, both the memory and the RFID tag are inserted into a slot of the communication device. The communication device need not include an RFID tag prior to insertion of a memory device. In some embodiments, the memory devices further include a separate antenna for use by the RFID tag. In alternative embodiments, the RFID tag is configured to use an antenna previously installed in the communication device.

Various embodiments of the invention include a memory device configured to be disposed within a financial card such as a credit card, to be removed from the credit card and to be inserted into the communication device. Thus, the memory device can be transferred from a credit card to the communication device. In some embodiments, transfer of the memory device includes transfer of an RFID tag. In some embodiments, transfer of the memory device includes transfer of an antenna for use by the RFID tag. In alternative embodiments the RFID tag is configured to use a first antenna included in the credit card and a second antenna

included in the communication device, these antenna being separable from the memory device.

In some embodiments the user interface of the communication device is configured to enter an ID of an RFID reader in order to assure that a transaction takes place with the proper RFID reader. For example, in one embodiment several vending machines each include a numbered RFID reader. A user enters the number of a desired member of the several vending machines in order to be sure that the transaction doesn't accidentally occur with an adjacent vending machine.

In some embodiments, the user interface of the communication device is configured for entering an amount of a financial transaction, e.g., an amount of an electronic payment.

In some embodiments, the communication device is configured to use voice recognition to approve an RFID based financial transaction. For example, in some embodiments voice recognition authentication may be required before an RFID tag is activated.

Some embodiments of the invention include a cellular phone configured to use two or more communication modes: one mode for cellular operation and one mode, e.g., RFID, for short range financial transactions or lock operation. These modes may use different frequency ranges.

In some embodiments, a memory device inserted in a slot of the communication device is configured to operate a lock, optionally via RFID. The communication device may be configured to accept more than one memory device configured to activate a lock and/or engage in a financial transaction. In some embodiments, a memory device inserted in a slot of the communication device is configured as a remote control (e.g., as a car remote or a television remote).

In some embodiments, the user interface of the communication device is configured to receive an access code before the RFID tag is detectable. For example, prior to receiving the access code the RFID tag may be disabled from sending radio frequency signals.

In some embodiments, a power source of the communication device is used to power the RFID tag. In these embodiments the RFID tag does not need to generate power from a received inductive or RF signal. In some embodiments, the RFID tag is configured to receive power from the power source of the communication device when the communication device is ON, and to generate power from a received inductive or RF signal when the communication device is off. In some embodiments, the RFID tag is configured to receive power from the power source of the communication device when the communication device is ON, and to be unresponsive when the communication device is off. In some embodiments, the RFID tag is configured to receive power from the power source of the communication device when the communication device is ON or OFF. For example, in one embodiment the RFID tag is configured to draw power from the power source of the communication when an incoming signal is detected but to draw reduced or no power from the power source when no incoming signal is detected.

In some embodiments, the RFID tag is included in a replaceable battery cover of the communication device. Thus, the RFID tag may be changed by changing the battery cover. In some embodiments, the RFID tag or memory device is included in a replaceable antenna component of the communication device. In some embodiments the RFID tag or memory device is configured to fit into an audio plug of the communication device. In some embodiments, the memory device or RFID tag is configured to fit into a MiniSD slot of the communication device. In some embodiments, the memory device or RFID tag is configured to fit into the same interface as a power cord of the communication device. In some embodiments the communication device has a form factor that can be opened and closed (e.g., a clamshell cell phone) and operation of the RFID tag is responsive to whether the communication device is open or closed. For example, in one embodiment the RFID tag is inactive unless a cell phone is opened.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** illustrates a container including a receptacle configured to store an ID incorporating an RFID tag, according to various embodiments of the invention.

FIG. **2** illustrates a container including an RFID tag or alternatively an RFID tag reader.

FIG. **3** illustrates various monitoring systems that employ illustrative embodiments of the container of FIG. **2**.

FIG. **4** illustrates further details of an embodiment of the container of FIG. **2** that includes a monitored vial.

FIG. **5** illustrates another embodiment of a monitored vial that includes more than one compartment.

FIG. **6** illustrates an embodiment of the container of FIG. **2** wherein the container is a room.

FIG. **7** illustrates an access system based on an RFID tag, according to various embodiments of the invention.

FIG. **8** illustrates a clamshell ID including a base including an RFID tag and a cover connected to the base, according to various embodiments of the invention.

FIG. **9** illustrates a clamshell ID similar to that shown in FIG. **8** except that the base and cover are pivotally connected at a point rather than along an edge, according to various embodiments of the invention.

FIGS. **10**A and **10**B illustrate an ID similar to that shown in FIGS. **8** and **9** except that the cover is configured to fit into the base, according to various embodiments of the invention.

FIG. **11** illustrates further detail of some embodiments of a clamshell ID having a first cover and second cover separated by a fold.

FIG. **12** illustrates further embodiments of a clamshell ID including a first cover and second cover separated by a fold.

FIG. **13** illustrates a clamshell ID wherein shielding is added to a page, according to various embodiments of the invention.

FIG. **14** illustrates an identification device, according to various embodiments of the invention.

FIG. **15** illustrates a method of allowing communication to an RFID tag, according to various embodiments of the invention.

FIG. **16** illustrates a method of modifying an RFID enabled identification device, according to various embodiments of the invention.

FIG. **17** illustrates a method of making an identity device including, according to various embodiments of the invention.

FIG. **18** is a block diagram illustrating a stage in the manufacture of an identification device, according to various embodiments of the invention.

FIG. **19** illustrates the method of manufacturing an identification device, according to various embodiments of the invention.

FIG. **20** illustrates an RFID reader system, according to various embodiments of the invention.

FIG. **21** illustrates an alternative RFID reader system, according to various embodiments of the invention.

FIG. **22** is a block diagram of a switchable RFID device, according to various embodiments of the invention;

FIGS. **23** and **24** illustrate some of many possible locations for a switch within a switchable RFID device, according to various embodiments of the invention;

FIG. **25**A illustrates an OFF Position of a switch, according to various embodiments of the invention;

FIG. **25**B illustrates an ON position of a switch, according to various embodiments of the invention;

FIGS. **26**A and **26**B illustrates a membrane switch, according to various embodiments of the invention;

FIG. **26**C illustrates an embodiment of a membrane switch including a spring, according to various embodiments of the invention;

FIG. **26**D illustrates a cross-sectional view of a membrane switch disposed within a switchable RFID Tag, according to various embodiments of the invention;

FIG. **27** illustrates a top view of a membrane switch, according to various embodiments of the invention;

FIG. **28** illustrates a switchable RFID tag in an identity document, according to various embodiments of the invention;

FIG. **29** illustrates the manufacture of instances of an identity document, according to various embodiments of the invention;

FIG. **30** illustrates an exploded view of an embodiment of a switchable RFID device including a driver's license, according to various embodiments of the invention;

FIG. **31** illustrates an embodiment of a switchable RFID device including a plurality of switches, according to various embodiments of the invention;

FIG. **32** illustrates various embodiments of an tag configured for use in embodiments of a switchable RFID device including a plurality of switches, according to various embodiments of the invention;

FIG. **33** illustrates an instance of a tag, according to various embodiments of the invention;

FIG. **34** illustrates a method according to various embodiments of the invention, according to various embodiments of the invention;

FIG. **35** illustrates a switchable RFID device configured to operate as a remote control, according to various embodiments of the invention;

FIG. **36** illustrates a multiswitch credit card, according to various embodiments of the invention;

FIGS. **37**A-**37**C illustrate an antenna within a credit card, according to various embodiments of the invention;

FIG. **38** illustrates an RFID device including a conductor configured to set a state of an RFID tag, according to various embodiments of the invention.

FIG. **39** is a block diagram illustrating an RFID tag, according to various embodiments of the invention;

FIG. **40** is a flowchart illustrating a method of changing a state of the RFID tag illustrated in FIG. **22**, according to various embodiments of the invention; and

FIG. **41** is a flowchart illustrating a method of operating the RFID tag illustrated in FIG. **22**, according to various embodiments of the invention.

DETAILED DESCRIPTION

Various embodiments of the present invention includes holders (e.g., containers) including radio frequency shielding materials to protect items, such as IDs (identification devices), incorporating RFID tags from being read. In some embodiments, a person can allow information within an RFID tag to be read by removing the item from the holder, while in other embodiments the holder is merely opened or removed to allow the RFID tag to be read. Replacing the item within the holder, or closing the holder, secures the item's RFID tag from unwanted readings from, or detection by, unknown or unauthorized RFID readers. It will be appreciated that items other than IDs, such as library books, consumer electronics, medications, and so forth, can also include, or be packaged with, RFID tags that a person may wish to shield from unauthorized RFID readers. Holders specifically tailored for such items, as well as general purpose holders such as wallets, purses and briefcases, can also include radio frequency shielding (also referred to herein as shielding) according to the present invention.

The holder can be in the general form of a container as an illustrative example, having two similar rectangular sides joined around three edges, being configured to be repeatedly opened and close, and optionally including a closure or flap along the fourth side. Such holders are well suited to the typical shape of most personal IDs such as passports, driver's licenses, green cards, credit and debit cards, medical information cards, insurance cards, medical alerts, student identification cards, security badges, immigration documents, or the like. Typically, the holder is configured to be repeatedly opened and closed to receive the ID.

The holder can also be a case such as a carrying-case for a cell phone or digital camera. The holder can also be a purse, suitcase, backpack, briefcase, satchel, glove compartment, a jewelry container, and the like. In some embodiments, the RF shielding is physically attached to the holder. The holder can alternatively include a checkbook holder, a wallet, a ticket holder, or a windshield visor pocket. Some embodiments of the invention are directed at articles of clothing in which one or more pockets include an attached radio frequency shielding material. Additional embodiments are directed to key holders.

The desirability of RFID shielding for the objects listed above will be readily appreciated. Being able to read an RFID tag on a green card (an immigration document) without the owner of the green card giving consent or being aware that the green card is being read, for example, can enable less scrupulous individuals to engage in improper behaviors. Incorporating RFID shielding into a wallet, purse, or other type of holder would prevent an RFID tag on an item within the holder from being read unless the item is deliberately exposed to the RFID reader, for instance, by removing the item from the holder. In view of the problem of identity theft, such shielding is desirable for credit cards with RFID tags, social security cards with RFID tags, driver's licenses with RFID tags, and so forth.

In some instances the RFID tag is essentially a label that has been attached to an object for inventory or similar purposes. Library books can carry RFID tags, for example. Accordingly, providing RFID shielding for various carrying devices, such as purses, suitcases, book bags, briefcases, and satchels can prevent RFID tags in library books and other objects from being read without permission. In other instances the RFID tag is more integral with an object. Consumer electronics, electronic media, and so forth, can be manufactured to include RFID tags inside of housings, on printed circuit boards, and on electronic components, for example. Often, such devices have specially designed cases such as cell phone cases and camera cases. These cases can also comprise RFID shielding to prevent the RFID tags in the associated devices from being read without authorization.

In some embodiments, the holder is clear (e.g., transparent) so that the ID, such as a driver's license, can be readily

seen without having to be removed from the holder. Many wallets include either a plastic sleeve or a leather pocket with a plastic window for this purpose. In some embodiments, of the invention in which at least part of the holder is transparent, the shielding in the transparent region needs to also be transparent. Certain electrically conductive polymers can serve as the RFID shielding material in these embodiments. Other transparent and non-transparent materials for RFID shielding are discussed further herein.

In some embodiments, the holder is designed to allow the ID to be easily and repeatedly removed and returned. For instance, some credit and debit cards have a smaller format (mini-cards) and can be stored in a matching case that can serve as a fob for keys. In some of these embodiments, the holder and the ID card are pivotally attached to one another so that the ID card can flip out from the holder, and in still further embodiments a spring mechanism aids in extending and retracting the ID card. Other cases of the present invention can comprise a clamshell configuration. Such ID card holders of the present invention include an RFID shielding material.

The present invention also provides for articles of clothing designed to include pockets that can shield RFID tags on objects within the pockets. In these embodiments the articles of clothing can be made from a cloth that includes a radio frequency shielding material, or the pocket can be lined with the radio frequency shielding material.

The present invention also provides for key holders comprising RFID shielding. The keys that are held by such key holders can be either mechanical or electronic, where mechanical is used herein to refer to keys meant to fit into mechanical locks such as car keys, house keys, and the like. Electronic keys refer to keys that carry an encoded password on a magnetic strip, a bar code, an RFID tag, or the like. Either type of key can include an RFID tag as either a further component of the locking mechanism or for completely unrelated reasons. An RFID tag on a key is part of the locking mechanism, for example, when the lock reads the RFID tag for some purpose, such as to read the key numbers from RFID tags on different keys in order to track which keys are being used in the lock.

Electronic keys are often placed on ID badges and other forms of identification. An RFID tag with such electronic keys may carry confidential information but be unrelated to the lock mechanism. In some embodiments, the key holder is retractable, and in some of these embodiments the key holder is spring-loaded to automatically retract the key into the key holder.

In the embodiments described herein, the holder, whether an container, case, article of clothing, or key holder, has some form of opening through which the ID or other object having an RFID tag can be transferred. In some embodiments, the holder also includes a closure for closing the opening. In some of these embodiments, the closure can comprise a flap that closes over the opening. In other embodiments the closure is a zipper, Velcro, or related closure device. The closure can provide an electrical contact between opposing sides of the opening, in some instances.

In some embodiments, the RFID shielding material is incorporated into an ID. For example, a passport can include an RFID shielding material in the passport's cover so that an RFID tag within the passport can only be read when the passport is opened. Similarly, a driver's license can include a clamshell cover and base including an RFID shielding material, or a pivoting cover including an RFID shielding material.

The RFID shielding material can be provided in numerous different ways. The radio frequency shielding material can include a conductive material such as a metal or an electrically conductive plastic. The RFID shielding can be attached using adhesive. The radio frequency shielding material can include a mesh with a mesh size small enough to provide shielding against the radio frequency range used by RFID readers. The radio frequency shielding material can be laminated, either by laminating the RFID shielding material to another layer, such as a protective material layer, and/or by laminating together multiple layers of RFID shielding materials. In many embodiments the RFID shielding material is either flexible, transparent, or both. Examples of suitable RFID shielding materials include metal-coated elastomers such as aluminized Mylar and copper-coated plastic sheets and films. In some embodiments, the RFID shielding material is a semi-transparent mesh.

In some embodiments, the RFID shielding material is effective to form a Faraday cage around the ID, object, or key. Closing the closure can be effective to complete the Faraday cage, in some instances. In other embodiments the RFID shielding is used in selective locations in the holder. For example, where a nation's passport includes an RFID tag in a lower right-hand corner of the cover, passport holders designed for that nation's passports need only include RFID shielding above and/or below the location of the RFID tag when the passport is in the passport holder.

The RFID shielding shields an RFID tag from a reader in two ways. First, the RFID shielding greatly reduces the power being broadcast from the reader that reaches the RFID tag within the holder. This cuts the power available to the RFID tag to transmit information back. Secondly, even if the RFID tag receives enough power to transmit, the signal sent from the RFID tag is also attenuated. Accordingly, it will be appreciated that the effectiveness of the RFID shielding can be varied considerably based on choices of radio frequency shielding materials and their thicknesses, mesh sizes, and so forth. In some embodiments, the radio frequency shielding material provides a reduction of input power to the RFID tag by between about 5 db-30 db, 10 db-25 db, 15 db-20 db, or more than 15, 25, 35 or 45 db.

In some embodiments, the container is configured to be repeatedly opened and closed to receive an item including an RFID tag. In some embodiments, the container includes a closure configured to enhance the shielding.

In some embodiments, the container configured to just fit a standard California driver's license. These embodiments may be characterized by inner dimensions of less then 3.5 inches, 3.75 inches, 4 inches or 4.5 inches height, and less than 2.25 inches, 2.5 inches or 2.75 inches in width. In some embodiments, the container is configured to just fit a U.S. passport or a passport issued by another country. These embodiments may be characterized by inner dimensions of less then 5 inches, 5.25 inches, 5.5 inches or 6 inches in height, and less than 3.5 inches, 3.75 inches, 4 inches or 4.5 inches in width.

FIG. **1** illustrates a Container **100** including a Receptacle **110** configured to store an ID **130** (identification device) incorporating an RFID Tag **140**. The Container **100** and Receptacle **110** may include a wallet, purse, passport holder, key chain, ticket holder, pocket, sleeve, slot, opening, niche, compartment, lid & base, glove compartment, jewelry, suitcase, backpack, bag, carrier, carton, box, sack, carton, casing, shell, carapace, covering, sheath, or the like. Container **100** further includes attached Shielding **120** configured to attenuate the transmission of radio frequency signals to or

from the RFID Tag **140**. Receptacle **110** is configured to be repeatedly opened and repeatedly closed for insertion and removal of ID **130**.

FIG. **2** illustrates an embodiment of a Container **200** including RFID Tag **140** or alternatively an RFID tag Reader **210**. Container **200** is optionally an embodiment of the Container of FIG. **1**, and visa-versa. Container **200** further includes Shielding **120** configured to attenuate the transmission of radio frequency signals to or from the RFID Tag **140** or Reader **210**. The shielding effect of the Shielding **120** is optionally dependent on a state of the Container **200**. For example, in some embodiments, the Shielding **120** may be more efficient at attenuating RF transmission when Container **120** is closed than when it is open. As such, in some embodiments, the state of the Container **200** may be determined by a magnitude of a detected radio frequency signal between RFID Tag **140** and Reader **210** either of which may be within Container **200**.

FIG. **3** illustrates various monitoring systems that employ illustrative embodiments of Container **200**. These illustrative embodiments include a wall hanging (e.g., a Picture **320**), a Refrigerator **325**, a Jewelry Box **330**, a Chest of Drawers **335**, a Monitored Vial **340**, a Filing Cabinet **345**, and a Safe **350**. In these embodiments, the monitoring systems further include RFID tag Reader **210** and optional Alarm and/or Log **310**. Each of these examples of Container **200** include one or more RFID Tag **140** and Shielding **120** (whether shown or not) configured to modify the transmission of RFID signals from Reader **210** to RFID Tags **140** responsive to a state of the Container **200**.

For example, the Picture **320** illustrated includes Shielding **120** (not shown) that surrounds the RFID Tag **140** while Picture **320** is mounted on Wall **330**. Shielding **120** is configured such that the attenuation effect of the shielding will be reduced if Picture **320** is removed from Wall **330**. For example, Shielding **120** may be disposed to form a Faraday cage around or interfere with the RFID Tag **140** (e.g. be on the back of the picture, optional standoffs, and/or wall) and if Picture **320** is removed from Wall **330** a resulting gap, or reduction in interference, will allow increased RFID signal transmission between the associated RFID Tag **140** and Reader **210**. Picture **320** may alternatively be a statue or some other object designed to sit on a surface with an RFID tag between the object and the surface.

In a similar manner each of the Refrigerator **325**, Jewelry Box **330**, Chest **335**, Monitored Vial **340**, Filing Cabinet **345** and Safe **350** includes Shielding **120** configured such that a magnitude of an RFID tag signal received by Reader **210** is dependent on whether the particular container is open or not.

Reader **210** is configured to detect RFID signals from one or more of the RFID Tags **140** and to generate a responsive output signal. In some embodiments, this responsive output signal is a quantitative or qualitative indication of the state of one or more of the containers. The reader is optionally configured to distinguish the signals received from each of the one or more RFID tags and, thus, identify which of the containers is open.

Alarm/Log unit **310** is optionally an alarm system or a logging system configured to activate an alarm or log an event responsive to the output signal of Reader **210**. For example, in some embodiments, the Alarm/Log unit **310** is configured to activate an alarm when Picture **320** is removed from the wall or Safe **350** is opened. In some embodiments, the Alarm Log unit **310** is configured to log when Filing Cabinet **345**, Chest **335** or Drawers or Refrigerator **325** is opened.

In alternative embodiments, Reader **210** may be placed within the container and RFID Tag **140** outside.

FIG. **4** illustrates further details of an embodiment of the Container of FIG. **2** that includes Monitored Vial **340**. Monitored Vial **340** includes shielding in a Lid **410** and/or Base **420**. When the Lid **410** and Base **420** are attached the shielding attenuates any signal from the enclosed RFID Tag **140**. When Lid **410** is opened the attenuation is reduced. The RFID tag is optionally disposed on the underside of Lid **410**. The illustrated embodiments are optionally used to monitor the use of medication or other material stored within Monitored Vial **340**. The monitored vial is optionally an alternative form of Container **200** and optionally configured to store alternative types of goods. In some embodiments, Reader **210** of FIG. **3** is configured to log when Monitored Vial **340** is opened and closed. For example, if a user has a medication that should be taken at a specific time Reader **210** may be used to detect if Monitored Vial **340** is opened at these times and activate a reminder using Alarm/Log **310** if Monitored Vial **340** is not opened at a time medication should be taken.

FIG. **5** illustrates another embodiment of Monitored Vial **340** that includes more than one Compartment **510**. Each Compartment **510** includes a separate RFID Tag **140** that may be separately identifiable using Reader **210**. This embodiment may be used, for example, to monitor an activity that should occur at a variety of different times (e.g., times of day or days of the week.).

FIG. **6** illustrates an embodiment of the Container of FIG. **2** wherein Container **200** includes a Room **610**. In these embodiments, radio frequency signals between RFID Tag **140** and Reader **210** may be used to determine if an opening to the room is open. Room **610** includes Shielded Wall(s) **620** that block radio frequency signals between Tag **140** and Reader **210** when an Opening **630** is closed. When Opening **630** is open Tag **140** can be detected by Reader **210** and this stage can be logged by Alarm/Log **310**. While the illustration shows Reader **210** within Room **610** and RFID Tag **140** outside, these positions are optionally exchanged. Room **610** is optionally a shipping container. RFID Tag **140** is optionally mounted on Opening **630** such that Tag **140** is brought within reading range of Reader **210** when Opening **630** is opened. Opening **630** can be, for example, a window or door.

FIG. **7** illustrates an access system based on an RFID Tag **140**. RFID Tag **140** is optionally implanted within a Animal or Person **720** or attached to an animal collar. A Reader/Lock Control **710** is configured to detect a signal from RFID Tag **140** and to control a Lock **740** in response. Lock **740** controls the function of a Barrier **730**, such as a door or gate. Reader/Lock Control **710** is optionally programmable to operate responsive to particular instances of RFID Tag **140**.

The Reader/Lock Control **710** illustrated in FIG. **7** is optionally used in the following manner. RFID Tag **140** is placed within or attached to the Animal or Person **720**. Reader/Lock Control **710** is placed in a programming mode. A serial number of the RFID Tag **140** is programmed into the Reader/Lock Control **710** either by digital data entry or communication, or by bringing the RFID Tag **140** within the reading range of the Reader/Lock Control **710**, such that the serial number can be read from the RFID Tag **140**. The Reader/Lock Control **710** in placed in a normal operation mode wherein it monitor's for the presence of the RFID Tag **140**. The RFID Tag **140** is detected by the Reader/Lock Control **710**. The serial number is read from the detected RFID Tag **140** by Reader/Lock Control **710**. Reader/Lock Control **710** compares the read serial number with the serial number programmed into the Reader/Lock Control **710**

while in the programming mode. If the read and programmed serial numbers agree Lock **740** is activated in response. Activation of Lock **730** controls (e.g., locks or unlocks) access through Barrier **730**. After the detected RFID tag is no longer detected by the Reader/Lock Control **710**, Reader/Lock Control **710** optionally reactivates Lock **740** to return it to a previous state.

FIG. **8** illustrates a Clamshell ID **810** (e.g. greencard (immigration card), passport, driver's license, transaction card, key card, national identity card, or the like). Transaction cards include credit cards, debit cards, check cards, payment cards, fare (e.g., transit) cards, or the like. Clamshell ID **810** includes an optional picture, a Base **830** including an RFID Tag **140**, and a Cover **820** connected to Base **830** in a clamshell configuration, e.g., connected along an edge or Fold **840**. Cover **820** and/or Base **830** include RFID shielding configured to attenuate radio frequency signals to or from RFID Tag **140** when Cover **820** is closed (e.g., shut), and to not attenuate, or attenuate to a lesser extent, radio frequency signals to or from RFID Tag **140** when Cover **820** is open. The shielding is optionally laminated into Base **830** and/or Cover **820**. In some embodiments, Clamshell ID **810** includes shielding in both Base **830** and Cover **820**. Base **820** can be the cover of a passport or other document. In some embodiments, Base **830** includes a plastic card.

In various embodiments, Clamshell ID **810** includes a passport, driver's license, credit card, etc. that includes RF shielding in one part (e.g., a page or cover) and an RFID tag in another part (e.g., a different page or cover). Not shown in FIG. **8** are pages that may be included between the covers (e.g., Base **830** and Cover **820**). The RF shielding and RFID Tag **140** are configured such that, when Clamshell ID **810** is closed the shielding interferes with the RF pickup of the RFID tag to an extent sufficient for reading of RFID Tag **140** to be attenuated.

In some embodiments, Clamshell ID **810** can be closed in two ways. First, such that a picture and/or other identification information is displayed on the exposed surface of Base **830**. Or, second, such that the picture and/or other identification information are covered by Cover **820**. These two methods of closure are achieved by rotating Cover **820** and Base **830** relative to each other in different directions around Fold **840**. In the first instance, the picture and/or other identification information can be used for identification while RFID Tag **140** is still shielded. Thus, Clamshell ID **810** can be used for identification (non-RFID) without unshielding RFID Tag **140**.

When the Clamshell ID **810** is open, the shielding is less close to RFID Tag **140** and, thus, the interference of the shielding is reduced and RFID Tag **140** can be read. The shielding does not necessarily form a Faraday cage around RFID Tag **140** when Clamshell ID **810** is closed. In some embodiments, shielding is not included in the part of Clamshell ID **810** that includes the RFID Tag **140**. Clamshell ID **810** is optionally formed by laminating RFID Tag **140** and RF shielding between layers of Cover **820** or to a page disposed between Cover **820** and Base **830**. Further visible information such as a name and/or photograph can be placed on any surface of the Clamshell ID. Thus, in some embodiments, this visible information is visible when the Clamshell ID is open or closed. In other embodiments, this visible information is visible only when the Clamshell ID is open.

FIG. **9** illustrates an ID **910** similar to that shown in FIG. **8** except that Base **830** and Cover **820** are pivotally connected at a Pivot Point **920** rather than in a clamshell configuration. Cover **820** is configured to rotate over Base **830** as shown. When Cover **820** covers the Base **830** the RFID Tag **140** is shielded. When Cover **820** is rotated away from Base **830** RFID Tag **140** is unshielded. In some embodiments, Cover **820** may have two sections between which Base **830** fits. Either Cover **820** and/or Base **830** can include the RF shielding.

FIGS. **10**A and **10**B illustrate an ID similar to that shown in FIGS. **8** and **9** except that Cover **820** is configured to fit into Base **839**, or visa versa . In the example shown, Cover **820** slides into and out of a slot in Base **830** and thus shields and exposes, respectively, RFID Tag **140**. This embodiment may include an item to be worn such as a medical alert bracelet, an identity tag, a ring, clothing, glasses, or the like. For example, in the case of a medical alert bracelet, the bracelet includes an RFID tag (having medical information) that is only readable when a cover element of the bracelet is opened to expose the RFID tag to an RFID tag reader. When the cover is opened medical personal can read data from the RFID tag. When the cover is closed the medical information is shielded from being read by unauthorized persons and is thus kept confidential.

One embodiment of the invention includes the credit card (**16**) and case having sides (**12**) and (**14**) as illustrated in U.S. patent application Pub. 2004/0117514. In this embodiment, credit card (**16**) further (additionally) includes an RFID Tag **140** and sides (**12**) and/or (**14**) n further include RF shielding, or visa versa. The credit card may be replaced by an alternative type of ID device, e.g., a driver's license, debit card, or others discussed herein.

On embodiment of the invention includes the credit card (**3**) and holder (**1**) as illustrated in U.S. patent application Pub. 2005/0011776. In this embodiment, credit card (**3**) further includes an RFID Tag **140** and the holder (**1**) further includes RF shielding. The credit card may be replaced by an alternative type of ID device, e.g., a driver's license, debit card, or the like.

One embodiment of the invention includes the carrying case taught in U.S. patent application Pub. 2004/0256469, wherein the carrying case further includes RF shielding.

One embodiment of the invention includes the credit card and pivoting case described in U.S. patent application Pub. 2004/0237360, wherein an RFID tag is included in one part (e.g., the credit card) and shielding in another part (e.g., the case). Thus, when the credit card is pivoted into the case the RFID tag is shielded. One embodiment of the invention includes a credit card and case illustrated in FIG. 10 of U.S. patent application Pub. 2004/0237360. In this embodiment, the credit card includes an RFID Tag **140** and the case includes shielding. The credit card may be replaced by an alternative type of ID device, e.g., a driver's license, debit card, or the like.

One embodiment of the invention includes the security wallet illustrated in U.S. Pat. No. 4,744,497, wherein the security wallet further includes RFID shielding.

Various embodiments of the invention include the foldable transaction cards illustrated in US. Patent Applications Pubs. 2004/0169087 and 2004/0089724, wherein shielding is further included in one side of the fold while RFID Tag **140** is further included in the other side. RFID Tag **140** is shielded when the transaction card is folded closed and unshielded when it is open.

Various embodiments of the invention include the several different folding cards illustrated in U.S. Pat. No. 5,700,037 and Application Pub. 2005/0205665. Wherein these cards further include RFID Tag **140** in one part and shielding in

another part, such that in one fold position RFID Tag **140** is shielded by the shielding, and in another fold position RFID Tag **140** is un-shielded.

One embodiment of the invention includes the credit card case illustrated in U.S. patent application Pub. 2002/0117243. Where in the credit card case further includes shielding configured to shield an rfid enabled credit card or other identification device.

FIG. **11** illustrates further detail of some embodiments of Clamshell ID **810**, having a First Cover **1110** and a Second Cover **1120** separated by Fold **840**. First Cover **1110** and a Second Cover **1120** may be, for example, Base **830** and Cover **820**. Fold **840** can be a spine, hinge, crease, or the like. In alternative embodiments, First Cover **1110** and/or Second Cover **1120** can be embodied as a page or pages between covers of an identity document. Shielding **1130** is disposed as part of the second cover (e.g., or on or in an ID document cover or page). Shielding **1130** is optionally disposed away from fold **840** such that, when Clamshell ID **810** is open, the shielding as well separated from RFID Tag **140**. In various embodiments, the separation between shielding **1130** and Fold **840** is greater than 5 mm, 10 mm, 15 mm, 20 mm, 25 mm or 30 mm. Likewise, RFID Tag **140** is optionally disposed away from Fold **830**. In various embodiments, the separation between RFID Tag **140** (including antenna) and Fold **840** is greater than 5 mm, 10 mm, 15 mm, 20 mm, 25 mm or 30 mm. Alternatively, RFID Tag **140** and/or Shielding **1130** may be disposed to abut Fold **840**.

FIG. **12** illustrates embodiments of Clamshell ID **810** including a First Cover **1210** and a Second Cover **1220** separated by Fold **830**. These embodiments further include a Page **1230** disposed between First Cover **1210** and Second Cover **1220**. Page **1230** includes RFID Tag **140** or Shielding **1130**. For example, these embodiments of Clamshell ID **810** can include a passport including a photograph and identity information within an inside surface (facing toward Page **1230**) of First Cover **1210**, RFID Tag **140** within First Cover **1210** or Second Cover **1220**, and Shielding **1130** within Page **1230**. RFID Tag **140** can be shielded and un-shielded by moving Page **1230** close to or away from RFID Tag **140**. In embodiments, wherein RFID Tag **140** is included in Second Cover **1220**, RFID Tag **140** is shielded when Page **1230** is held close to Second Cover **1220**. In this position is may be possible to view the photograph and identity information within the inside surface of First Cover **1210** without un-shielding RFID Tag **140**. When Page **1230** is moved away from Second Cover **1220** then RFID Tag **140** is unshielded.

By including the RF Shielding **1130** with one of the one or more Page **1230**, Clamshell ID **810** can be opened without necessarily removing Shielding **1130** from the vicinity of RFID Tag **140**. For example, if RFID Tag **140** is disposed within the back cover, and Clamshell ID **810** is opened such that the inside of the First Cover **1210** is visible, Page **1230** including Shielding **1130** could remain adjacent to Second Cover **1220** and thus limit communication with the RFID Tag **140**. To allow communication with RFID Tag **130** Page **1230** including Shielding **1130** is turned such that it moves away from Second Cover **1220**. The Shielding **1130** may be attached to Page **1230** or be included within Page **1230**. For example, Shielding **1130** may be laminated within Page **1230**, be sewn on Page **1230**, be glued on Page **1230**, be within the material of Page **1230**, or otherwise be connected to Page **1230**. In various embodiments, Shielding **1130** includes a wire mesh, metallic fibers, metallic particles, metallic thread, or the like. Shielding is optionally attached to a binding of Clamshell ID **810** as Page **1230**. Page **1230** is optionally bound to Clamshell ID by stable, pin, wire, thread, adhesive, laminate, or the like.

FIG. **13** illustrates embodiments of Clamshell ID **810** wherein Shielding **1130** is added to Page **1230** following assembly of Clamshell ID. In these embodiments, Shielding **1130** is included in a Shielding Insert **1310**. Shielding Insert **1310** optionally includes Adhesive **1320** or some other mechanism for attaching Shielding Insert **1310** to Page **1230**. The attachment of Shielding Insert **1310** to Page **1230** can be permanent or temporary (e.g., Shielding Insert **1310** may be removable). In various embodiments, Shielding Insert **1310** includes a metal plate, wire mesh, metallic fibers, metallic particles, metallic thread, or other forms of shielding.

The size of Shielding Insert **1310** is optionally the same as or slightly smaller then a European Union Passport, a Japanese Passport, a Chinese Passport, a United States Passport, or the like. Alternatively, in various embodiments, Shielding Insert **1310** is configured in size such that it can be attached to Clamshell ID **810** at least greater than 5 mm, 10 mm, 15 mm, 20 mm, 25 mm or 30 mm from Fold **830**. For example, Shielding Insert **1310** may be configured to attach to Page **1230** such that Shielding Insert **1310** extends from near an outer edge (opposite Fold **830**) of Page **1230** to within 10 mm of Fold **830**.

FIG. **14** illustrates embodiments of an Identification Device **1410**, such as Clamshell ID **810**. In these embodiments, Shielding Insert **1310** includes one or more clips **1420**, clamp, pin, slot, rivet, or other mechanism configured for, optionally temporary, attaching Shielding Insert **1310** to Identification Device **1410**. In some embodiments Clip **1420** is replaced by a slot configured to receive that part of Identification Device **1410** including an RFID tag. Shielding Insert **1320** is optionally pivotally connected to Identification Device **1210**. In the embodiments illustrated by FIG. **14**, Fold **830**, Second Cover **1220** and Page **1230** are optional. For example, Identification Device **1410** can be a single piece driver's license, credit card, etc. (without separate front and back covers) including RFID Tag **140**. Shielding Insert **1310** is configured to be attached to First Cover **1210**, Page **1230**, and/or Second Cover **1220**. In these embodiments Page **1230** need not include shielding. In some embodiments, Shielding Insert **1310** may be attached to that part of Identification Device **1410** that includes RFID Tag **140**. In these embodiments, Shielding Insert **1310** is inserted to shield RFID Tag **140** and removed in order to un-shield RFID Tag **140**. In some embodiments, Shielding Insert **1310** includes a flat metal plate configured to fit within a passport, e.g., a passport issued by the United States, a European Country, or an Asian Country. In these embodiments, the size of shielding insert may be similar to or slightly smaller than the dimensions of the passport. In some embodiments, Shielding Insert **1310** can include an attachment device, such as Clip **1420**, on more than one side (face). As such, Shielding Insert **1310** may be configured to shield and RFID enabled driver's license on one side and an RFID enabled credit card on the other side. Shielding Insert **1310** is optionally approximately the size of a driver's license or credit card. In some embodiments, Shielding Insert **1310** has height and width dimensions similar to or smaller than a page between the front cove and the back cover. Shielding Insert **1310** is optionally thin and optionally flexible.

As illustrated in FIG. **15**, some embodiments of the invention include a method of allowing communication to an RFID tag. The method includes a Step **1510** of opening a front cover of an identification device, such as Clamshell ID **810** or Identification Device **1410**, in order to make

information included on the inside of the front cover visible, an RF shielding page being kept in proximity of the back cover such that an RF tag within the back cover is unreadable. The RF shielding page can be for example an instance of Page **1230** or a page with Shielding Insert **1310** attached. The method further includes a Step **1520** of visually presenting the information on the inside of the front cover. The information can include a name, citizenship, photograph, identification number, or the like. A step **1530** includes turning the shielding page away from the back cover such that the RFID tag becomes un-shielded and can communicate with a reader. The shielding page is a page, between the front cover and the back cover, that includes or is attached to RF shielding configured to limit communication with the RFID tag. In alternative embodiments of this method, the rolls of the front cover and back cover are reversed.

As illustrated in FIG. **16**, some embodiments of the invention include a method of modifying an RFID enabled identification device, e.g., Identification Device **1410**. This method includes, a Step **1610** of opening the identification device by turning a back cover away from a front cover; a Step **1620** of selecting a page disposed (optionally bound) between the front cover and the back cover; an optional Step **1630** of exposing an adhesive surface on an RF shielding insert, the RF shielding configured to limit RF communication between an RFID tag included in the identification device and a reader; and a Step **1640** of attaching the RF shielding insert to the selected page using the exposed adhesive. In alternative embodiments, the adhesive is optionally replaced by a clip, clamp, pin, slot, or other mechanism configured for temporary attachment to the identification device. The identification device is optionally a passport, driver's license, immigration document, national identity document, or other identification device discussed herein. The RF shielding insert is optionally sized (as discussed elsewhere herein) such that it is disposed at a distance from a fold in the identification device.

As illustrated by FIG. **17**, one embodiment of the invention includes a method of making an identity device including: a Step **1710** of adding an RFID tag to a first cover layer; a Step **1720** of adding a second cover layer such that the RFID tag is disposed between the first cover layer and the second cover layer; and a Step **1730** of a attaching an RF shield to the combined first cover layer and second cover layer. The RF shield is optionally attached as a page configured to be disposed between to parts of the combined first cover layer and second cover layer when the combination is folded. The RF shield is optionally temporally attached to the combined first cover layer and second cover layer.

FIG. **18** is a block diagram illustrating the manufacture of an identification device, such as a passport. At one stage in the manufacturing process Shielding **1130** is dispensed in the form of a strip. The strip is laid down over what will be several separate identification devices when the manufacturing is completed. A plurality of RFID Tags **140** are deposited. The assembled material, including shielding is cut along a Cutting Line **1820** (cutting area) to separate the locations where the RFID Tags **140** are deposited or to be deposited. As a result a plurality of identity documents are produced. The cut along Cutting Line **1820** occurs after Shielding **1130** is laid down. Pages are optionally added to the assembled material prior to cutting.

FIG. **19** illustrates the method of illustrating an identification device as shown in FIG. **18**. In an Add Shielding Step **1910**, shielding is added to an area of a cover that will become a first identification device and a second identification device. In an Add RFIDs Step **1920**, a first RFID tag is added to that part of the cover that will become the first identification device and a second RFID tag is added to that part of the cover that will become the second identification device. In a Cut Step **1930**, the cover is cut to separate that part that will become the first identification device and that part that will be come the second identification device. Cut Step **1930** includes cutting the shielding added in Add Shielding Step **1910**.

FIG. **20** illustrates an RFID reader system configured to read Clamshell ID **810** e.g., an RFID enabled passport including shielding. Spacing between an RFID Reader **2010** and a Base **2020** is configured to form a Passport Slot **2030**. RFID Reader **2010** is configured to read Clamshell ID **810**. The height of Passport Slot **2030** is configured such that Clamshell ID **810** is sufficiently open when passed though Passport Slot **2030** between the RFID Reader **2010** and Base **2020**. E.g., Passport Slot **2030** is configured such that, in order to pass through Passport Slot **2030** Clamshell ID **810** cannot be partially open such that shielding within Clamshell ID **810** could block the communication between RFID Reader **2010** and the RFID tag included in Clamshell ID **810**. The width of the passport slot is optionally configured to assure that the shielding is not disposed between the RFID reader and the RFID tag.

FIG. **21** illustrates an RFID reader system including more than one RFID readers (RFID Reader **2010**A, RFID Reader **1010**B, and optionally RFID Reader **1010**C). The more than one RFID readers are disposed such that any shielding within an ID is never within the line of sites between all of the one or more RFID readers and an RFID tag in a reading volume. And in addition, the more than one RFID readers are disposed such that the angle between an antenna of the RFID tag is at least one of the RFID readers is favorable for communicating between the RFID tag and RFID reader. Achieving both or these criteria may require three or more RFID readers. In alternative embodiments, this system may include fewer or more RFID readers than illustrated. The illustrated readers optionally surround a walk through reading volume.

FIG. **22** is a block diagram of a Switchable RFID Device **2200**. In some embodiments, Switchable RFID Device **2200** is an identity device such as a passport, identity card, driver's license, immigration document (e.g., green card or visa), student identity card, library card, financial card (e.g., credit card, debit card or prepaid card), social security card, Military ID card, key, keycard or the like. Switchable RFID Device **2200** optionally includes Visible Indications **2220** such as a barcode, picture, image, name, address, text, and/or the like. Switchable RFID Device **2200** further includes one or more Switchable RFID Tag **2230**. Switchable RFID Tag **2230** includes one or more RFID Antenna **2240**, a Circuit **2250**, one or more Tag **2260** and one or more Switch **2270**. Switch **2270** is optionally disposed within Circuit **2250** or Tag **2260**. RFID Antenna **2240** is configured for sending a radio frequency (RF) signal from Switchable RFID Device **2200** in response to a received signal. The received signal is optionally used to power Switchable RFID Tag **2230**. In some embodiments, the received signal is an RF signal received by RFID Antenna **2240**. In alternative embodiments, the received signal is received through an inductive coupling or a non-RF antenna within Circuit **2250**. RFID Antenna **2240** is optionally a dipole antenna. RFID tags can operate in both low frequency (less than 100 MHz) and high frequency (greater than 100 MHz) modes. In low frequency systems, a field interacts with a coil which induces a current that is converted into a digital signal. In high frequency systems, the electric field of a propagating

signal gives rise to a potential difference across the tag's dipole antenna, which results in a digital signal.

In some embodiments, Switchable RFID Tag **2230** is configured for a user to be able to repeatedly turn on and off the function (e.g., delectability or readability) of Tag **2260** using Switch **2270**. Circuit **2250** typically further includes a diode, capacitor, transistor, and/or the like configured to receive power through RFID Antenna **2240** or an inductive coupling and to convey signals between RFID Antenna **2240** and Tag **2260**. In some embodiments, Tag **2260** includes an integrated circuit.

Switchable RFID Tag **2230** is differentiated from circuits found in RFID tags of the prior art by at least the inclusion of Switch **2270**. Switch **2270** is optical, thermal, magnetic, mechanical, wireless, and/or electronic. Switch **2270** is configured to be activated by a magnetic field, an electric field, a wireless signal, light, heat, mechanical force, and/or an electronic circuit external to Switchable RFID Device **2200**. Switch **2270** is optionally a sliding switch, a flip switch, a rotating switch, membrane switch, pushbutton switch, or other mechanical switch known in the art of mechanical switches. In typical embodiments, Switch **2270** is configured for both turning on and turning off function of Tag **2260**.

In various embodiments, Switch **2270** is normally open or normally closed, and the function of Tag **2260** can be normally on or normally off. For example, In some embodiments, Switch **2270** is a mechanical contact switch activated by applying pressure to an outside surface of Switchable RFID Device **2200**. In some embodiments, when this pressure is applied the functionality of Tag **2260** will be turned on, and when this pressure is not applied the functionality of Tag **2260** will be off. In some embodiments, Switch **2270** is a mechanical contact switch activated using a magnetic field. In some embodiments, Switch **2270** is an electrical switch turned on or off by a circuit external to Switchable RFID Device **2200**. For example, Switch **2270** may include two electrical contacts exposed at the exterior of Switchable RFID Tag **2230**. When a conductance path, current and/or voltage is applied between these electrical contacts Switch **2270** is turned on, or in alternative embodiments, turned off.

In various embodiments, Switch **2270** functions by creating a short circuit. For example, Switch **2270** can be configured to turn off the function of Tag **2260** by short circuiting RFID Antenna **2240**, a diode within Circuit **2250**, a capacitor within Circuit **2250**, a transistor within Circuit **2250**, and/or a connection within Tag **2260**.

In various embodiments, Switch **2270** functions by creating an open circuit. For example, Switch **2270** can be configured to create an open circuit between (or within) RFID Antenna **2240**, Circuit **2250**, and/or Tag **2260**.

In some embodiments, Switchable RFID Device **2200** is configured to operate as a key and Switch **2270** is activated to turn on the functions of Tag **2260** by mechanical insertion of the key into a locking device. In these embodiments, the functions of Tag **2260** are typically off when the key is not inserted in the locking device. The locking device is configured to activate Switch **2270** using an electronic circuit, a mechanical force, or a magnetic field.

In alternative embodiments, an instance of Switch **2270** is included in Tag **2260** and/or Circuit **2250**. Thus, Switchable RFID Tag **2230** may include a plurality of Switch **2270**, one Switch **2270** in Circuit **2250** and one Switch **2270** in Tag **2260**. As is described further herein, these instances of Switch **2270** may be configured to perform different functions.

FIG. **23** illustrates some of many possible locations for Switch **2270** within Switchable RFID Device **2200** where Switch **2270** creates an open circuit. FIG. **24** illustrates some of man possible locations for Switch **2270** within Switchable RFID Device **2200** wherein Switch **2270** creates a short circuit. The embodiments illustrated by FIGS. **23** and **24** include a Transistor **2310**, a Diode **2320**, and a Capacitor **2330**. Possible positions for Switch **2270** are indicated by an "X."

In some embodiments, Switch **2270** is configured to partially limit the functionality of Tag **2260**. Thus, Tag **2260** may be configured to respond with data indicating a first state when Switch **2270** is on and to respond with data indicating a second state when Switch **2270** is off. For example, Switch **2270** can be connected to logic circuits of Tag **2260** in such a way that Tag **2260** will transmit a limited amount of data when Switch **2270** is off and a less limited amount of data when Switch **2270** is on. For example, Tag **2260** may be configured to respond with data indicating the name of a person when Switch **2270** is off and to respond with the data including the name, an address, an account number and a telephone number when Switch **2270** is on. When Switch **2270** is connected to a circuit within Tag **2260**, Switch **2270** (or a plurality thereof) is optionally configured to separately control detection of and readability of Tag **2260**. Detection occurs when Tag **2260** sends any response signal, while readability is a function of the data that may be included in the contents of the response signal.

FIGS. **25**A and **25**B illustrate one embodiment of Switchable RFID Device **2200** in which Switch **2270** is a sliding switch disposed along an Edge **2520** of Switchable RFID Device **2200**. FIG. **25**A illustrates an OFF Position wherein an Electrical Connector **2510** between Circuit **2250** and Tag **2260** is in an open circuit state. In this state, Tag **2260** is not normally detectable or readable. FIG. **25**B illustrates an ON position wherein Switch **2270** completes an electrical connection between Circuit **2250** and Tag **2260**. In this position, Tag **2260** is detectable and readable. In this embodiment, Switch **2270** is configured to be moved between the on position and the off position, for example using a finger. In the on position, Switch **2270** optionally extends from Edge **2520** of Switchable RFID Device **2200**. In the off position, Switch **2270** is optionally approximately flush with Edge **2520**. Some embodiments of the invention include a switch configured to be approximately flush with an edge of a financial card (e.g., credit card or debit card) in at least one position. Some embodiments of the invention include a switch configured to be below an edge of a financial card in at least one position. Switch **2270** may be bistable or astable. Other features illustrated in FIGS. **25**A and **25**B are optional.

FIGS. **26**A and **26**B illustrates a Membrane Switch, generally designated **2600**, (and surrounding area) for use in a switchable RFID device such as Switchable RFID Device **2200**. Membrane Switch **2600** is optionally an embodiment of Switch **2270**. Membrane Switch **2600** is shown in the OFF and ON positions, in FIGS. **26**A and **26**B respectively. The use of a finger to operate Membrane Switch **2600** is optional, other devices may be used to activate the switch. By bringing electrical conductors on a Surface **2630** and a Surface **2625** together, a switchable RFID tag is controlled, activated or deactivated. Typically, Surface **2625** and Surface **2630** are coated with an electrical conductor, such as copper. In some embodiments, a Support Layer **2610** is disposed at a

First Surface **2615** of Switchable RFID Device **2200** and a Flexible Membrane **2620** is disposed at a Second Surface **2635** of Switchable RFID Device **2200**. Thus, the Flexible

Membrane **2620** includes both Surface **2625** and an outer surface, e.g., Surface **2635** of Switchable RFID Device **2200**. In some embodiments, Surface **2635** extends beyond Membrane Switch **2600** to Surrounding Areas **2650**. As such Flexible Membrane **2620** is essentially flush with a surface of Switchable RFID Device **2200**. Flexible membrane **2620** and Support Layer **2610** are separated by a Spacer **2640**. In some embodiments, Spacer **2640** extends beyond the immediate vicinity if Membrane Switch **2600** to Surrounding Areas **2650**. Spacer **2640** optionally extends essentially throughout Switchable RFID Device **2200**. As such, Surface **2635** can be essentially smooth, e.g. does not include raised portions near Membrane Switch **2600**. Support Layer **2610** is typically stiffer than Flexible Membrane **2620**.

In various embodiments, Membrane Switch **2600** is included in an identity device such as a passport, driver's license, immigration card, key card, financial card, ID card, or the like. For example, in some embodiments, Membrane Switch **2600** is included within a passport or other identity device having a clamshell configuration. In these embodiments, Flexible Membrane **2620** is optionally disposed toward an interior of the identity device when the identity device is closed. In this position, Flexible Membrane **2620** is protected from inadvertent contact and typically can only be pressed after the identity device is opened.

In various embodiments, Membrane Switch **2600** is included in a financial card (e.g., a credit card, debit card or the like). In some of these embodiments, Flexible membrane **2620** is essentially flush with Surrounding Areas **2650** of the financial card including Surface **2625**, as illustrated in FIGS. **26**A and **26**B. In this position Membrane Switch **2600** does not substantially stick out from First Surface **2625** of the financial card and is, thus, protected by Surrounding Areas **2650** from inadvertent activation. In some embodiments, Membrane Switch **2600** is recessed below First Surface **2635**.

FIG. **26**C illustrates an embodiment of Membrane Switch **2600** further including a Spring **2655**. Spring **2655** may be considered a switch activator. Spring has an activation height at which the spring center will spring into contact with the Support Layer **2610** this activation height is typically below First Surface **2635**.

FIG. **26**D illustrates a cross-sectional view of Membrane Switch **2600** disposed within Switchable RFID Tag **2230**. Tag **2260** is at least partially disposed within Spacer **540** and/or Support Layer **2610**. Spacer **2640** and/or Support Layer **2610** optionally include a cavity configured to receive Tag **2260**. In some embodiments, Tag **2260** is deposited on Support Layer **2610** before Spacer **2640** is deposited on Support Layer **2640**. In these embodiments, Support Layer **2640** is formed around Tag **2260**. In some embodiments, Spacer **2640** is configured to hermetically seal Tag **2260** and/or Membrane Switch **2600**.

In various embodiments, an Opening **2670** within Membrane Switch **2600** is less than or equal to 2.0 mm, 1.5 mm, 1.75 mm, 1.25 mm, 1.0 mm, 0.75 mm, or 0.5 mm think as measured from Surface **2625** to Surface **2630**.

The membrane switch illustrated in FIGS. **26**A and **26**C is optionally disposed such that Flexible Membrane **2620** is approximately flush with, or recessed in, First Surface **2635** of an identity device such as a driver's license or credit card. As such, Spacer **2640** prevents the membrane switch from being activated when a force is applied to the entire first surface. For example, when the identity device is placed within a wallet and the wallet is compressed.

Spacer **2640** optionally extends essentially throughout an identity device. For example, where Switchable RFID Device **2200** is a credit card, Spacer **2640** may extend to the outer edges of the credit card. Flexible Membrane **2620** optionally includes a picture of a user and/or an indication of the location of Opening **2670** in Spacer **2640**. In some embodiments, Flexible Membrane **2620** is transparent and Spacer **2640** includes a picture of a user or a credit card number. In some embodiments, Spacer **2640** includes a cavity configured to fit an integrated circuit, the integrated circuit configured to operate as part of Tag **2260** and optionally mounted on Support Layer **2640**. In some embodiments, Support Layer **2640** includes conductive traces configured to connect Tag **2260** to an RFID Antenna **2240**. In some embodiments, Spacer **2640** is generally rectangular in shape, (e.g., in the shape of a financial card).

FIG. **27** illustrates a top view of Membrane Switch **2600** of FIG. **26**C, according to various embodiments of the invention. In these embodiments, the shape of the Opening **2670** is configured to prevent Spring **2655** from rotating. A wide variety of alternative shapes may be used in alternative embodiments.

FIG. **28** illustrates Switchable RFID Tag **2230** in an embodiment wherein Switchable RFID Device **2200** includes an Identity Document **2800** having a clamshell configuration (e.g., a passport). Switchable RFID Tag **2230** may be included in a Cover **2840**, a Cover **2830**, or an interior page (not shown) of Identity Document **2800**. Identity Document **2800** optionally includes Shielding **2810**. Flexible Membrane **2620** is typically disposed such that it is on the interior of Identity Document **2800** when Identity Document **2800** is closed. See U.S. Pat. No. 7,719,425 issued May 18, 2010 for further details of Identity Document **2800**, according to some embodiments.

FIG. **29** illustrates the manufacture of instances of Identity Document **2800**. At one stage in the manufacturing process, Shielding **2810** is dispensed in the form of a strip. The strip is laid down over what will be several separate instances of Identity Document **2800** (after when the manufacturing is completed). A plurality of Switchable RFID Tag **2230** are deposited, creating a device including several Switchable RFID Tag **2230**. The assembled material, including Shielding **2810** is optionally cut to separate the locations where the instances of Switchable RFID tag **2230** are deposited or to be deposited. As a result a plurality of Identity Document **2800** are produced. Pages are optionally added to the assembled material prior to cutting. See U.S. non-provisional patent application 11/350,309 filed Feb. 7, 2006 for further details, according to some embodiments.

In the above and other embodiments, Switchable RFID Tag **2230** is optionally disposed such that the switch mechanism is accessed from the inside of Cover **2830** or Cover **2840**, the inside being the sides that face each other when Identity Document **2800** is closed. This orientation is optionally configured to reduce the probability of inadvertently activating Switch **2270** when Identity Document **2800** is closed. For example, in these embodiments, Flexible membrane **2610** may be to the inside (of the closed Identity Document **2800**) and Support Layer **2610** may be to the outside. Support Layer **2610** optionally includes a stiffener in the region near Opening **2670**.

FIG. **30** illustrates an exploded view of an embodiment of Switchable RFID Device **2200** including a Driver's License, generally designated **3000**. In this view, for clarity, Spacer **2640** is removed and Flexible Membrane **2620** is separated from Tag **2260**, RFID Antenna **2240**, Circuit **2250** and Support Layer **2610**. A location of Membrane Switch **2600** is indicated by Markings **3020** visible at Flexible Membrane **2620**. Surface **2635** is of uniform level across the face of

Driver's License **3000**. As such, Switchable RFID Device **2200** can smoothly be placed in a wallet and Membrane Switch **2600** is protected from inadvertent activation by Spacer **2640**. Membrane Switch **2600** is optionally disposed at least partially within RFID Antenna **2240**. A similar embodiment of Switchable RFID Device **2200** may include a credit card or similar financial device.

FIG. **31** illustrates an embodiment of Switchable RFID Device **2200** including a plurality of Switches, designated **3110**, **3120** and **3130**. These embodiments of Switchable RFID Device **2200** may include an identity device, financial device, credit card, debit card, remote control, product label, communication device, or the like. Any of Switches **3110**, **3120**, and **3130** are optional. Switch **3130** is configured for turning Switchable RFID Device **2200** ON and OFF. For example, as illustrated, Switch **3130** may be disposed in a connection between RFID Antenna **2240** and a Power Circuit **3140**. Power Circuit **3140** is an embodiment of Circuit **2250** configured to generate electrical power from a received signal to power Tag **2260**.

Switch **3110** and Switch **3120** are configured to control processing logic within Tag **2260**. For example, in some embodiments, Switch **3110** and Switch **3120** are configured to provide Boolean (true/false) values to a logic circuit within Tag **2260**. Some embodiments include further switches (e.g., 3, 4, 6, 8, 10 or more) configured to control processing logic.

In various embodiments, the processing logic within Tag **2260** can be configured to perform a wide variety of functions responsive to Switch **3110**, Switch **3120**, and any additional switches present. For example, in some embodiments, the processing logic is configured such that when Switch **3110** is activated a transaction amount is approved and when Switch **3120** is activated the transaction amount is disapproved. Alternatively, Switch **3110** and Switch **3120** may be part of a set of switches used to enter a PIN (personal identification number), an encryption key, an amount, an authorization code, an RFID reader identification number, an identification number associated with Switchable RFID Device **2200**, a selection of a mode of Tag **2260**, text, numbers, and/or other data.

In some embodiments, data sent by Tag **2260** using RFID Antenna **2240** is responsive to Switch **3110** and/or Switch **3120**. For example, in some embodiments, Tag **2260** will send a different identification number depending on whether Switch **3110** or Switch **3120** is activated. In some embodiments, Tag **2260** is configured to allow a transaction up to a certain value if neither Switch **3110** nor Switch **3120** is activated, and progressively higher values if Switch **3110** or Switch **3120** is activated. In some embodiments, Tag **2260** is configured to require that Switch **3110** and Switch **3120** be activated in a specific combination, order and/or with a specific temporal pattern in order to perform some operation, e.g., a financial transaction.

While the embodiment of Switchable RFID Device **2200** illustrated in FIG. **31** includes one instance of Tag **2260**, as discussed elsewhere herein, Switchable RFID Device **2200** optionally includes more than one instance of Tag **2260**. When more than one instance of Tag **2260** is present, a separate instance of Switch **3130** may be disposed between RFID Antenna **2240** (or Circuit **2250**) and each instance of Tag **2260**. In this configuration, the instances of Switch **3130** may be used to select which instance of Tag **2260** to activate. Switch **3110** and/or Switch **3120** may, likewise, be configured to select, activate or control different instances of Tag **2260**.

In some embodiments, Switchable RFID Device **2200** includes a Memory **3150**. Memory **3150** is optionally programmable. For example, in some embodiments, Memory **3150** is programmable using data entered through instances of Switch **3110** and Switch **3120**. In some embodiments, Memory **3150** is changed from a write state to a read only state, using Switch **3110**. In various embodiments, Memory **3150** is configured to store data to be broadcast, encryption information, data keys, values to be used in conjunction with data entered suing Switch **3110**, data for logic processing, identifying data, account data, mode data characterizing a mode of Switchable RFID Tag **2230**, or the like. Memory **3150** can be volatile or non-volatile, FLASH, SDRAM, ROM, DDRAM, DRAM, or the like. Some embodiments of the invention include an automated device configured to actuate Switch **2270** in order to place Switchable RFID Tag **2230** in a programmable mode.

FIG. **32** illustrates various embodiments of Tag **2260** configured for use in embodiments of Switchable RFID Device **2200** including a plurality of switches. In the illustrated embodiments, Tag **2260** includes a First Logic Input **3210** and an optional Second Logic Input **3220**, configured to be coupled to Switch **3110** and Switch **3120**, respectively. First Logic Input **3210** and Second Logic Input **3220** are each configured to be responsive to a different switch. First Logic Input **3210** and Second Logic Input **3220** are configured to control the function of Tag **2260**.

For example, in some embodiments, Tag **2260** is configured to output different data via a Data Input/Output **3240** depending on the state of Switch **3110** as determined by the First Logic Input **3210**. Tag **2260** is optionally configured to output different data depending on whether a switch coupled to First Logic Input **3210** or a switch coupled to Second Logic Input **3220** is activated. In some embodiments, Tag **2260** is configured to send a signal via Antenna **2240** in response to a signal received and/or energy received via Antenna **2240**. The sent signal is responsive to the states of Switches **3610-3612**. For example, in some embodiments, Tag **2260** is configured to respond with a specific signal only when Switches **3610-3612** are activated in a specific order, combination, or temporal pattern. In some embodiments, Tag **2260** is configured to receive power via Antenna **2240**, examine a state of Switches **3610-3612**, and to send data via Antenna **2240** responsive to the examined state.

In some embodiments, the switches illustrated in FIG. **32** are membrane switches. In some embodiments, the switches illustrated in FIG. **32** are irreversible switches.

FIG. **33** illustrates an instance of Tag **2260**, according to various embodiments of the invention. These embodiments include a plurality (e.g., 2, 3, 4, 8, 10, 12 or more) of switch inputs, such as First Logic Input **3210**, Second Logic Input **3220** and Third Logic Input **3330**. First Logic Input **3210**, Second Logic Input **3220** and Third Logic Input **3330** are configured to receive inputs from Switch **3110**, Switch **3120**, Switch **3130**, or the like, respectively. The state of connected switches (Switch **3110**, Switch **3120**, etc.) is monitored by an optional Switch State Monitor **3340** and a Processing Logic **3350**. Switch State Monitor **3340** is optionally a multiplexer, latch, logic circuit, or the like.

In some embodiments, Processing Logic **3350** is configured to process data received through a Data Input From Antenna **3360**, to receive power from a Power Input From Antenna **3230**, and to generate data for output through a Data Output to Antenna **3370** responsive to the states of Switch **3110**, Switch **3130**, etc. The generated data is optionally further responsive to data stored in Memory **3150** and/or data received from Data Input from Antenna **3360**.

The data received from Memory **3150** can include codes required for Processing Logic **3350** to generate specific data for communication through Data Output to Antenna **3370**. For example, in some embodiments, Tag **2260** is configured to output an RF signal only if data in Memory **3150** matches a state of Switches **3110** and **3120**. In some embodiments, the state of switches is used to determine which of several different alternative RF signals to transmit. For example, if Switch **3110** is activated then a first signal is transmitted, if Switch **3120** is activated then a second signal is transmitted, and if no switches are depressed than no signal is transmitted or an third signal is transmitted. The first and second signals are optionally associated with different financial accounts and/or different functions.

Some embodiments of the invention include a multi-switch credit card including one or more instances of Tag **2260**. This multiswitch credit card optionally is configured to be associated with more than one financial account and switches may be used to indicate which of the more than one financial account should be used for a transaction. In one example, the multiswitch credit card includes an instance of Tag **2260** configured for engaging in a financial transaction responsive to Switch **3110** and also configured to operate an electronic lock responsive to Switch **3120**. Multiswitch credit card: Includes one or more switches; Includes RFID device-optionally passive; Single switch can be used to tum on and off RFID; Multiple switches can be used to enter an access code, such as PIN or password; the PIN or password may be encoded in an order of switch state change or a temporal relationship between switch state change, e.g., a temporal pattern; Multiple switches can be used to enter an ID number of an RFID reader. Multiple switches may be embodied in telephone device, such as a cellular phone; Multiple switches may be used to enter an access code based on combinations of switches as well as single switch activation. Single switch activation optionally includes. use of a temporal pattern of switch to generate a code. Switches could be used to indicate amount approval. Switches could be used to select an account. For example, activating a first switch may result in a transaction being debited from a first account and activating a second switch may result in a transaction being debited from a second account.

Cellular phone: Cellular phone configured to use two or more communication modes: one mode for cellular operation and one mode, e.g., RFID, for short range financial transactions or lock operation. These modes may use different frequency ranges. Keys (switches) within cellular phone turn on and off short range transmissions within the short range mode. Keys within cellular phone configured to enter access code for use in short range mode. Short range mode is optionally passive RFID. For example, the presence of an RFID tag, within the cellular phone, may allow operation of a lock. The cellular phone is optionally configured to receive a plurality of RFID tags. These RFID tags are optionally responsive to switches (e.g., keys) on the cellular phone.

Some embodiments of the invention include a multi-switch credit card including one or more instances of Tag **2260**. This multiswitch credit card optionally is configured to be associated with more than one financial account and switches may be used to indicate which of the more than one financial account should be used for a transaction. In one example, the multiswitch credit card includes an instance of Tag **2260** configured for engaging in a financial transaction responsive to Switch **3110** and also configured to operate an electronic lock responsive to Switch **3120**.

Some embodiments of the invention optionally include programming of Tag **2260** to make associations with the one or more financial account. This programming can include entering data within Memory **3150**. Alternatively, Tag **2260** is configured to include a plurality of exchangeable Memory **3150**. In these embodiments, Tag **2260** is programmed to operate with different financial accounts and/or functions by inserting different instances of Memory **3150** within Switchable RFID Tag **2230**. The multiswitch credit card is, thus, optionally a multi account credit card.

Some embodiments of Switchable RFID Device **2200** are configured to include a plurality of Tag **2260**. Each member of the plurality of Tag **2260** may be responsive to one or more switches. In some embodiments, Switchable RFID Device **2200** is configured to receive one or more replaceable instances of Tag **2260**. In these embodiments, Switchable RFID Device **2200** may be programmed by replacing an instance of Tag **2260**. Multiple instances of Tag **2260** optionally share one instance of RFID Antenna **2240** and/or one instance of Memory **3150**.

FIG. **34** illustrates a method according to various embodiments of the invention. In these embodiments, power is received by Tag **2260** through an RF or inductive signal in a Receive Power Step **3410**. The RF signal optionally includes data received in a Receive Data Step **3420**. The state of one or more of Switches **3110**, Switch **3120**, etc. is then determined in a Determine Switch State **3430** Step. This state is used to determine an RF response, of any, in a Determine Response Step **3440**. The RF response is then sent in a Send Response Step **3450**.

FIG. **35** illustrates various embodiments of the invention in which Switchable RFID Device **2200** is configured as a RF Powered Remote **3500** configured to control external devices. This RF Powered Remote **3500** optionally does not require an internal power source (e.g., is powered wirelessly). Power is received from an RF (radio frequency) signal via RFID Antenna **2240** and used to send a return signal, typically through the same instance of RFID Antenna **2240**. RF Powered Remote **3500** uses one or more Switchable RFID Tag **2230** to activate and deactivate or modify the return signal. The one or more Switchable RFID Tag **2230** optionally share RFID Antenna **2240**, power circuits, and/or processing logic. RF Powered Remote **3500** is typically a multifunction remote control.

RF Powered Remote **3500** is optionally used as part of a locking mechanism, such as in a vehicle lock or door lock. RF Powered Remote **3500** is optionally configured to control electronic equipment, such as a computing device, a video recording device, projector, a game, a stereo, or a television. RF Powered Remote **3500** is optionally configured to control a garage door opener.

As illustrated in FIG. **35**, a Transmitter **3510** is configured to send an RF signal to provide power to RF Powered Remote **3500**. This RF signal is received by RF Powered Remote **3500**. When a switch (e.g. a First Switch **3520** or a Second Switch **3530**), included in RF Powered Remote **3500**, is in a first position the received power is used to send a return signal from RF Powered Remote **3500** to the device being controlled, e.g. a Controlled Device **3540**. Transmitter **3510** is optionally included in Controlled Device **3540**. When First Switch **3520** and/or Second Switch **3530** is in a second position the received power is not used to send the return signal from the remote, or is used to send a different return signal. The return signal may include audio, RF, infrared light, visible light, or the like. First Switch **3520** and Second Switch **3530** are optionally embodiments of Switch **3110**, Switch **3120**, or Switch **3130**. In various embodi-

ments, RF Powered Remote **3500** includes 1, 2, 3, 4 or more switches, such as First Switch **3520** and Second Switch **3530**. Typically, different switches are configured to control different functions of Controlled Device **3540**.

In some embodiments, First Switch **3520** and/or Second Switch **3530** are configured to control the collection of power from the RF signal. In some embodiments, First Switch **3520** and/or Second Switch **3530** are configured to prevent the power from flowing through an integrated circuit within the RF Powered Remote **3500**. In some embodiments, the First Switch **3520** and/or Second Switch **3530** are configured to decouple an instance of RFID Antenna **2240** within RF Powered Remote **3500**. In some embodiments, the First Switch **3520** and/or Second Switch **3530** are configured to prevent data transmission from RF Powered Remote **3500**. In some embodiments, First Switch **3520** and/or Second Switch **3530** are configured to control logic within an instance of Tag **2260** within RF Powered Remote **3500**. In various embodiments, First Switch **3520** and/or Second Switch **3530** are normally on or normally off. In some embodiments, more than one switch is configured to control logic within the same integrated circuit.

The embodiments of RF Powered Remote **3500** illustrated in FIG. **14** include a Power Collection Circuit **3550** configured to convert the received RF signal to electrical power of the operation of one or more Tag **2260**. RF Powered Remote **3500** is configured to power an integrated circuit, e.g., Tag **2260**, and send a return signal using the electrical power produced by Power Collection Circuit **3550**. The RF Powered Remote optionally receives all of its electrical power from the Power Collection Circuit **3550**.

Depending on the state of First Switch **3520** and/or Switch **3530**, Tag **2260** may cause the return signal to be transmitted using a Return Signal Generator **3560**. Return Signal Generator **3560** is optionally included in Tag **2260**. Return Signal Generator **3560** is optionally shared by a plurality of Tag **2260** within RF Powered Remote **3500**. In some embodiments, Return Signal Generator **3560** includes an instance of RFID Antenna **2240**.

First Switch **3520** and Second Switch **3530** each control Tag **2260**, such that the return signal is responsive to the states of these, and optionally further, switches. For example, in some embodiments, if First Switch **3520** is on, then Tag **2260** will include a first data in the return signal, and if Second Switch **3530** is on, then Tag **2260** will include a second (typically different) data in the return signal.

The RF Transmitter **3510** and Controlled Device **3540** are optionally separate. For example, the RF transmitter may be included in an automobile and the controlled device may be a garage door.

In some embodiments, First Switch **3520** is activated by insertion of RF Powered Remote **3500** in part of a locking system.

In some embodiments, First Switch **3520** is coupled to a button configured for turning the volume of an electronic device up and/or Second Switch **3530** is coupled to a different button configured for changing a channel.

In some embodiments, RF Powered Remote **3500** is configured to unlock a car.

In various embodiments, RF Powered Remote **3500** includes a wireless keypad, a wireless computer mouse, a wireless keyboard, a wireless microphone, a key, a telephone, an identity document, or the like.

In some embodiments, RF Powered Remote **3500** is included in a hermetically sealed and/or waterproof housing. Because the RF powered remote is remotely powered, there is no necessity for a battery compartment or power plug.

First Switch **3520** and Second Switch **3530** may include a push-button switch, a membrane switch, a sliding switch, a magnetic switch, or any of the many other switches known in the art to make and break electrical connections. First Switch **3520** is optionally part of a roller, wheel or dial that makes and breaks an electrical connection as it is turned. First Switch **3520** and Second Switch **3530** are optionally embodiments of Switch **2270**.

In some embodiments, a single instance of RF Transmitter **3510** is configured to power a plurality of Tag **2260**. Each of this plurality of Tag **2260** is optionally configured to control a separate electronic device or operate different functions in a single electronic device. The plurality Tags **2260** optionally included in the same RF Powered Remote **3500**.

In some illustrative embodiments, an instance of RF Transmitter **3510** is disposed within a vehicle dashboard and a plurality of Tag **2260** are disposed within a steering wheel of the vehicle or rear view mirror. One of the plurality Tag **2260** is configured to control an audio system and another of the plurality of switchable RFID tags is configured to control a climate system (e.g., air conditioner or heating). In some embodiments, the wireless response signals generated by both of these Tag **2260** is received by a RF receiver and communicated to a circuit that then controls the separate electronic devices. In alternative embodiments, each of the separate electronic devices (e.g., audio system and climate system) includes a separate RF receiver configured to receive the response signals.

FIG. **36** illustrates an embodiment of Switchable RFID Device **2200** including a Multiswitch Credit Card **3600**, according to various embodiments of the invention. Multiswitch Credit Card **3600** includes two or more switches, such as Switch **3610**, Switch **3611**, and optional Switch **3612**. Switches **3610**, **3611** and **3612** are optionally embodiments of Switch **3110** and Switch **3120**. Multiswitch Credit Card **3600** further includes one or more instances of Tag **2260**, an optional instance of Circuit **2250** configured to generate power for used by Tag **2260**, and RFID Antenna **2240**. In embodiments without Circuit **2250**, Multiswitch Credit Card **3600** includes its own power source (not shown).

Switches **3610-3612** are each configured to make or break an electrical connection, the state of which can be determined by the resistance of electric current flow or the presence of a current or voltage. In some embodiments, Switches **3610-3612** are membrane switches, such as Membrane Switch **2600**. In various embodiments, Multiswitch Credit Card **3600** including Switches **3610-3612** is less than 4, 3, 2, 1.5, 1, or 0.5 mm thick. In various embodiments, Switches **3610-3612** are essentially flush with a front surface of Multiswitch Credit Card **3600**.

In some embodiments, Circuit **2250** is configured to generate electrical power from the RF signal received via RFID Antenna **2240** for use by one or more instances of Tag **2260**. In some embodiments, Circuit **2250** and/or RFID Antenna **2240** are shared by several instances of Tag **2260** within Multiswitch Credit Card **3600**. In some embodiments, Multiswitch Credit Card **3600** is configured not to transmit an RF signal unless at least one of Switches **3610-3612** is activated. In some embodiments, Switches **3610-3612** are configured for entering an access code, such as PIN or password. The access code is optionally encoded by an order in which the states of switches are changed, by a switch combination, and/or by a temporal relationship between changes in switch state, e.g., a temporal pattern.

In some embodiments, Switches **3610-3612** are configured for approving the amount of a financial transaction. In

some embodiments, Switches **3610-3612** are configured for selecting from among a plurality of financial accounts. For example, activating Switch **3610** may result in a transaction being debited from a checking account, activating Switch **3611** may result in a transaction being applied a first charge account, and activating Switch **3612** may result in a transaction being applied to a second charge account.

In some embodiments, Multiswitch Credit Card **3600** (or other embodiments of Switchable RFID Device **2200**) includes encryption logic configured to operate in response to the activation of switches. For example, the encryption logic may be configured to use data received via switches as an encryption or decryption key. The encryption logic may be configured to encrypt data received via switches prior to transmission of this data. In some embodiments, Switchable RFID Tag **2200** is configured to make use of rolling codes for security purposes. In these embodiments, synchronization of the codes is optionally be coordinated by a central server configured to communicate with point of sale stations. In some embodiments, a switch is activated using a biometric sensor. The features described herein with respect to various embodiments of Switchable RFID Device **2200**, such as Multiswitch Credit Card **3600**, may be included in other types of identity devices.

In various embodiments of the invention, an identity device includes both one or more electrical contact configured to make physical electrical contact with a reader and a RFID tag configured to communicate wirelessly with a reader. The physical contact is optionally used to convey communication that is different from the wireless communication. For example, the physical connection based communication may include programming of a circuit within the RFID tag (e.g., programming account number), while the wireless communication may be more limited than the physical connection based programming, (e.g., the wireless communication may be limited to reading the programmed account number). In another example, the wireless communication may be configured for a limited set of transaction types (e.g., those less than $50, or deposits), while the physical communication is configured for additional transaction types (e.g., larger value withdrawals). Further, the physical communication may be used for downloading transaction logs or other data stored on the ID card. Transaction logs are optionally stored using power received through RFID Antenna **2240**.

In various embodiments, an identity device includes a plurality of switches and is configured to engage in a transaction or allow access (to an account, data, or a physical location) responsive to whether proper members of the plurality of switches are pressed. For example, in one embodiment the ID card includes 10 switches configured for a user to enter a PIN (personal identification number) or password. Only when the proper data is entered using the plurality of switches will the ID card participate in certain functions, such as an electronic payment or opening of a lock. As described further herein, different numbers of switches are possible.

In various embodiments, an identity device includes logic configured to process data entered using a plurality of switches. This logic may, for example, prevent the identity device from transmitting an RF signal unless the entered data matches previously stored data, for example, if an entered PIN matches a stored access code. The logic may be responsive to the order of switches activated, combinations of switch activation (e.g., which switches are activated at the same time), or which of the plurality of switches are activated. Timing may be achieved through the use of appropriate RC (resister-capacitor) circuits or a clock signal.

Various embodiments of the invention include a modified version of Basic Access Control. In these embodiments, the logic is configured to prevent the identity device from transmitting certain data unless the data entered using switches on the identity device matches an ID number of a RFID reader making a request. The logic may be configured to implement Basic Access Control, such as that used in electronic U.S. passports, but unlike the system used in current passports, the data entered is an ID of the reader and the data is entered at the passport (or other identity device) rather than at the reader.

In various embodiments, the identity device includes a plurality of switches configured for a user to enter data associated with a reader. For example, in some embodiments, the switches are configured to receive an ID number of a point of sale (POS) device. Logic within the identity device may then use this ID number to assure that a transaction is communicated to the correct POS device. For example, if several vending devices are positioned adjacent to each other, the ID number of one of the vending devices may be entered in the identity device using the plurality of switches and the ID card may then be enabled to engage in a transaction with that particular vending device but not the other nearby vending devices.

Passwords, PINs, or the like received by the identity device through the plurality of switches are optionally stored in volatile memory within the identity device. When the identity device ceases to receive energy through an RF signal the data stored in this volatile memory is discarded (lost). In some embodiments, this data is stored in non-volatile memory and thus retained between RF transmissions.

In some embodiments, the identity device is configured to store an account balance in static memory. Logic within the identity device is optionally configured such that the account balance can only be increased using a physical connection, while the account balance can be debited using a wireless connection. Alternatively, logic within the identity device is optionally configured such that the account balance can only be debited using a physical connection.

Some embodiments of the invention include methods of purchasing using a switchable RFID. The identity device is placed within the reading range of a wireless POS device. One of a plurality of switches within identity device is activated such that an RFID tag will respond to an RF signal from the POS device. The RFID tag responses to the RF signal from the POS by energizing itself using the RF signal and generating a response RF signal. The responsive RF signal includes an account number such as a checking or savings account number, a credit card number, identity number, or the like, responsive to the switch.

FIGS. **37**A-**37**C illustrate positions of RFID Antenna **2240** within Multiswitch Credit Card **3600**, according to various embodiments of the invention. As illustrated in FIG. **37**A, in some embodiments, RFID Antenna **2240** is disposed such that Embossed Lettering or Numbering **3620** is inside of RFID Antenna **2240**. In these embodiments, at least part of Switch **2270** (or a plurality thereof) is optionally disposed inside of RFID Antenna **2240**. As illustrated in FIGS. **37**B and **37**C, in some embodiments, RFID Antenna **2240** is disposed primarily in the part of a credit card (e.g., the upper half) that does not include Embossed Lettering or Numbering **3620**. In these embodiments, Switch **2270** (or a plurality thereof) may be disposed either inside and/or outside of RFID Antenna **2240**. As illustrated in FIG. **37**C, when

Switch **2270** is disposed outside of RFID Antenna, Connections **3615** between Switch **2270** and Tag **2260** are optionally routed to avoid Embossed Lettering or Numbering **3620**. In some embodiments, Spacer **2640** is comprised of a material that can be embossed to form raised lettering and numbering (e.g., a name and credit card number). In these embodiments, the manufacture of Embossed Lettering or Numbering **3620** can be made through Spacer **2640**.

In some embodiments, of the invention, one or more instances of Switch **2270** are configured to control whether Tag **2260** (and/or associated memory) are in a programmable state or a non-programmable state. For example, when an instance of Switch **2270** is in a first state writing to non-volatile memory within Tag **2260** is allowed and when Switch **2270** is in a second state writing to the non-volatile memory is not allowed but reading of the non-volatile memory may be allowed. In some embodiments, Switch **2270** is initially in a state wherein the non-volatile memory can be written to and the switch is then irreversible changed to a state wherein the non-volatile memory can no longer be written to.

The irreversible change optionally includes breaking of a conductor. For example, in some embodiments, an RFID enabled identity device is configured such that an instance of Switch **2270** comprises a Conductor **3810** coupled to Tag **2260**. As illustrated in FIG. **38**, when Conductor **3810** is unbroken Tag **2260** is in a programmable state, e.g., non-volatile memory within Switchable RFID Tag **2230** can be written to. After programming this conductor is broken and Tag **2260** is thus irreversibly changed to a nonprogrammable state. Data already programmed within Switchable RFID Tag **2230** may be locked by the breaking of Conductor **3850**. In one embodiment, Conductor **3810** is broken through the manufacture of Embossed Lettering or Numbering **3620**. For example, embossing a credit card number into a credit card can break a conductor and thus lock the contents of non-volatile memory within the credit card. In alternative embodiments, an identity device includes a plurality of Conductor **3810** and members of this plurality are broken in order to program function of Tag **2260**. Each member of the plurality of Conductor **3810** that is or is not broken represents one bit of logic programmed.

Some embodiments of the invention include a switchable RFID tag is configured to be remotely switched using an RF signal. In some embodiments, in an OFF state, the RFID tag will not transmit a response signal and thus is not remotely detectable using an RF signal. In an ON state, the RFID tag will transmit a response signal. The RFID tag is switched between the ON state and the OFF state through receipt of a specific command or commands, through an RF signal. In alternative embodiments, the RFID tag includes multiple ON states, optionally in combination with an OFF state.

FIG. **39** illustrates a remotely switchable RFID Tag **3900** including an Antenna **3910**, a Power Electronics **3920** , and an Integrated Circuit **3930**. RFID Tag **3900** is optionally an embodiment of other RFID tags disclosed herein. Likewise, Antenna **3910**, Power Electronics **3920** and Integrated Circuit **3930** are optionally embodiments of other antennae, power electronics and integrated circuits disclosed herein. Antenna **3910** is configured to send and receive data encoded in an RF signal and also optionally configured to receive sufficient energy to power RFID Tag **3900**.

Power Electronics **3920** are configured to receive energy through Antenna **3910** and to power Integrated Circuit **3930** using this received energy. Power Electronics **3920** typically include elements such as a diode, capacitor, transistor, or the like.

Integrated Circuit **3930** includes an Input **3935** configured to receive data from Antenna **3910** and power from Power Electronics **3920**. Integrated Circuit **3930** further includes an Output **3940** configured to convey data to Antenna **3910** for transmission as an RF signal.

Integrated Circuit **3930** further includes an optional State Memory **3945** configured to store the current state of the RFID Tag, e.g., ON or OFF. In various embodiments, State Memory **3945** includes a memory location in a static random access memory, a magnetic memory, or the like. In these embodiments, the state stored within State Memory **3945** is preserved without a constant source of power. In some embodiments, State Memory **3945** includes memory configured to store data only while power is available. In this embodiment, the ON state is typically temporary and automatically reverts to the OFF state after power is no longer available.

Integrated Circuit **3930** further includes an optional Data Memory **3950** configured to store data received through Antenna **3910**, and/or to be transmitted using Antenna **3910**. The data stored in Data Memory **3950** may include a serial number of RFID Tag **3900**, identification data, biometric data, medical information, license information, or the like.

Integrated Circuit **3930** further includes a Key Memory **3955** configured to store a key required to change the state of the RFID Tag **3900** from ON to OFF, from OFF to ON, and/or between two ON states. Key Memory **3955** is typically static memory, and optionally read only memory or write-once memory. In other embodiments, the Key Memory **3955** is memory configured for temporary storage of data.

Integrated Circuit **3930** further includes Switch Logic **3960** configured to read the state stored in State Memory **3945** and, responsive to the read state, either transmit or not transmit an RF signal using Antenna **3910**. The transmitted data optionally includes data stored in Data Memory **3950**. In some embodiments, Switch Logic **3960** is configured to not transmit an RF signal unless the state read from State Memory **3945** indicates that the RFID Tag is in an ON state. In some embodiments, Switch Logic **3960** is configured to read the state stored in State Memory **3945** and, responsive to the read state, transmit one of a plurality of alternative data stored in Data Memory **3950**. In some embodiments, Switch Logic **3960** is configured to read the state stored in State Memory **3945** and, responsive to the read state, transmit different amounts of data stored in Data Memory **3950**.

In some embodiments, Switch Logic **3960** is configured to receive data through Antenna **3910**, to read a key from Key Memory **3955**, to compare the received data with the read key, and to change the state stored in State Memory **3945** responsive to this comparison. For example, in some embodiments, if the read key matches the received data, the state of the RFID Tag **3900** is set to ON, or changed from one ON state to another ON state. In some embodiments, Switch Logic **3960** includes logic configured to decrypt or apply a hash function to the received data prior to the comparison. The Switch Logic **3960** can include software, hardware, and/or firmware. In some embodiments, State Memory **3945** is configured to store a rolling code.

In some embodiments, Integrated Circuit **3930** is embodied in several devices. For example, the functionality of Integrated Circuit **3930** may be distributed among several chips. In some embodiments, Key Memory **3955**, Antenna **3910**, Switch Logic **3960** and/or State Memory **3945** are configured to be shared by more than one instance of Integrated Circuit **3930**. For Example, two or more instances

of RFID Tag **3900** may be included in a single device and these two or more instances of RFID Tag **3900** may share a single instance of Key Memory **3955**, Antenna **3910**, Switch Logic **3960** and/or State Memory **3945**.

In some embodiments, RFID Tag **3900** further includes a mechanical switch configured to control operation of RFID Tag **3900**. This switch may include, for example, Switch **2270** (FIG. **22**). For example, in one embodiment, Switch Logic **3960** is configured for turning ON and OFF operation of RFID Tag **3900**, while Switch **2270** is configured to select between alternative ON states. In an alternative embodiment, Switch **2270** is configured for turning ON and OFF operation of RFID Tag **3900** and Switch Logic **3960** is configured for selecting between alternative ON states. In some embodiments, proper activation of both Switch **2270** and Switch Logic **3960** is required to turn RFID Tag **3900** to an ON state. Thus, in order for RFID Tag **3900** to transmit certain information, or to transmit at all, Switch **2270** must be activated by a person and Switch Logic **3960** must receive a proper key from an RF reader. This provides a dual layer of mechanical and key based security. In some embodiments, the switch must be activated and a proper key must be received in order for RFID Tag **3900** to transmit certain information. In some embodiments, use of Switch **2270** will activate RFID Tag **3900** in a first ON state and use of Switch Logic **3960** (through an RF signal) will activate RFID Tag **3900** in a second ON state. The second ON state optionally requires use of both Switch **2270** and Switch Logic **3960**.

In some embodiments, Integrated Circuit **3930** also includes an independent Power Supply **3965** such as a battery or capattery.

In some embodiments, the switchable RFID Tag **3900** of FIG. **1** is included in an identification document such as a driver's license, green card, passport, or the like. In some embodiments, the Switchable RFID Tag **3900** is included in a wireless key configured to open a lock, to access data, to gain entry, or the like. In some embodiments, Switchable RFID Tag **3900** is included in a cellular telephone or another device configured to communicate using WiFi, WiMAX, or similar non-RFID standards.

FIG. **40** is a flowchart illustrating a method of changing a state of RFID Tag **3900**. In an optional Receive Energy Step **4010**, energy sufficient to power RFID Tag **3900** is received by Antenna **3910**. Receive Energy Step **4010** is typically similar to Receive Power Step **3410**. In a Receive Data Step **4020**, data is received by Antenna **3910** in the form of an RF signal. In some embodiments, Receive Data Step **4020** requires that a mechanical switch be activated. In a Read Key Step **4030**, a key is read from Key Memory **3955**. Optionally, the data received in the Receive Data Step **4020** is decrypted or otherwise processed. In a Compare Step **4040**, the read key is compared with the, optionally processed, data received in the Receive Data Step **4020**.

In a Change State Step **4050**, the state of RFID Tag **3900** is changed responsive to results of the comparison made in the Compare Step **4040**. In some embodiments, if there is a match between the key and the data then the state of RFID Tag **3900** is set to ON. Setting the state ON optionally includes writing a value to State Memory **3945**. In some embodiments, if there is no match between the key and the data then the state is set to OFF. In some embodiments, if there is a match between the key and the data, then the state is set to one of two or more possible ON states. In one of the two or more possible ON states, RFID Tag **3900** can transmit a response RF signal but the data that can be included in the response RF signal is restricted relative to another of the two or more possible ON states. For example, in one embodiment, in one ON state RFID tag **3900** is configured to include a name in the response RF signal, but another ON state RFID tag **3900** is configured to include the name and medical information in the response RF signal.

In some embodiments, RFID Tag **3900** is automatically returned to the OFF state from the ON state, in a Revert Step **4060**. For example, in one embodiment the ON state remains only so long as there is charge on a capacitor. When this charge dissipates or is used, the RFID automatically returns to a default OFF state. The automatic switch back to the OFF state can be dependent on when power is no longer received from an RF signal, on the timing characteristics of an RC (resistor-capacitor) circuit, on Switch **2270**, on an RF signal received, and/or the like.

FIG. **41** is a flowchart illustrating a method of operating the RFID Tag **3900** illustrated in FIG. **39**. In an optional Receive Energy Step **4010** energy sufficient to power the RFID is received by Antenna **3910**. In a Read State Step **4120** the state of the RFID Tag is read from State Memory **2245**. In a State? Step **4130** the read state is examined. If the read state is ON, then in a Send Response Step **4140** an RF response is sent from the RFID Tag **3900** using Antenna **3910**. If the read state is OFF, then the RFID Tag **3900** is prevented from sending an RF response, in an Abort Response Step **4150**. In some embodiments, that include more than two states, the read state can be something other than ON or OFF. If the read state is a state other than ON or OFF then a restricted RF response is sent in a Send Restricted Response Step **4160**. The restricted response typically includes less or different data than would be included if the read state had been ON.

The steps shown in FIGS. **40** and **41** are optionally performed using Integrated Circuit **3930** of FIG. **39**.

In some embodiments, first data in a transmission is configured to change the state of an RFID tag to ON. Further data in the transmission is then configured to elicit a responding transmission from the RFID tag. After the transmission is concluded the RFID tag automatically reverts to the OFF state. These embodiments optionally include non-volatile memory for storage of the state.

In some embodiments, data in a transmission is configured to change the state of an RFID tag to ON. The ON state persists until the RFID tag receives data configured to change the state of the RFID tag to OFF.

Several embodiments are specifically illustrated and/or described herein. However, it will be appreciated that modifications and variations are covered by the above teachings and within the scope of the appended claims without departing from the spirit and intended scope thereof. For example, an RFID key device may include more than one RFID tag and moving of shielding may be used to determine which RFID tag can communicate with readers. The RFID tags discussed herein may include active or passive contactless circuits configured to transmit identification information. For example, in some embodiments, Tag **2260** is an active rather than a passive RFID tag. Examples discussed herein in relation to credit cards can equally be applied to other types of financial card such as a debit card, or prepaid card. For example, in some embodiments, RFID Tag **3900** is configured to change the ON/OFF state in response to a signal from a point of sale system indicating that an item has been sold. In these embodiments, RFID Tag **3900** is optionally configured to send different signals before and after a sale. A first of the different signals may be used to determine that the item has not yet been sold, and a second of the different signals may be used to determine that the item has been sold and/or may be returned. The features illustrated in

FIGS. **39-41** are optionally included in embodiments illustrated by other figures of this application.

The embodiments discussed herein are illustrative of the present invention. As these embodiments of the present invention are described with reference to illustrations, various modifications or adaptations of the methods and or specific structures described may become apparent to those skilled in the art. All such modifications, adaptations, or variations that rely upon the teachings of the present invention, and through which these teachings have advanced the art, are considered to be within the spirit and scope of the present invention. Hence, these descriptions and drawings should not be considered in a limiting sense, as it is understood that the present invention is in no way limited to only the embodiments illustrated.

What is claimed is:

1. An electronic communication system comprising:

a cellular telephone configured to communicate wirelessly using an inductive coupling, wherein the inductive coupling is part of a circuit including an electronic switch configured to change between states of the circuit and configured to communicate via the inductive coupling responsive to the states of the circuit.

2. The system of claim **1**, wherein the circuit includes a switchable RFID tag, input logic, processing logic, a return signal generator, switch logic, a switch state monitor, encryption logic, one or more antenna, memory or a power supply.

3. The system of claim **2**, wherein the memory is configured to store a financial account balance.

4. The system of claim **2**, wherein the cellular telephone further includes a user interface configured to enter a financial account number and the memory is configured to store the financial account number for use in the financial transaction.

5. The system of claim **1**, wherein the circuit is configured to facilitate a financial transaction responsive to the states of the circuit via the inductive coupling.

6. The system of claim **5**, wherein the electronic switch is configured for a user to select between a plurality of financial accounts for the financial transaction.

7. The system of claim **5**, further including a user interface configured to approve the financial transaction via the electronic switch.

8. The system of claim **5**, wherein the cellular telephone includes a biometric sensor and the circuit is configured to facilitate the financial transaction responsive to the biometric sensor.

9. The system of claim **5**, wherein the circuit is configured to communicate an account number via the inductive coupling to facilitate the financial transaction.

10. The system of claim **5**, further comprising an input configured for a user to enter a personal identification number, wherein the financial transaction is responsive to entry of the personal identification number and a signal communicated via the inductive coupling is responsive to the personal identification number.

11. The system of claim **5**, further comprising a key memory configured to store an encryption key used to facilitate the financial transaction.

12. The system of claim **5**, further comprising a key memory configured to store a key required to change the states of the circuit to facilitate the financial transaction via the inductive coupling.

13. The system of claim **5**, further comprising a mechanical switch configured to approve the financial transaction.

14. The system of claim **5**, further comprising a reader configured to read a signal generated by the inductive coupling of the cellular telephone to perform the financial transaction.

15. The system of claim **14**, further comprising a point of sale device including the reader.

16. The system of claim **1**, wherein the circuit is configured to operate in at least a first ON state and a second ON state of the states, responsive to the electronic switch.

17. The system of claim **16**, wherein the circuit is configured to facilitate a financial transaction in the first ON state but not in the second ON state.

18. The system of claim **1**, wherein the circuit includes a state memory configured to store the states of the circuit.

19. The system of claim **1**, wherein the circuit is configured to store transaction logs.

20. The system of claim **1**, wherein the electronic switch is responsive to a biometric sensor.

21. The system of claim **1**, further comprising an input configured for a user to enter a personal identification number (PIN), communication via the inductive coupling being responsive to the personal identification number.

22. The system of claim **1**, wherein the cellular telephone further includes an antenna configured to communicate using WiFi, the antenna being configured to operate at a different frequency than the inductive coupling.

23. The system of claim **1**, wherein the inductive coupling is part of a radio frequency identification device.

24. The system of claim **1**, further comprising an electronic key configured to be inserted into the cellular telephone, the electronic key including an account identifier and a signal communicated via the inductive coupling being responsive to the account identifier.

25. The system of claim **24**, wherein the electronic key is configured to store a password.

26. The system of claim **1**, wherein the circuit includes both the electronic switch and a mechanical switch configured to approve a financial transaction.

27. The system of claim **1**, wherein the cellular phone is configured to purchase goods by placing the circuit within the reading range of a wireless point of sale device and communicating a financial account number to the wireless point of sale device using the induction coupling responsive to the states of the circuit.

28. The system of claim **1**, wherein the electronic switch is responsive to data stored in memory of the cellular telephone and the data stored in memory includes biometric data.

29. A cellular telephone configured to communicate wirelessly using an inductive coupling and also configured to communicate using WiFi, wherein the inductive coupling is part of a circuit configured to facilitate a financial transaction communicated via the inductive coupling, the circuit being configured to facilitate the financial transaction responsive to a biometric sensor.

30. A cellular telephone configured to communicate wirelessly using an inductive coupling and also configured to communicate using WiFi, wherein the inductive coupling is part of a circuit configured to facilitate a financial transaction communicated via the inductive coupling, the circuit being configured to facilitate the financial transaction being responsive to a personal identification number entered by a user.

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