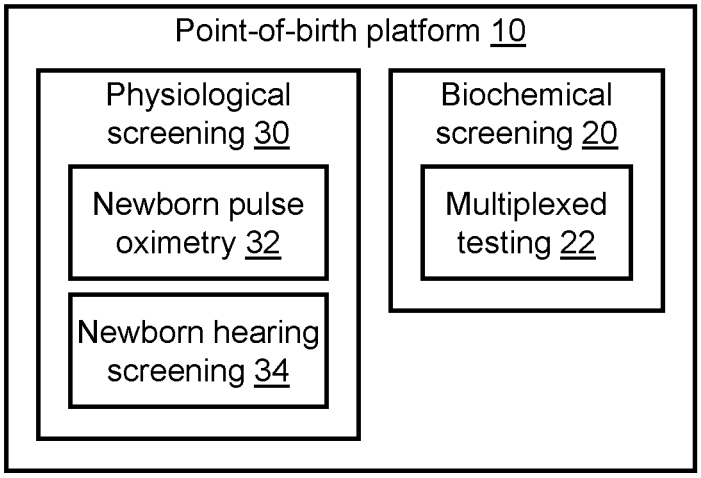

Point-of-birth platform 10
Physiological screening 30
Newborn pulse oximetry 32
Newborn hearing screening 34
Biochemical screening 20
Multiplexed testing 22

FIG. 1

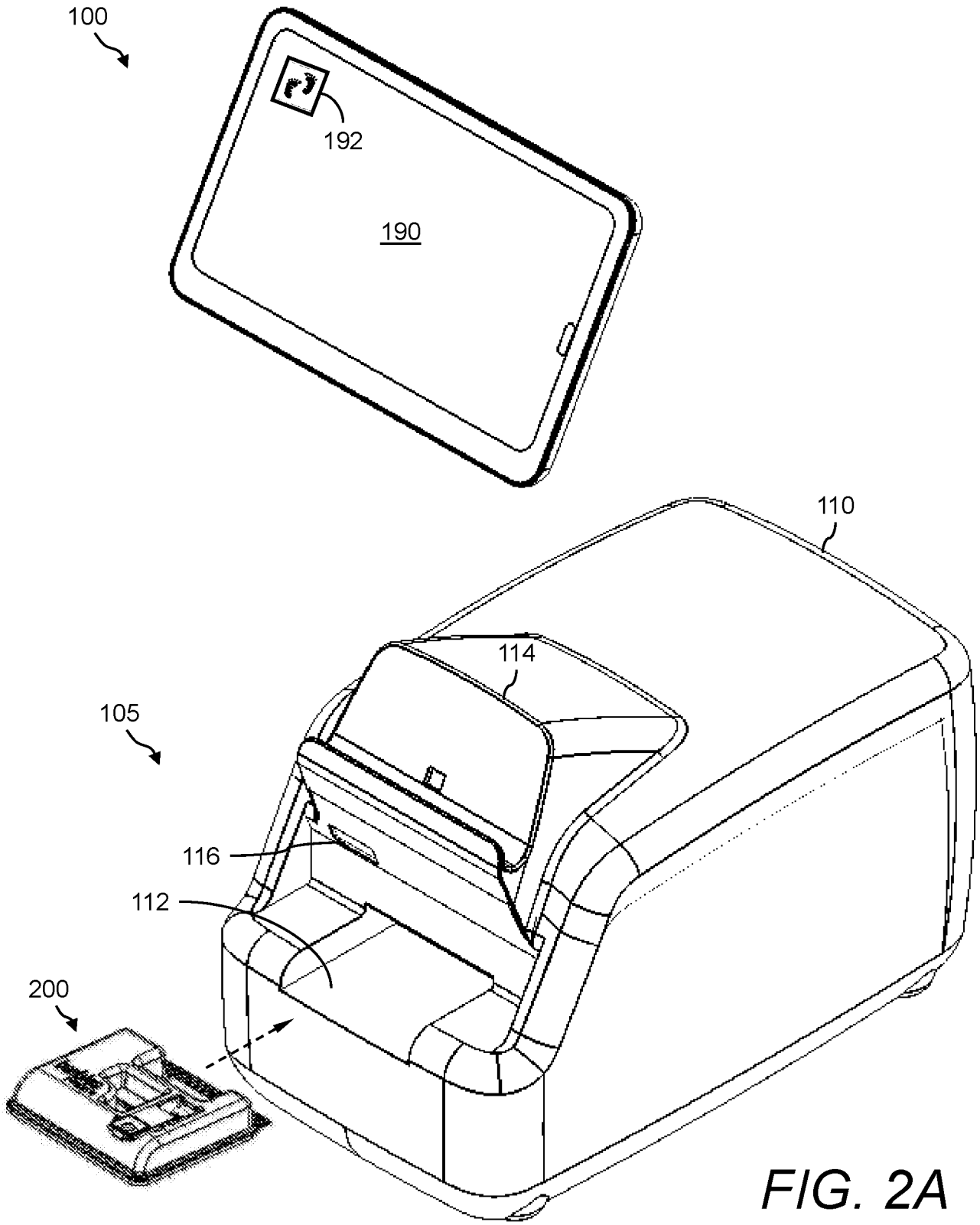


FIG. 2A

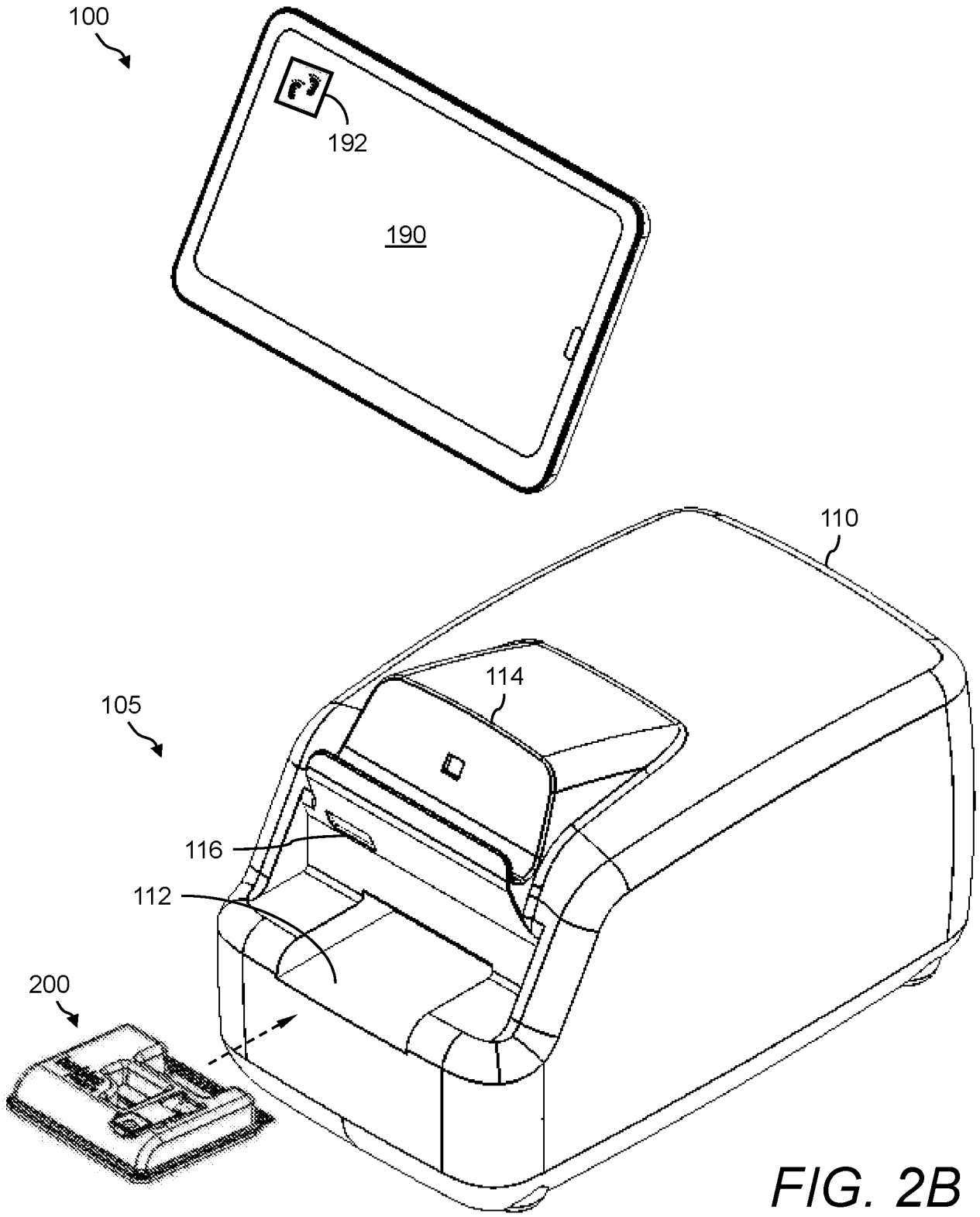


FIG. 2B

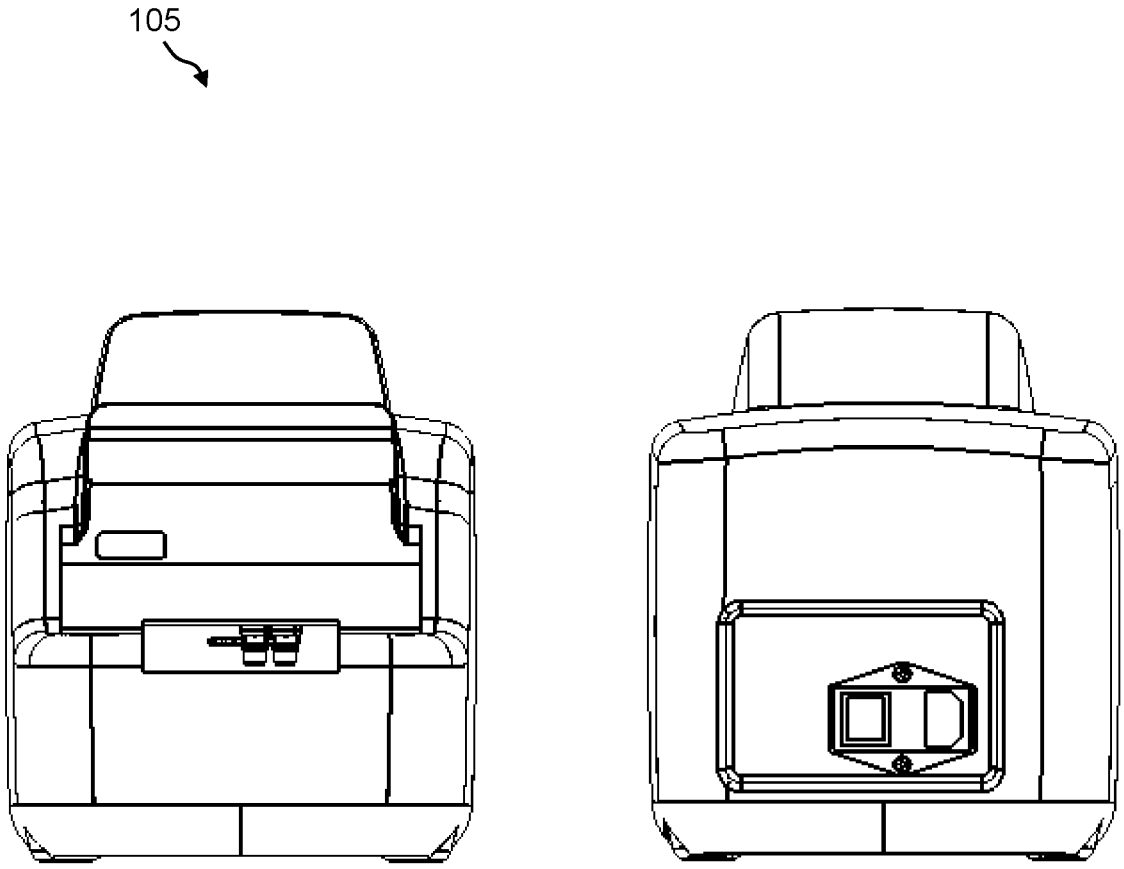


FIG. 3A

FIG. 3B

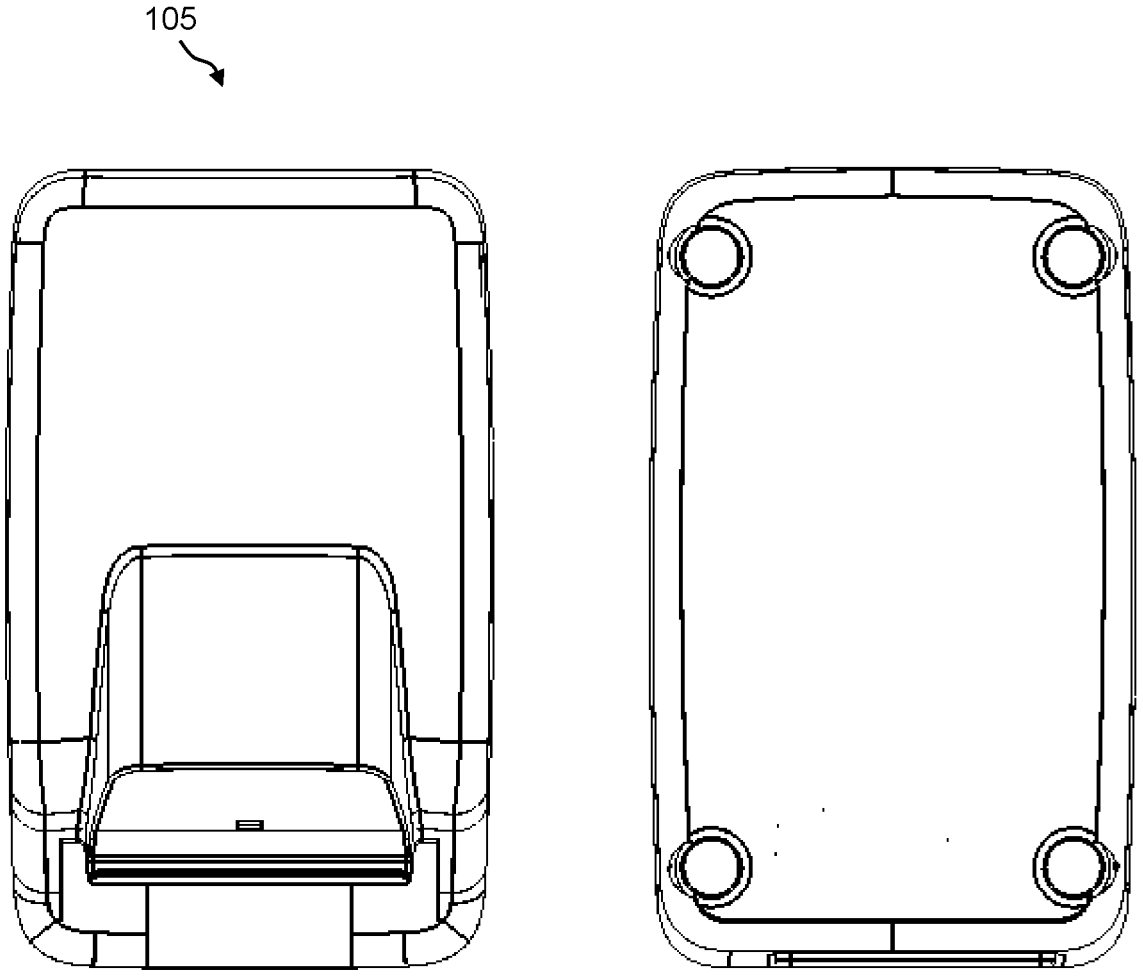


FIG. 3C

FIG. 3D

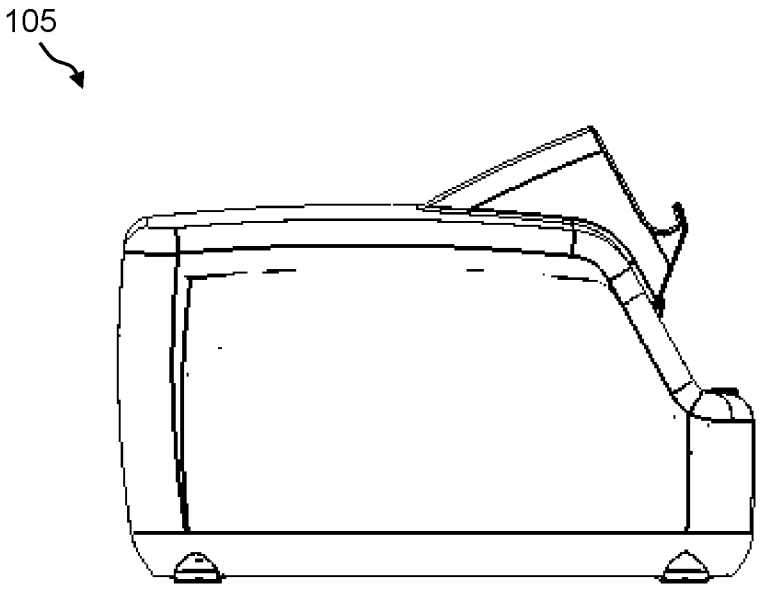


FIG. 3E

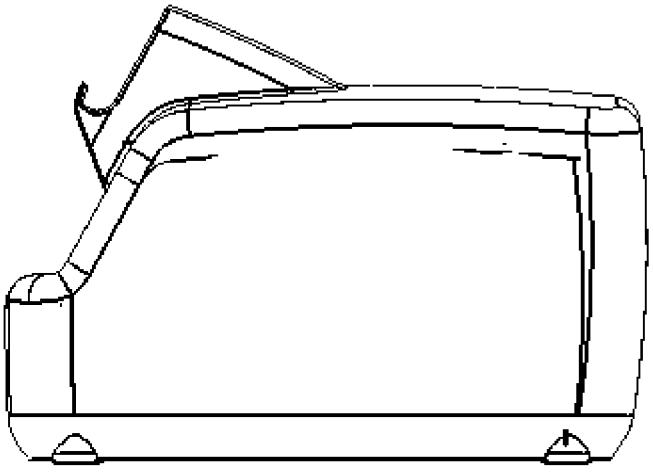


FIG. 3F

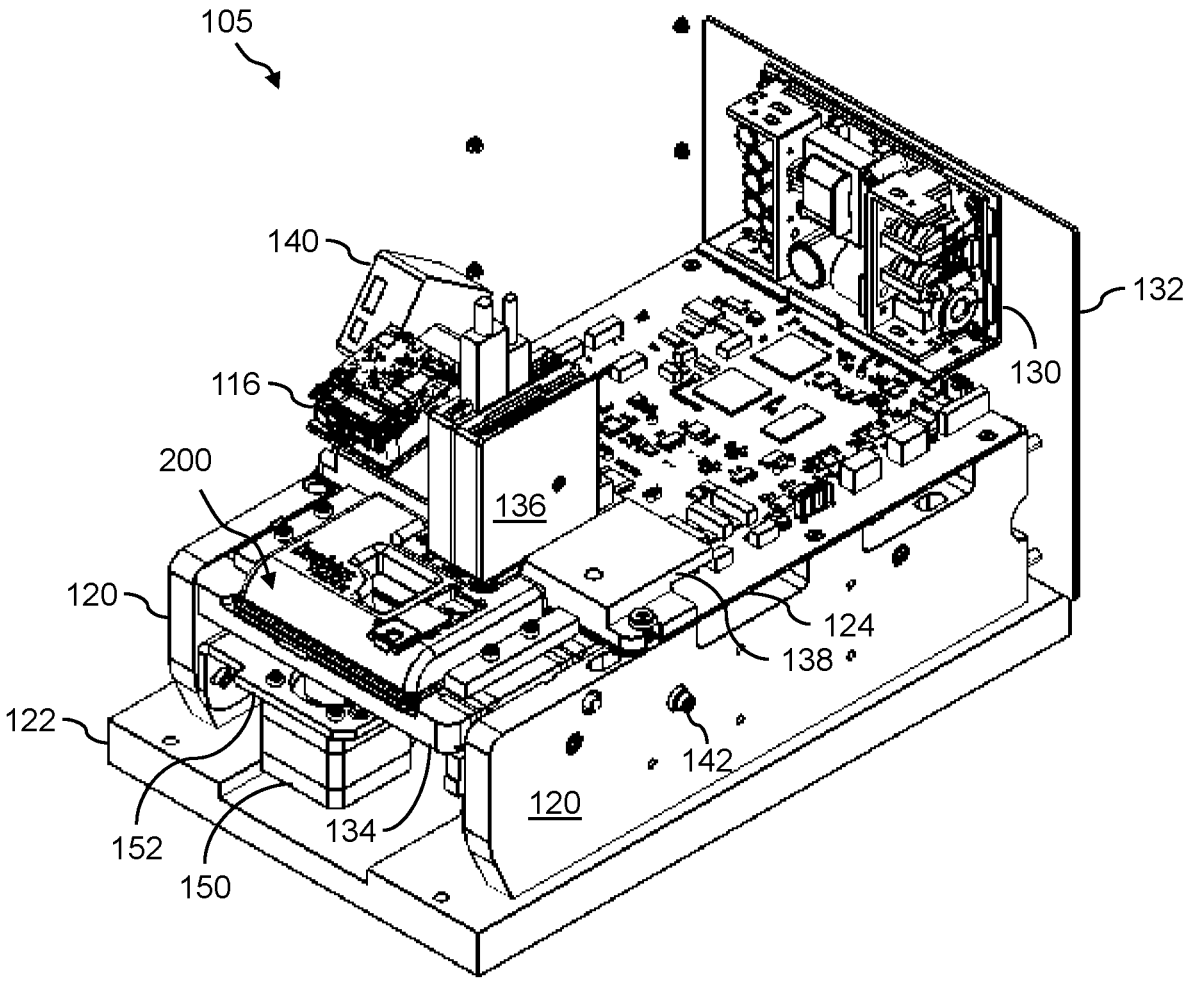


FIG. 4

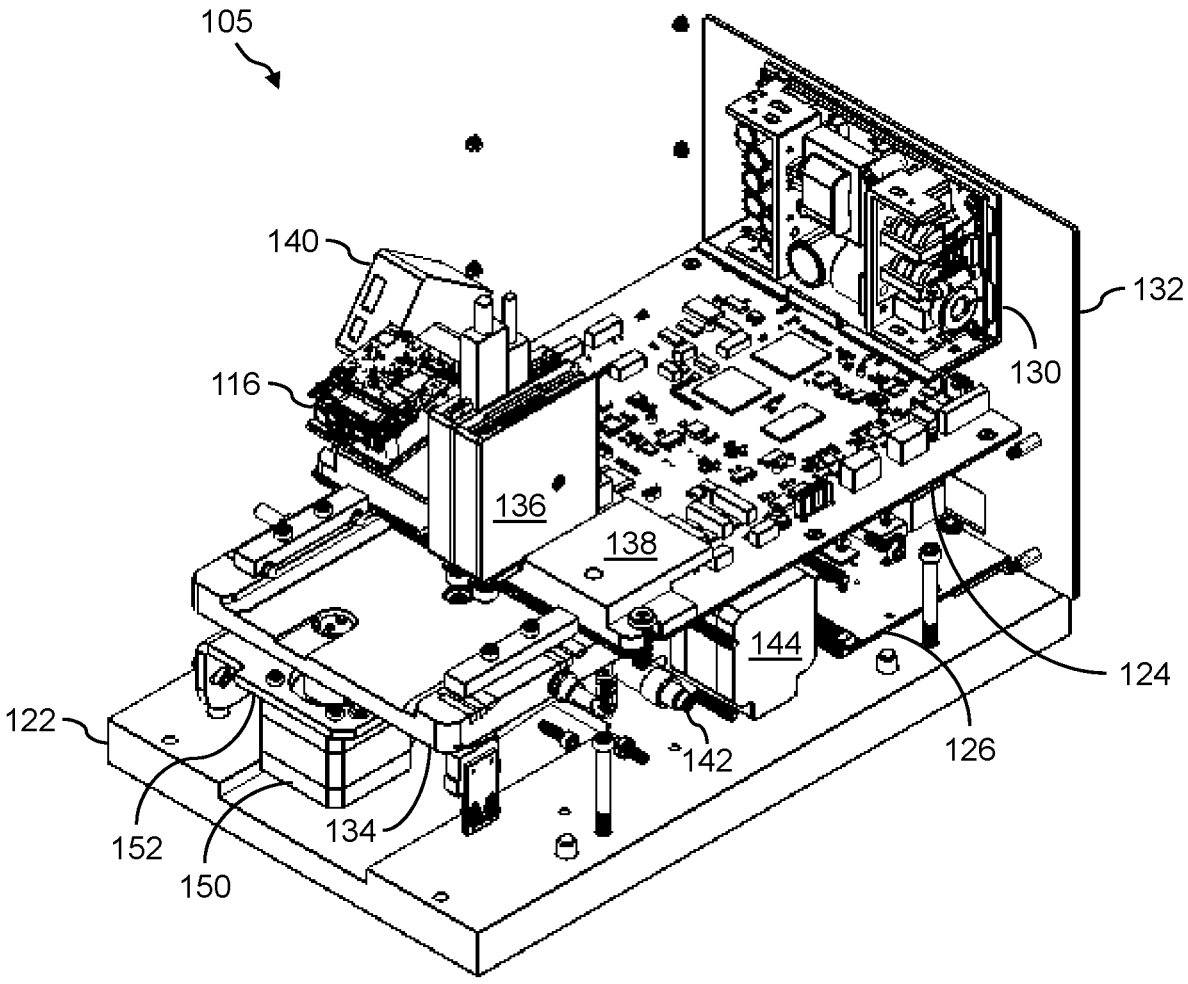


FIG. 5

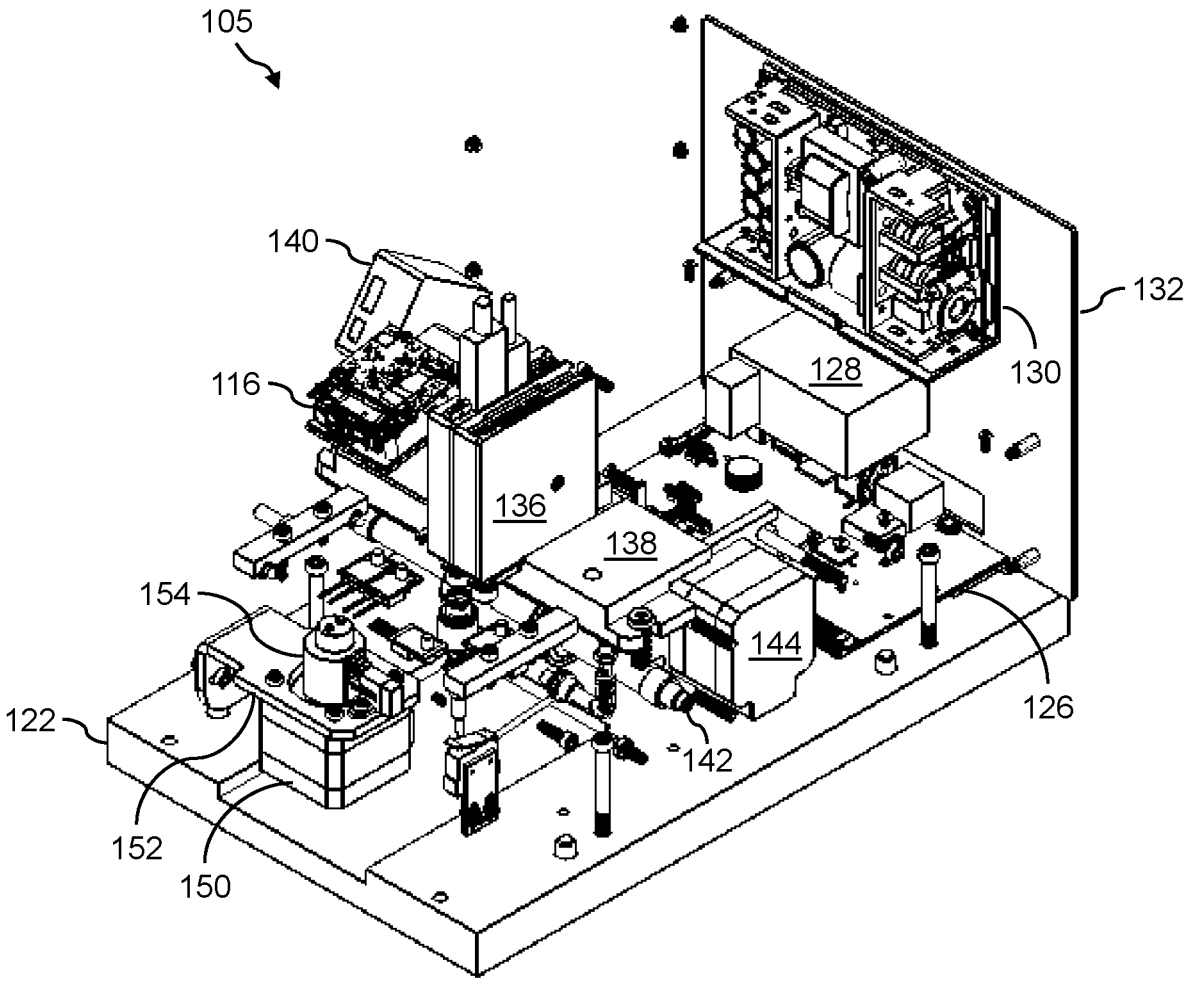


FIG. 6

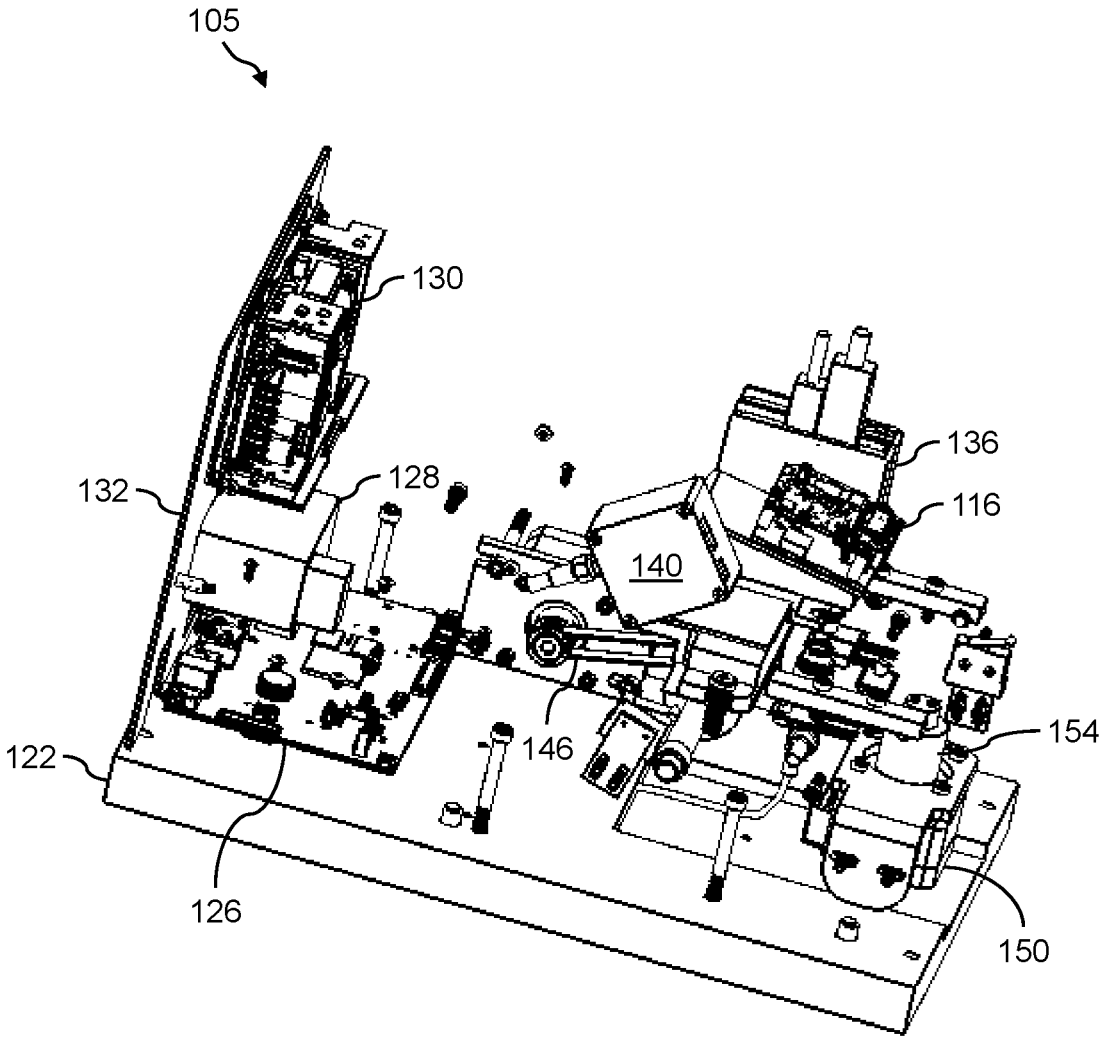


FIG. 7

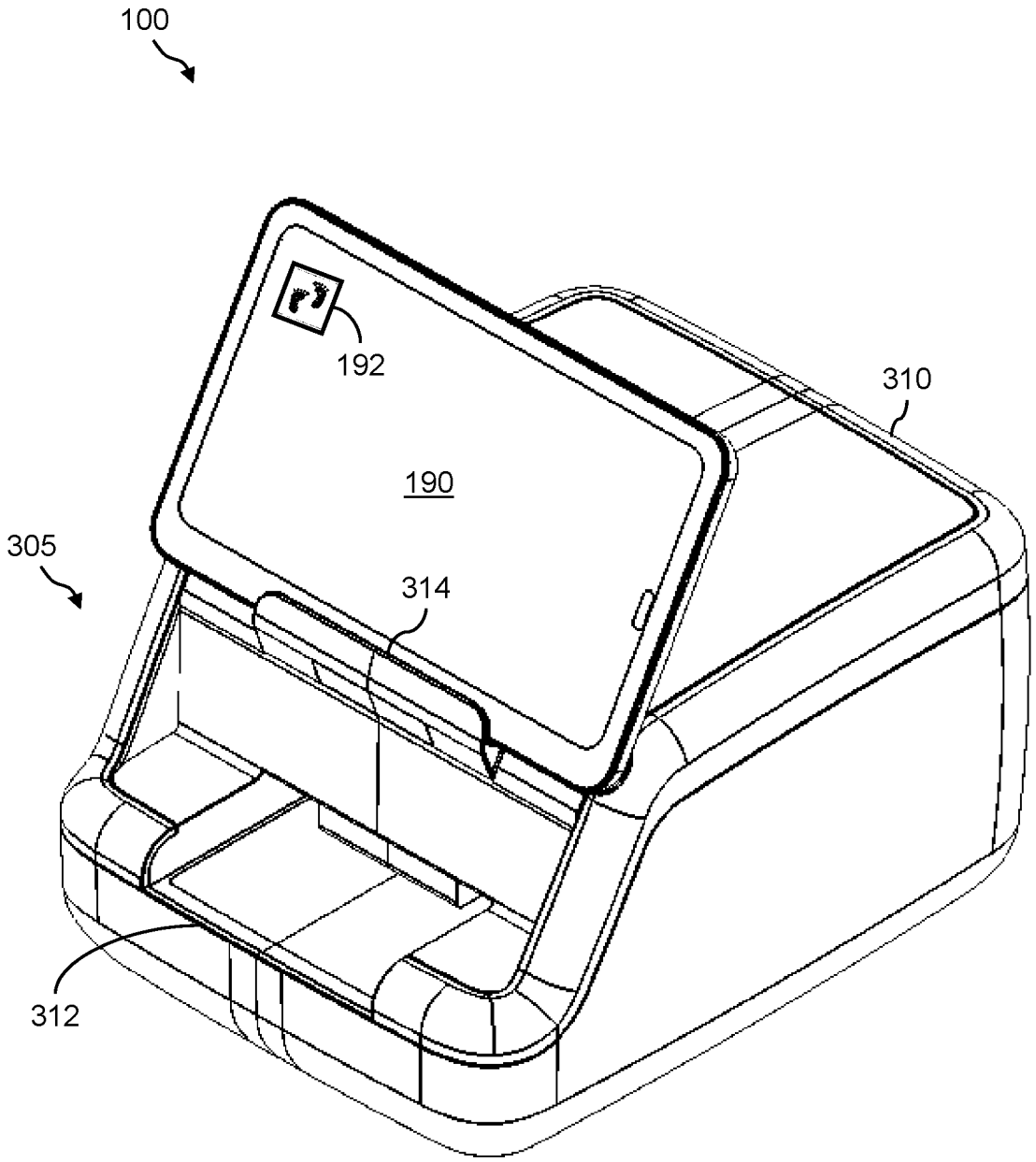


FIG. 8A

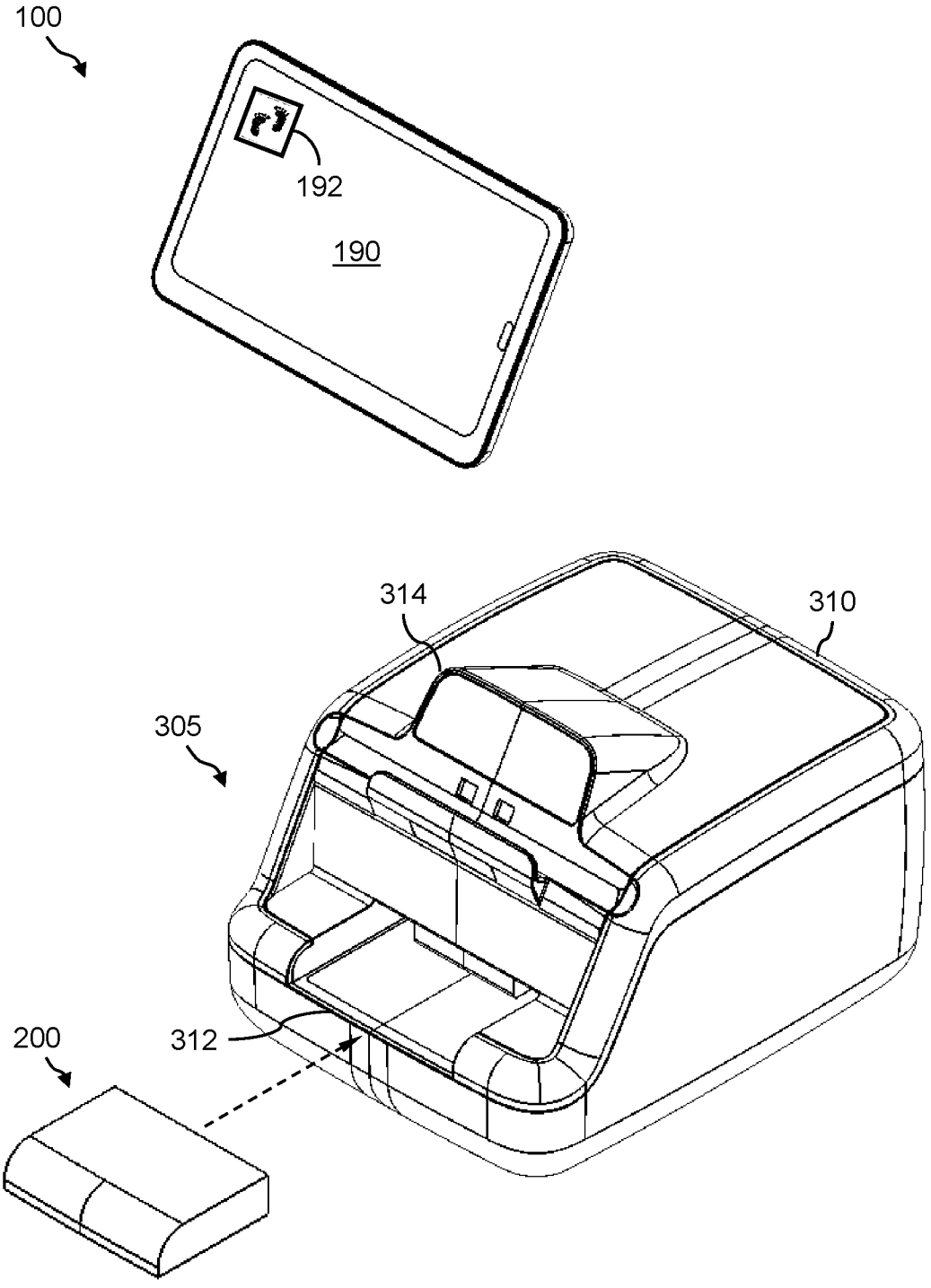


FIG. 8B

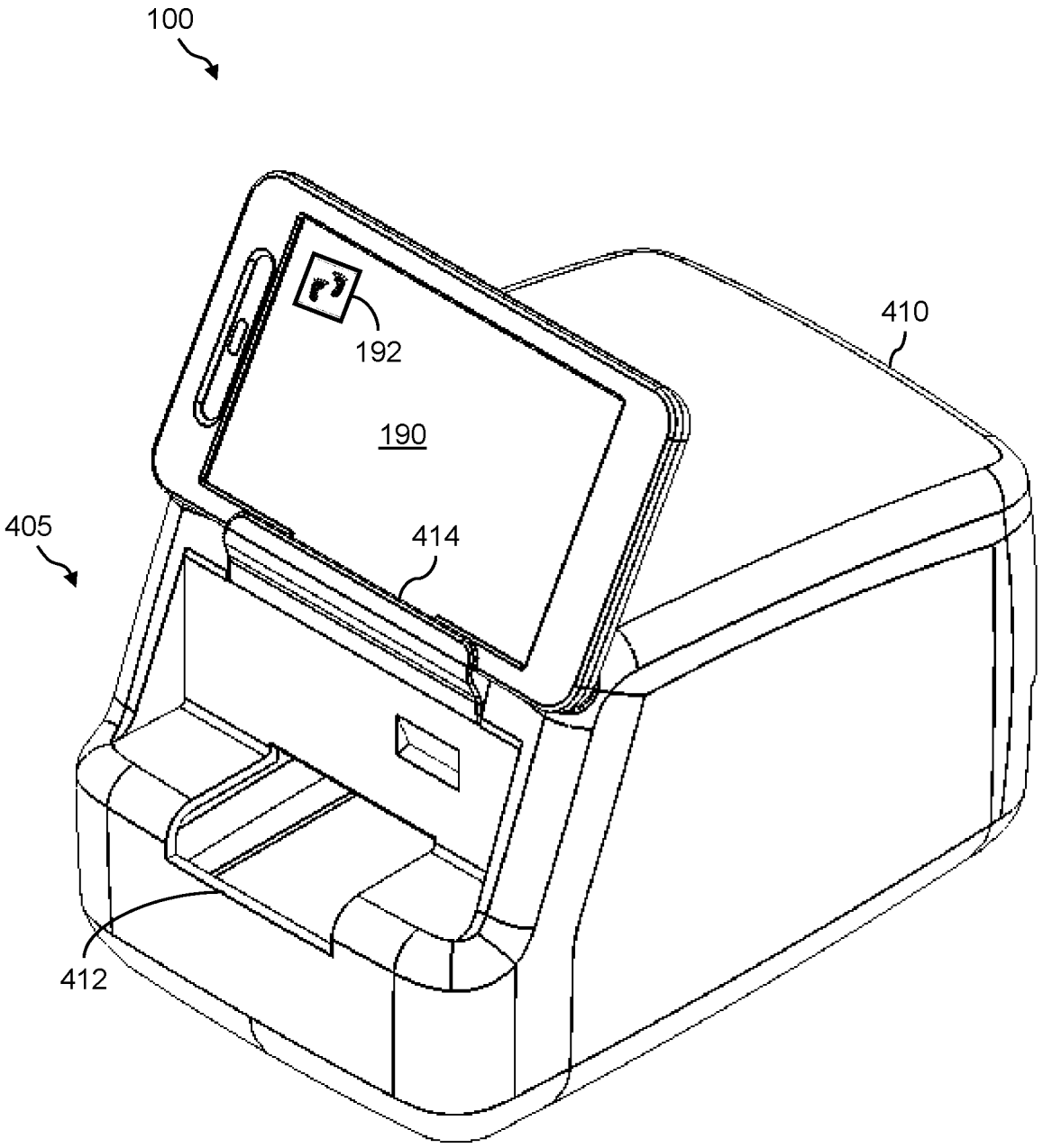


FIG. 9A

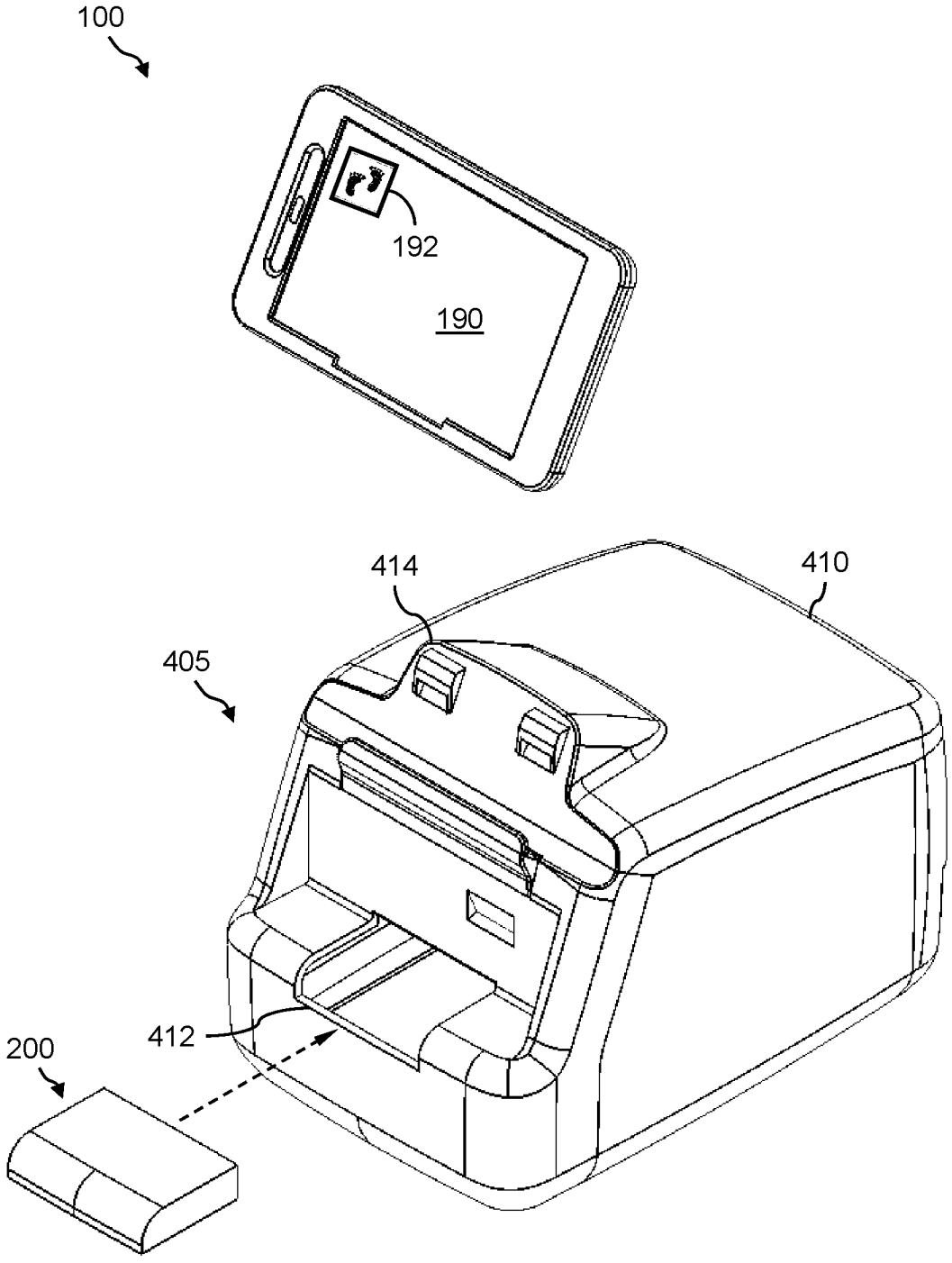


FIG. 9B

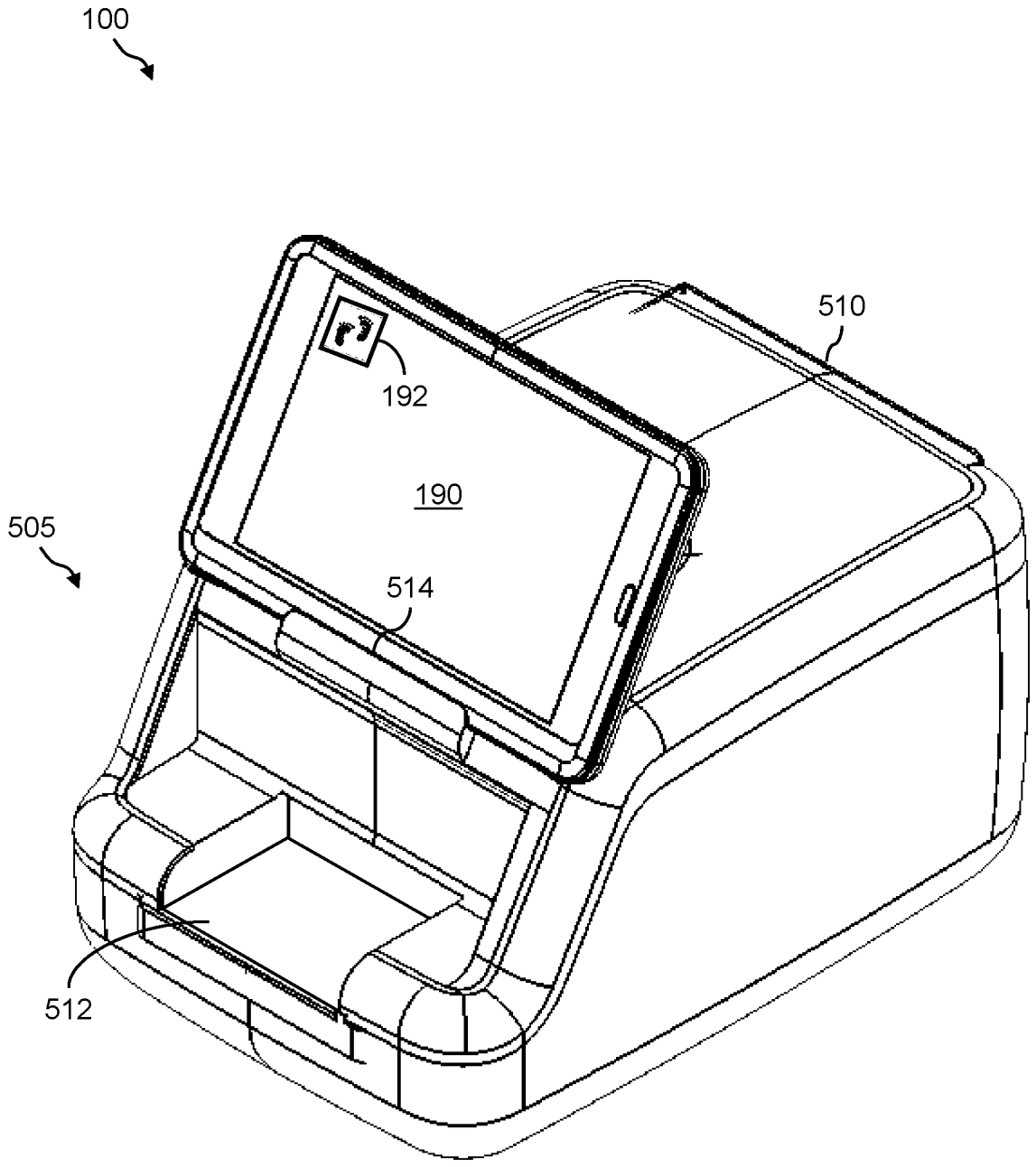


FIG. 10A

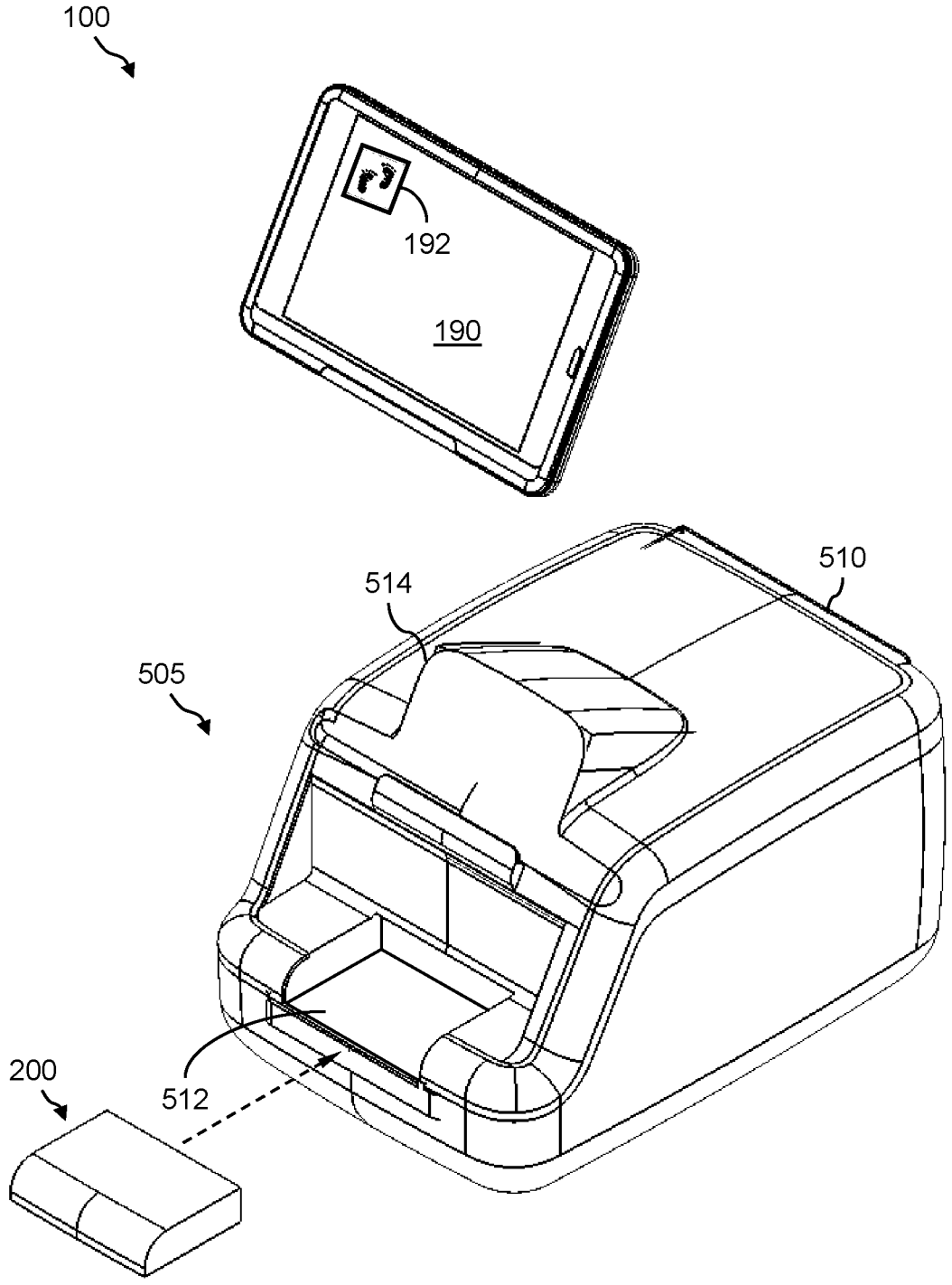


FIG. 10B

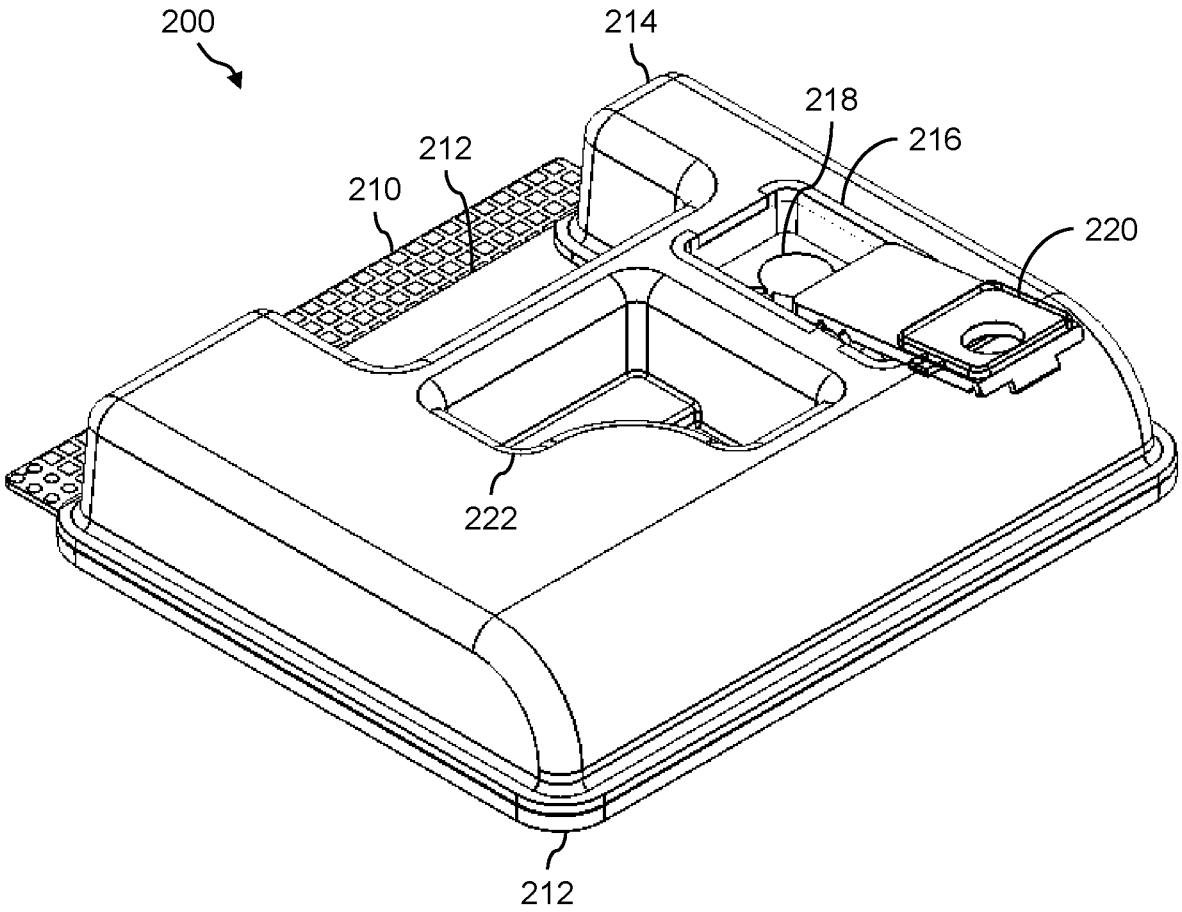


FIG. 11

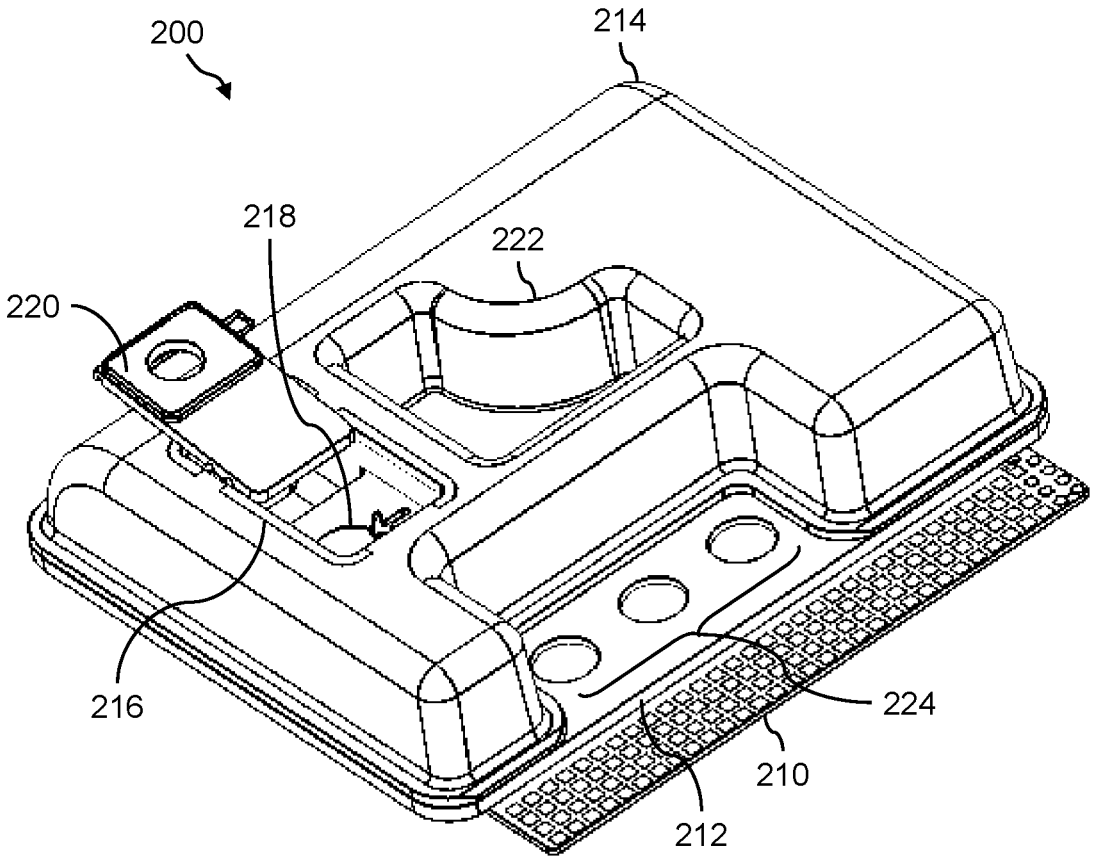


FIG. 12

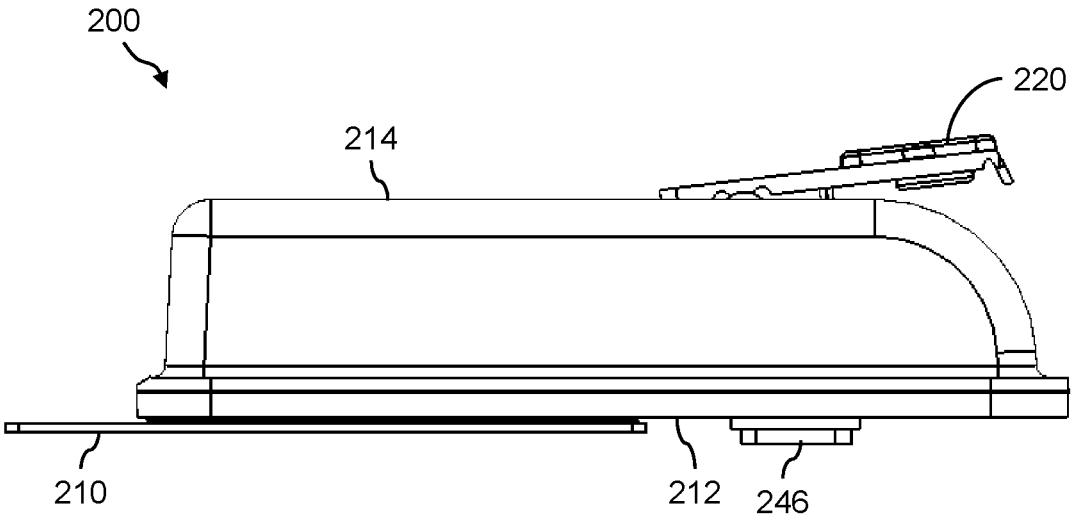


FIG. 13

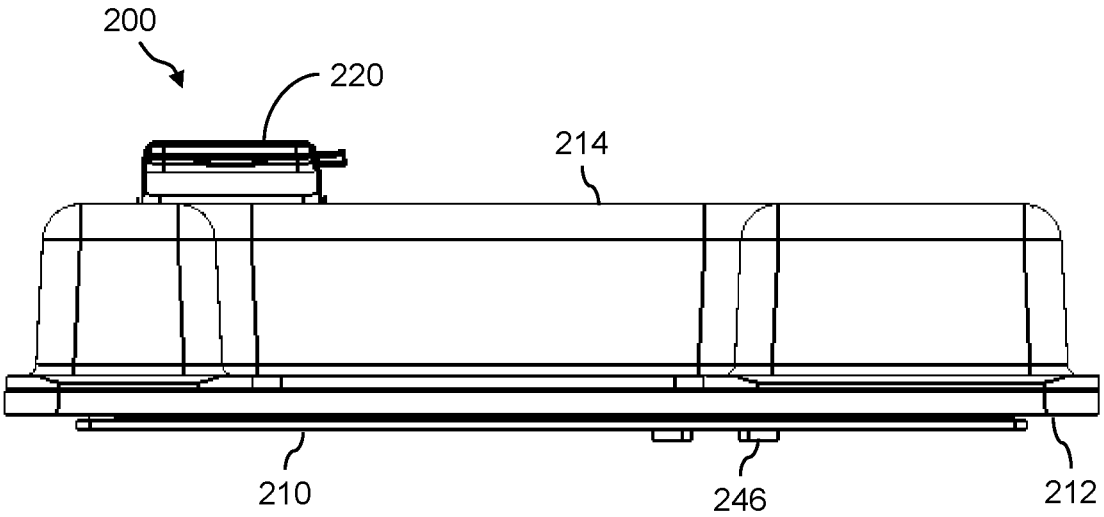


FIG. 14

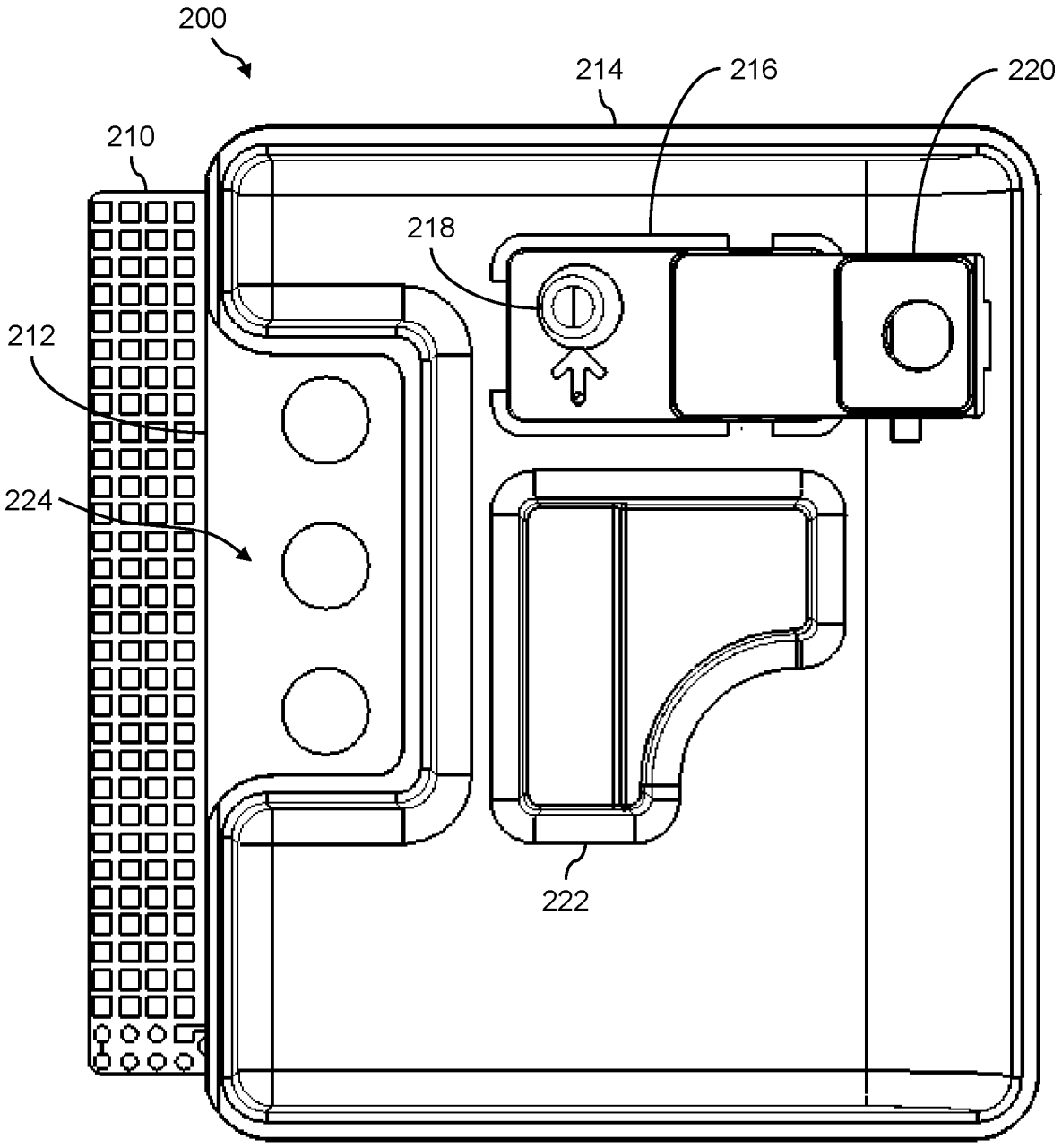


FIG. 15

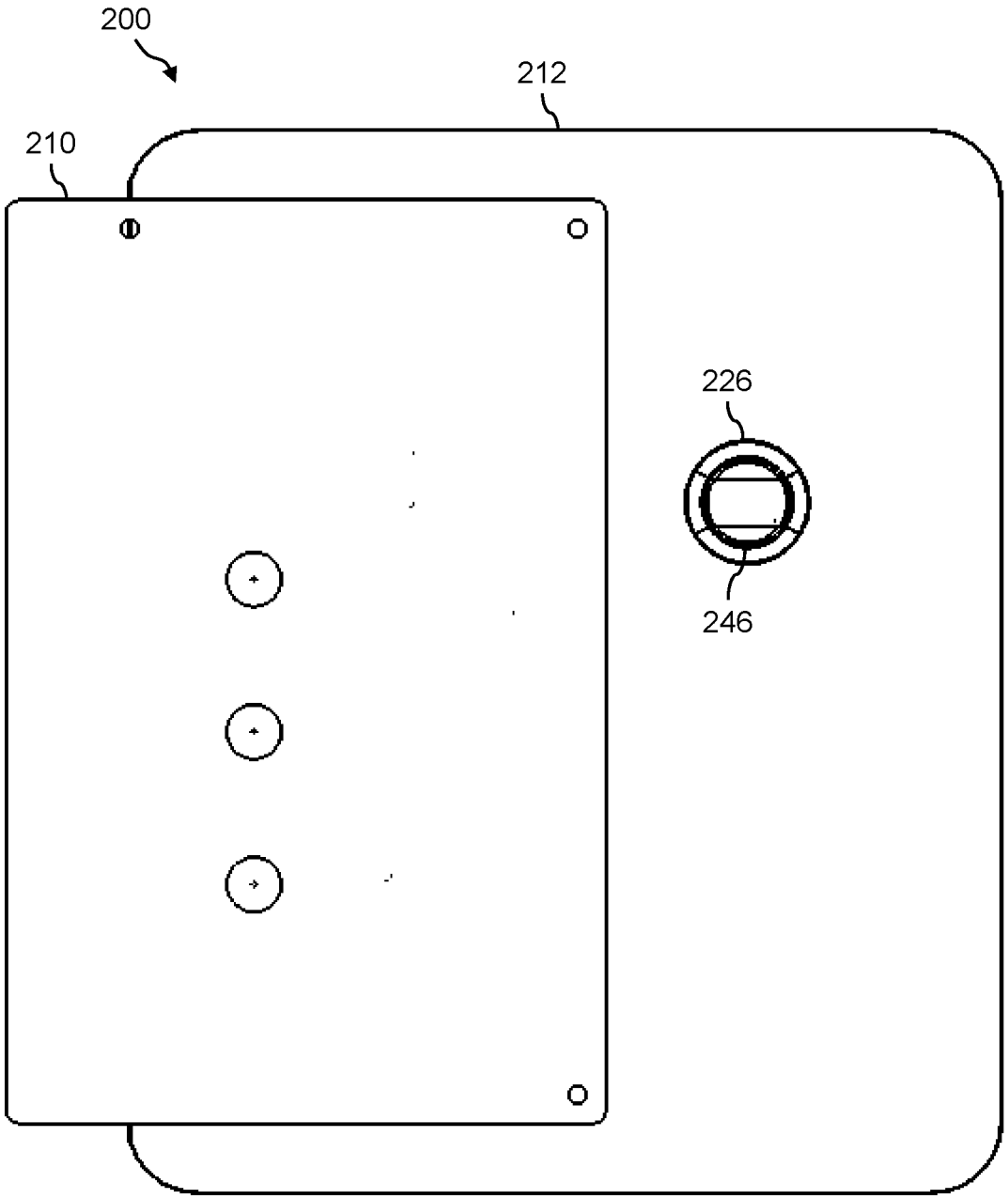


FIG. 16

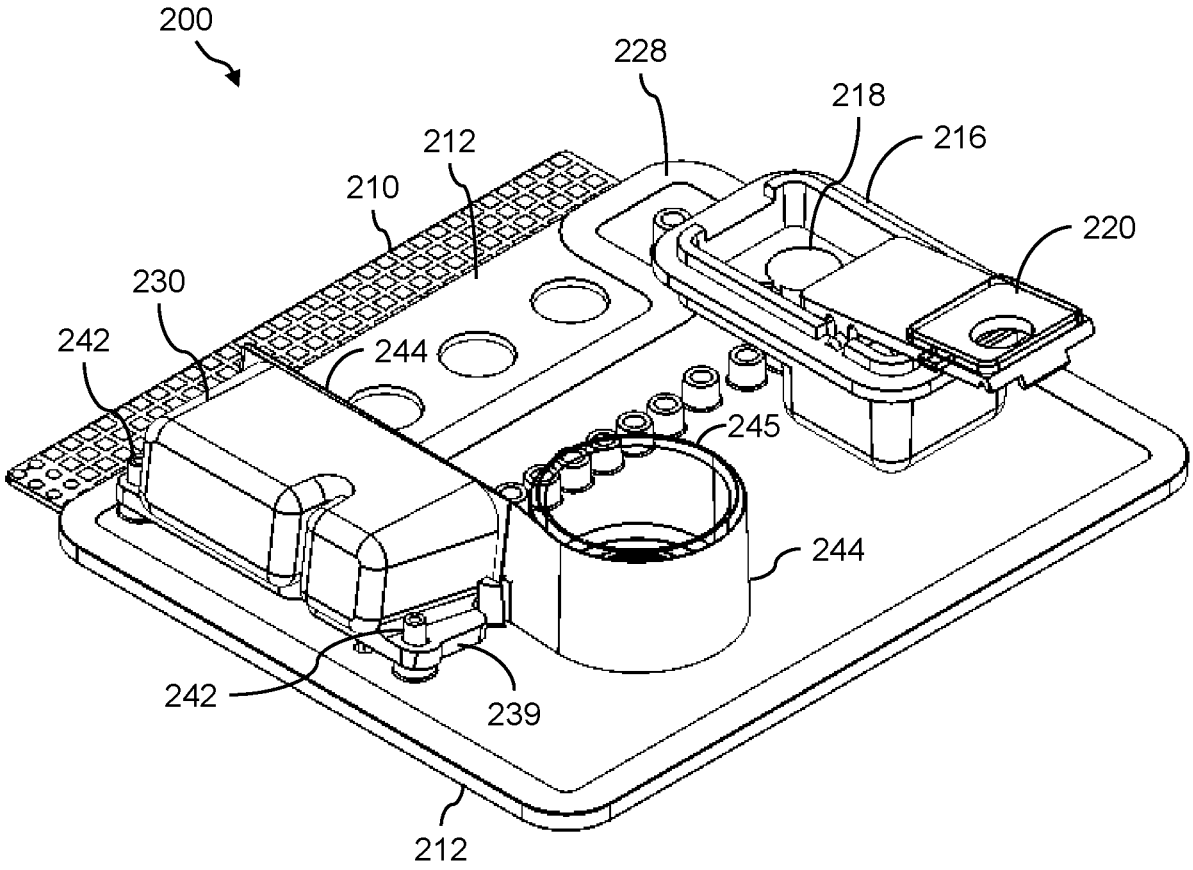


FIG. 17

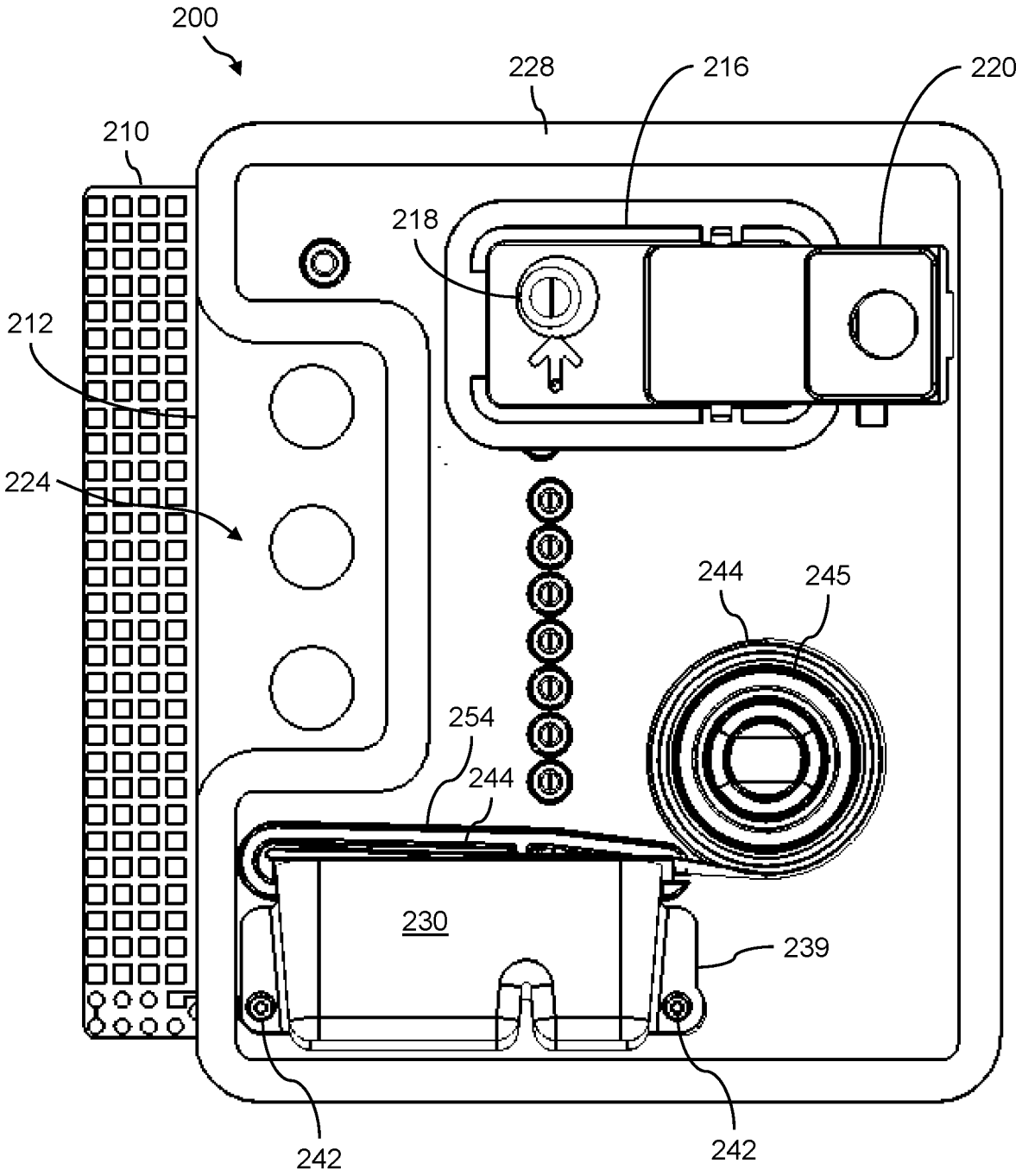
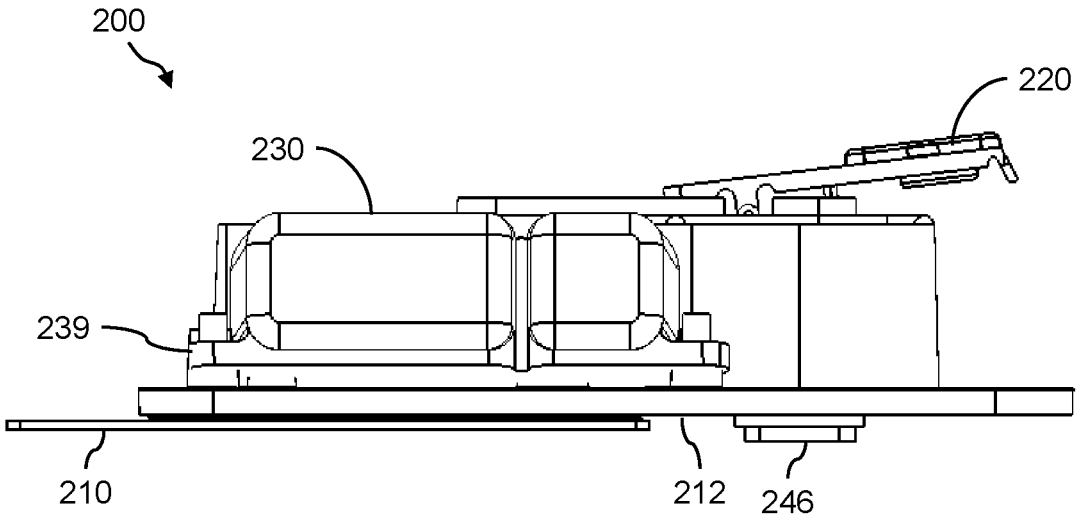


FIG. 18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212
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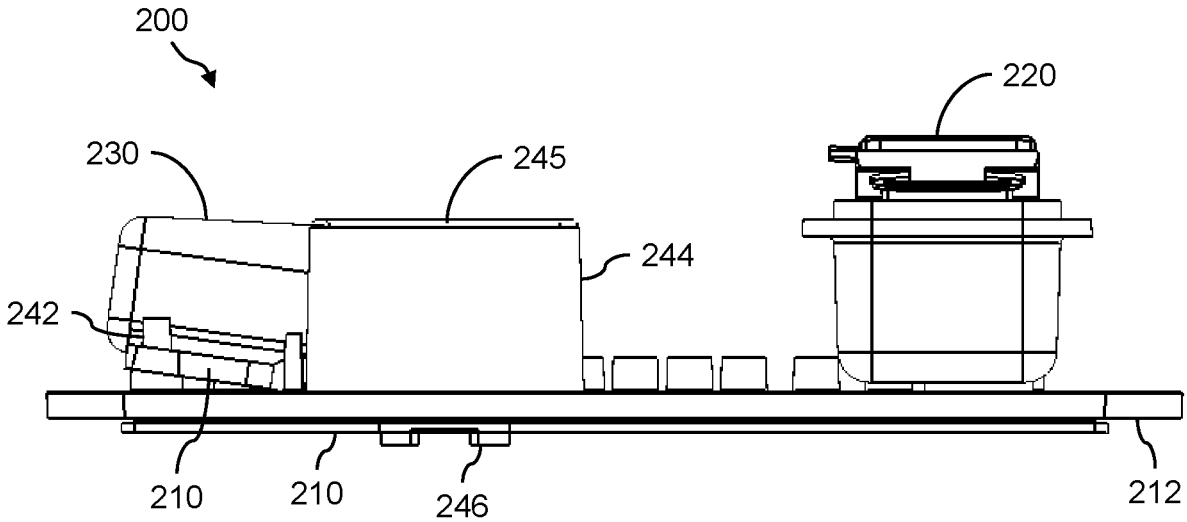
FIG. 19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212

FIG. 20

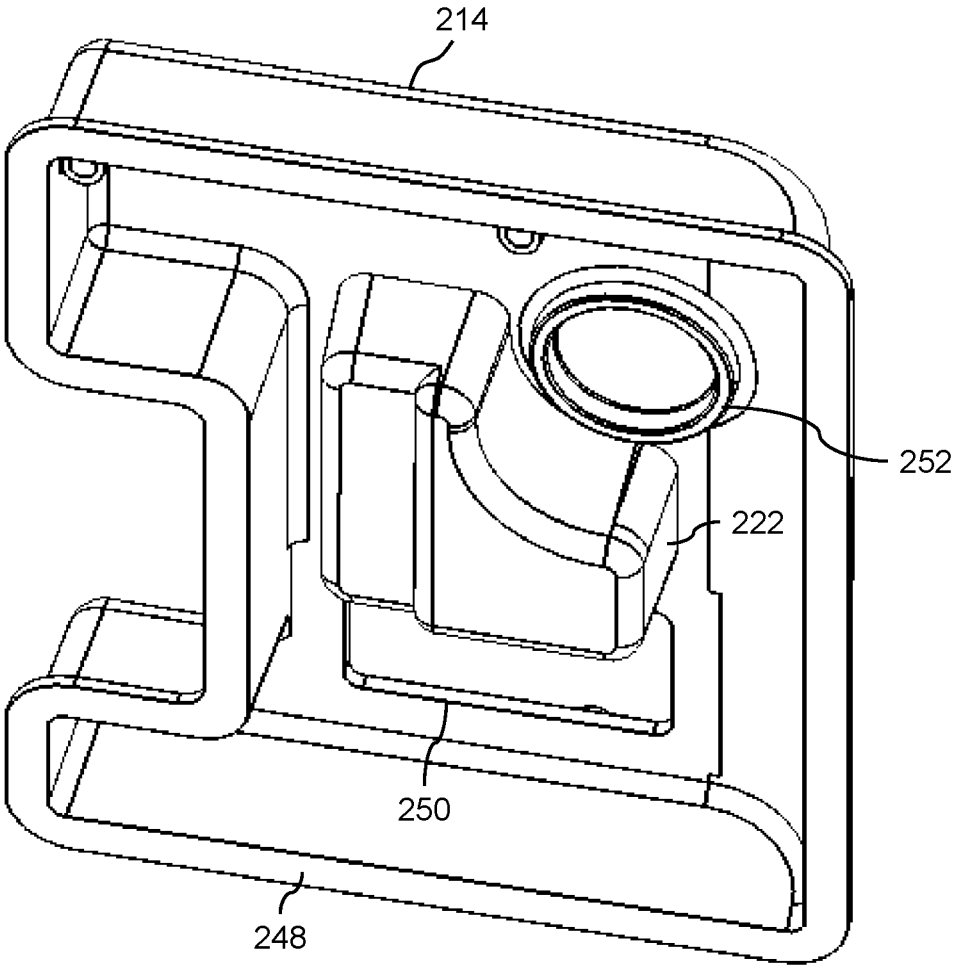

FIG. 21

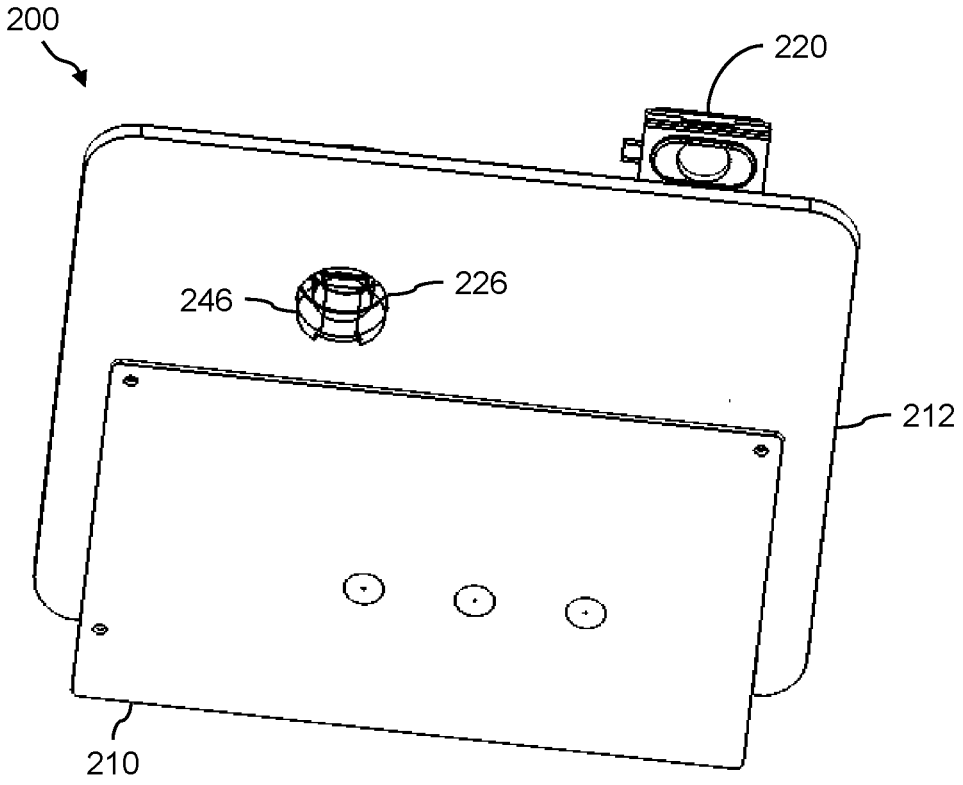

FIG. 22A

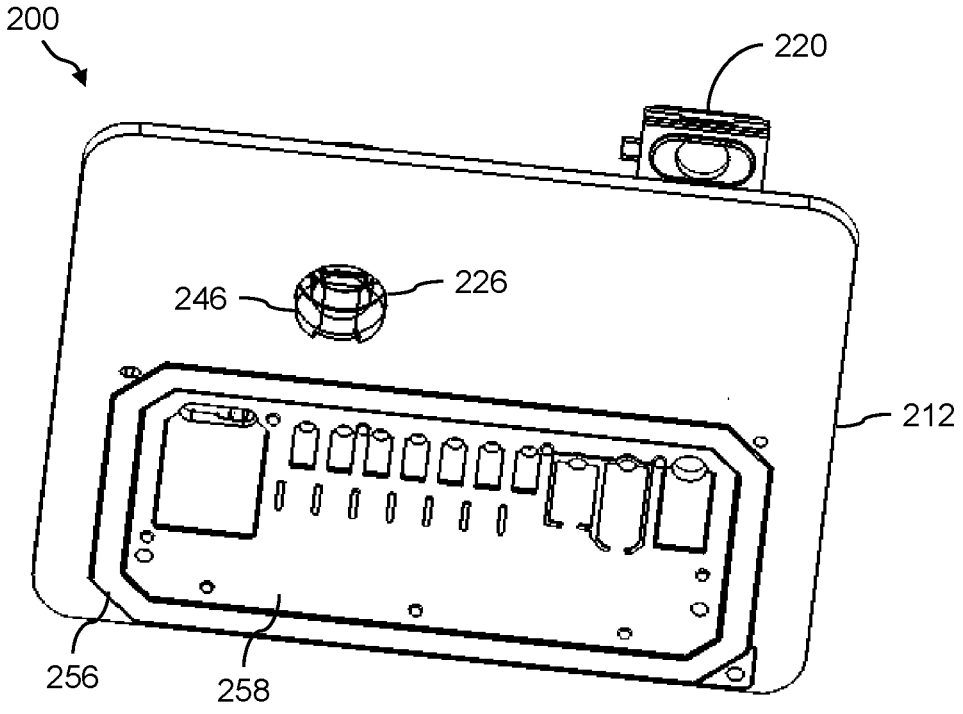

FIG. 22B

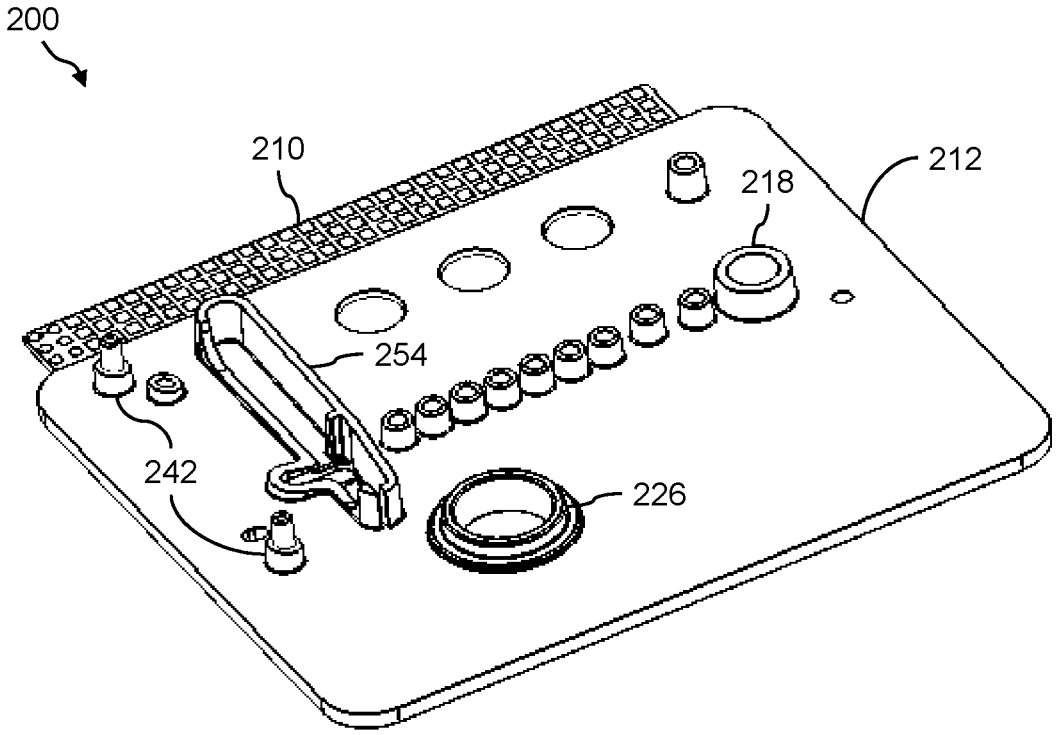

FIG. 23A

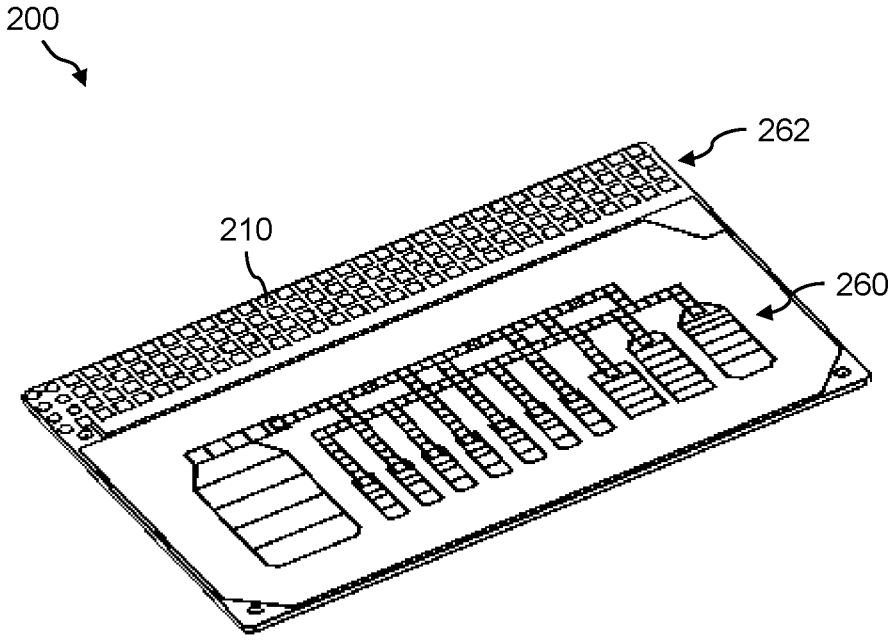

FIG. 23B

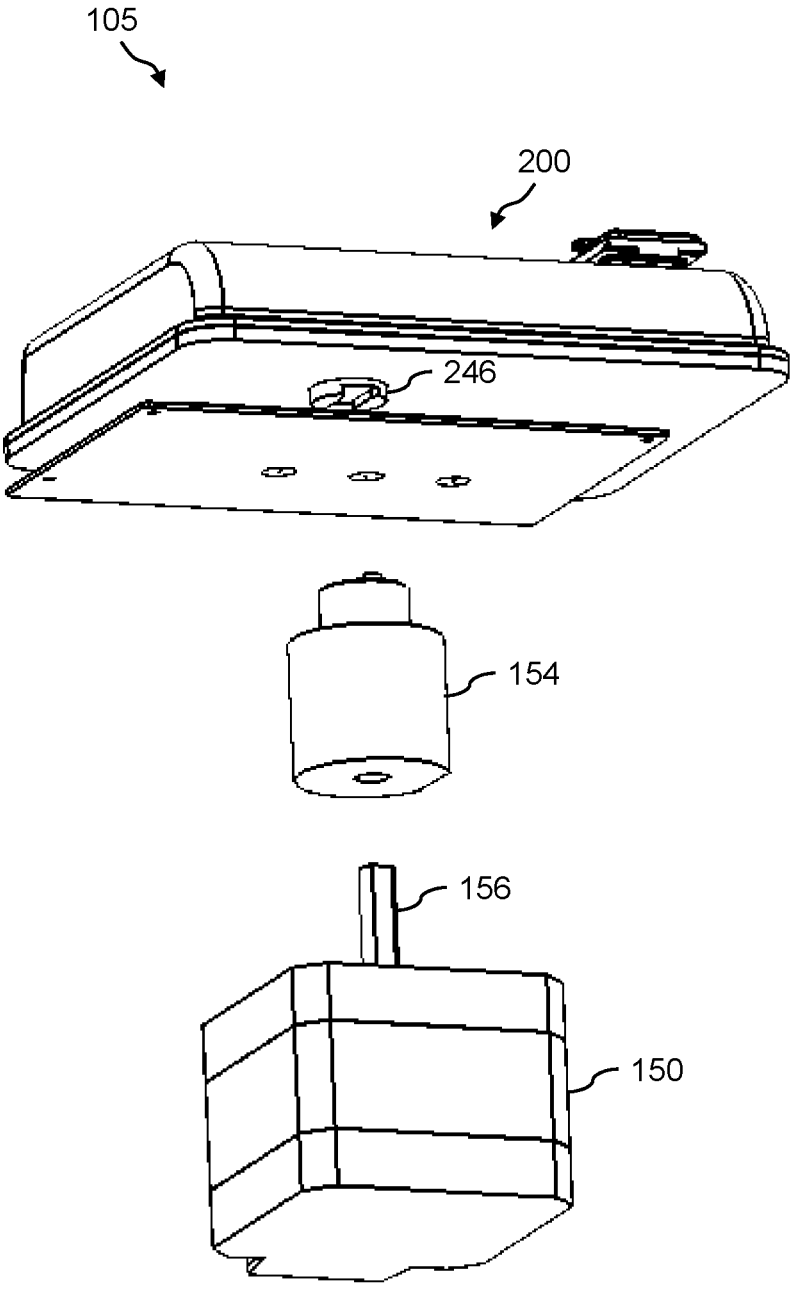

FIG. 24A

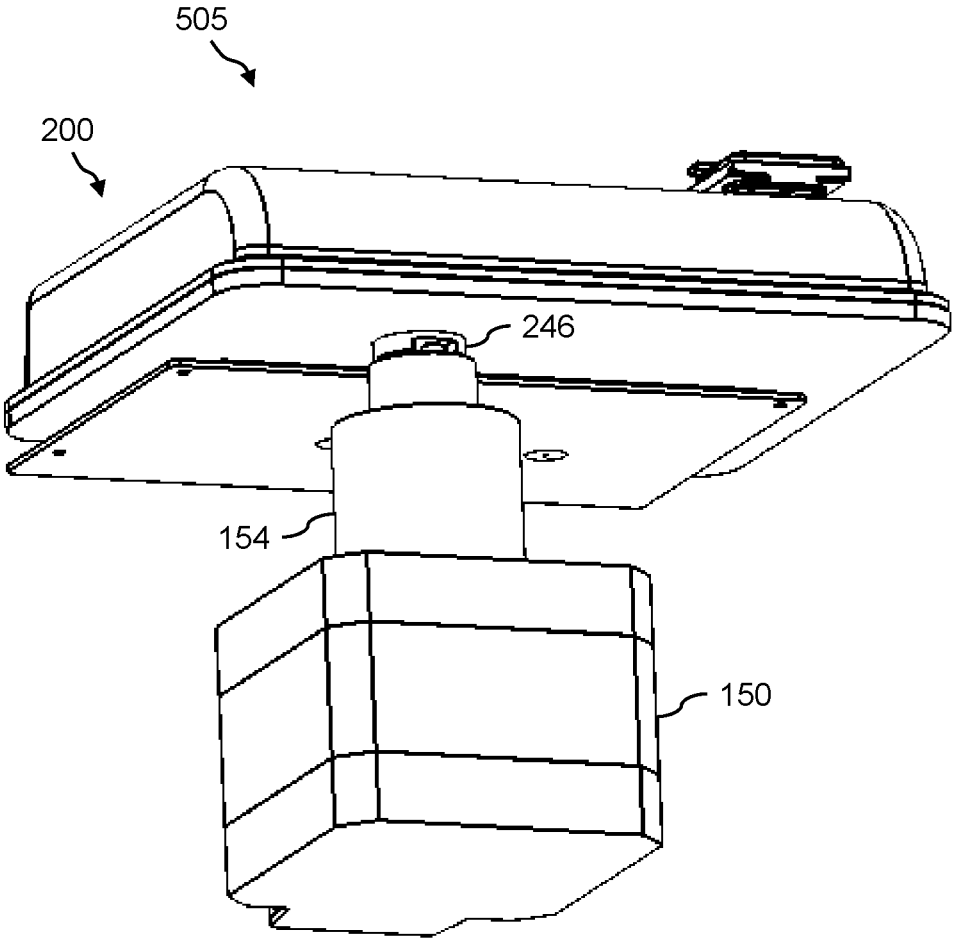

FIG. 24B

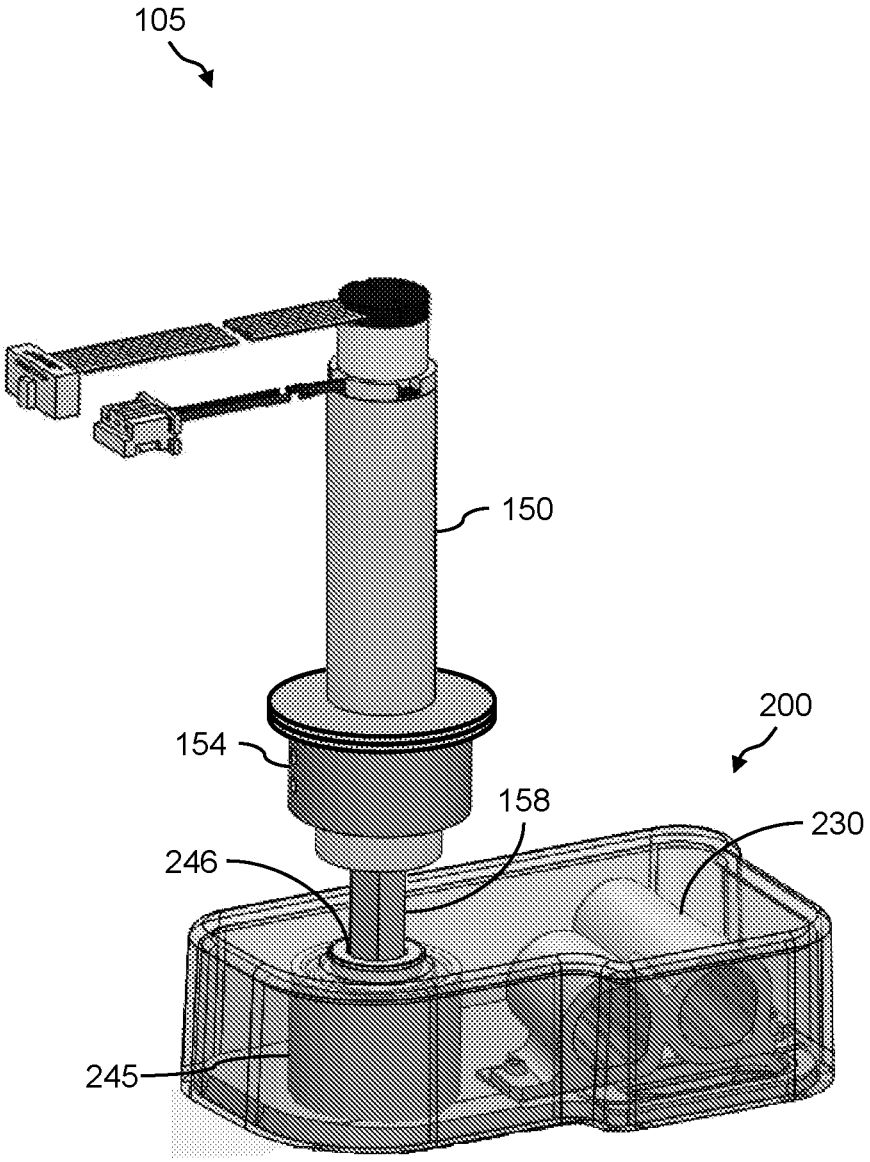

FIG. 25

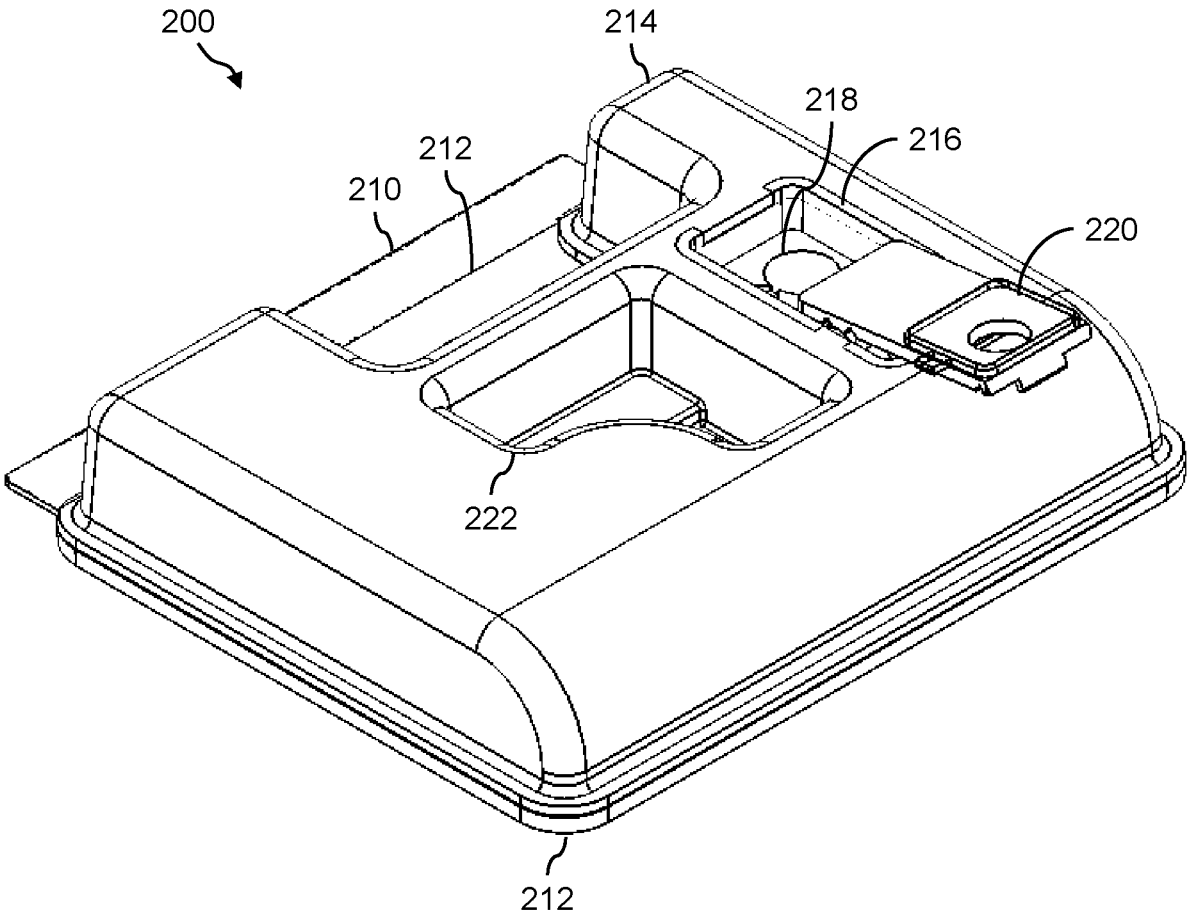

FIG. 26

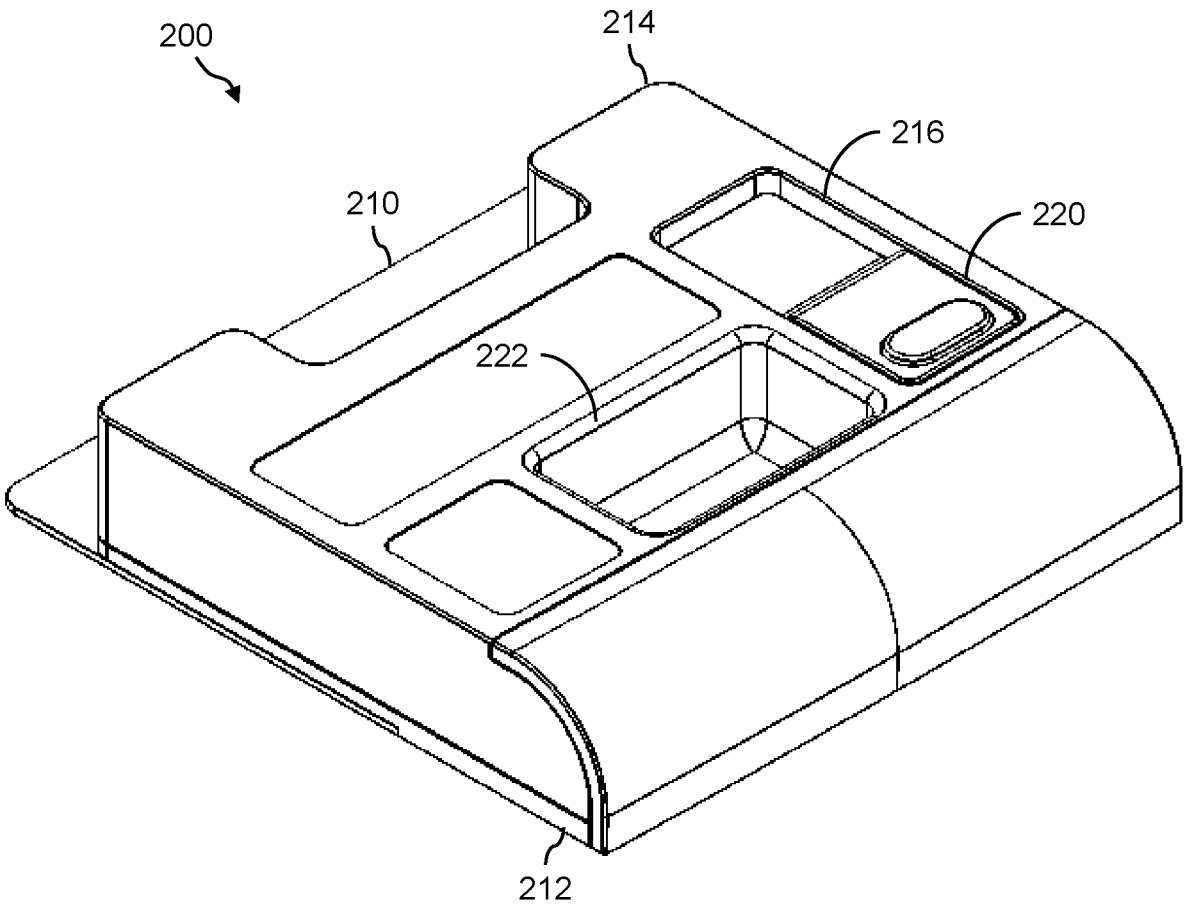

FIG. 27

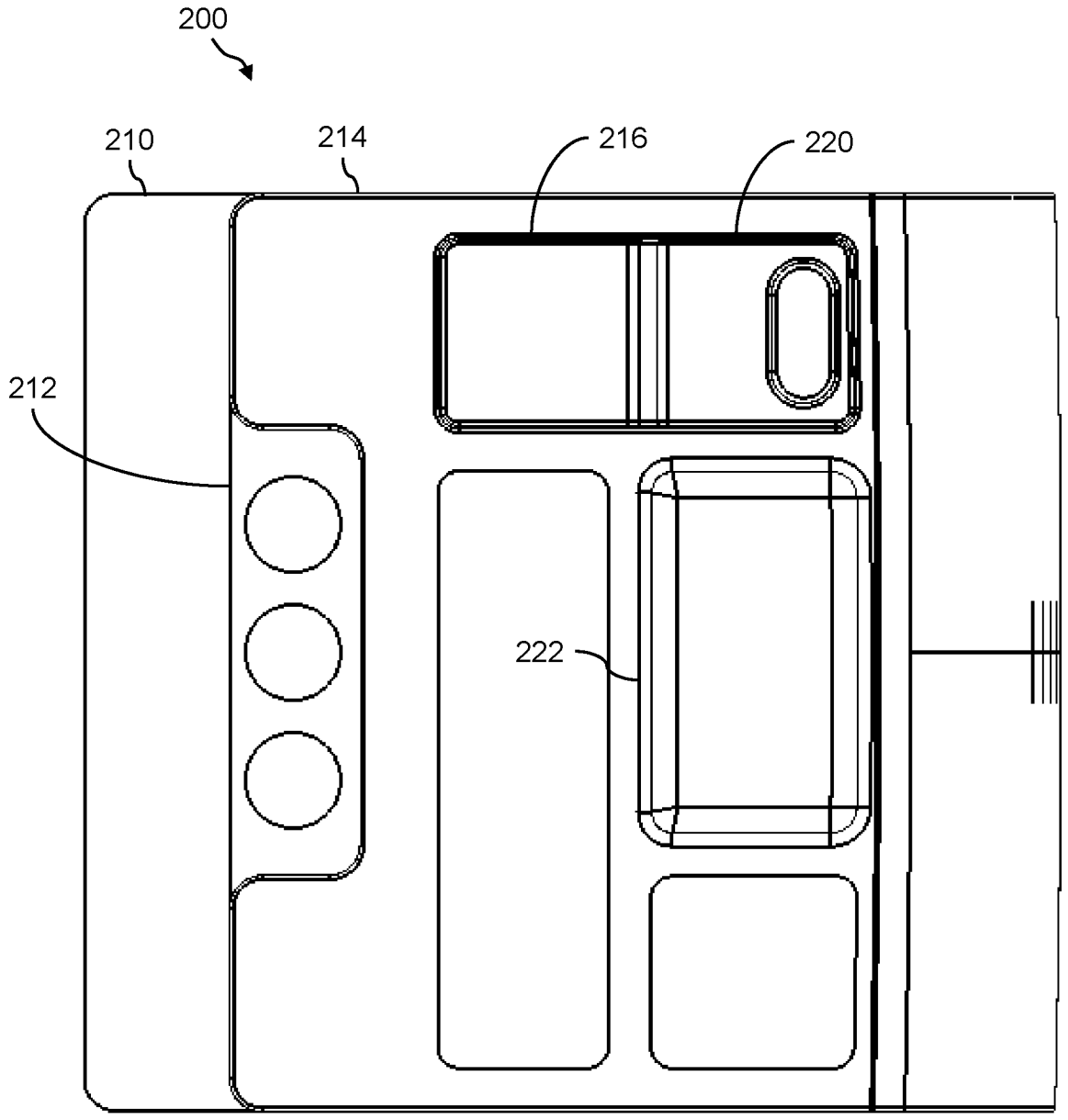

FIG. 28

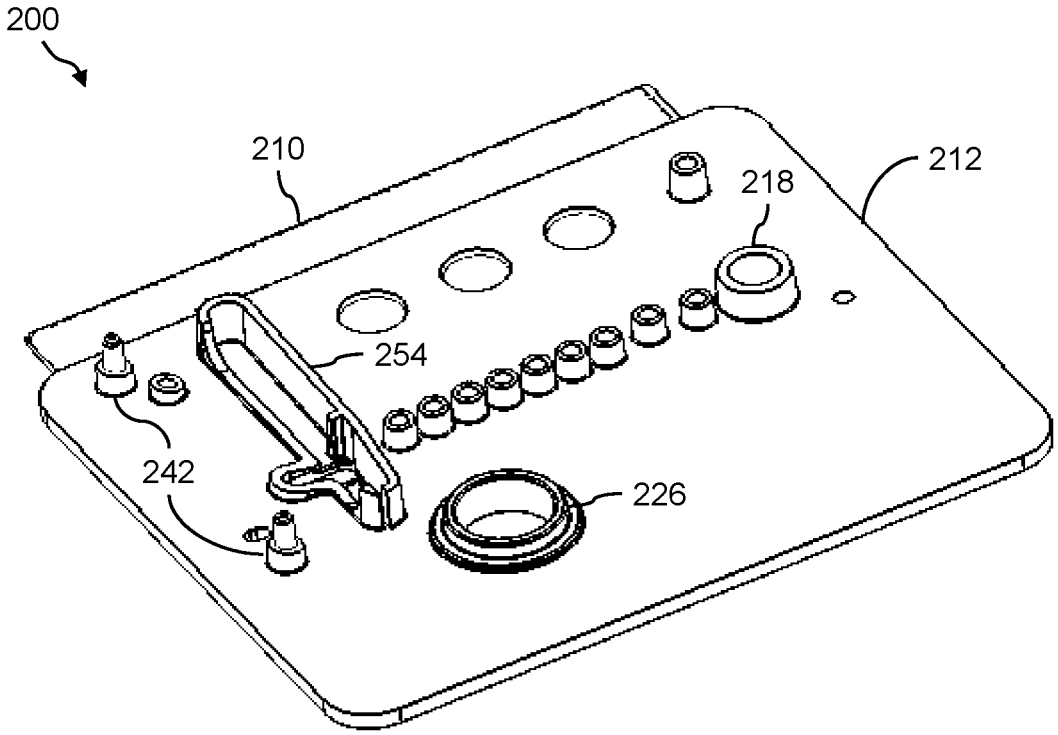

FIG. 29A

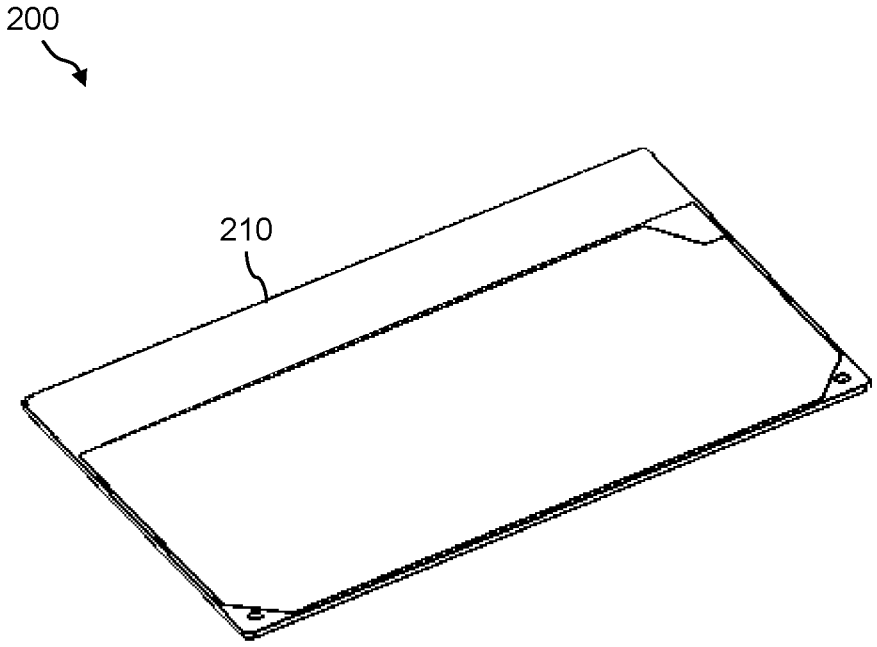

FIG. 29B

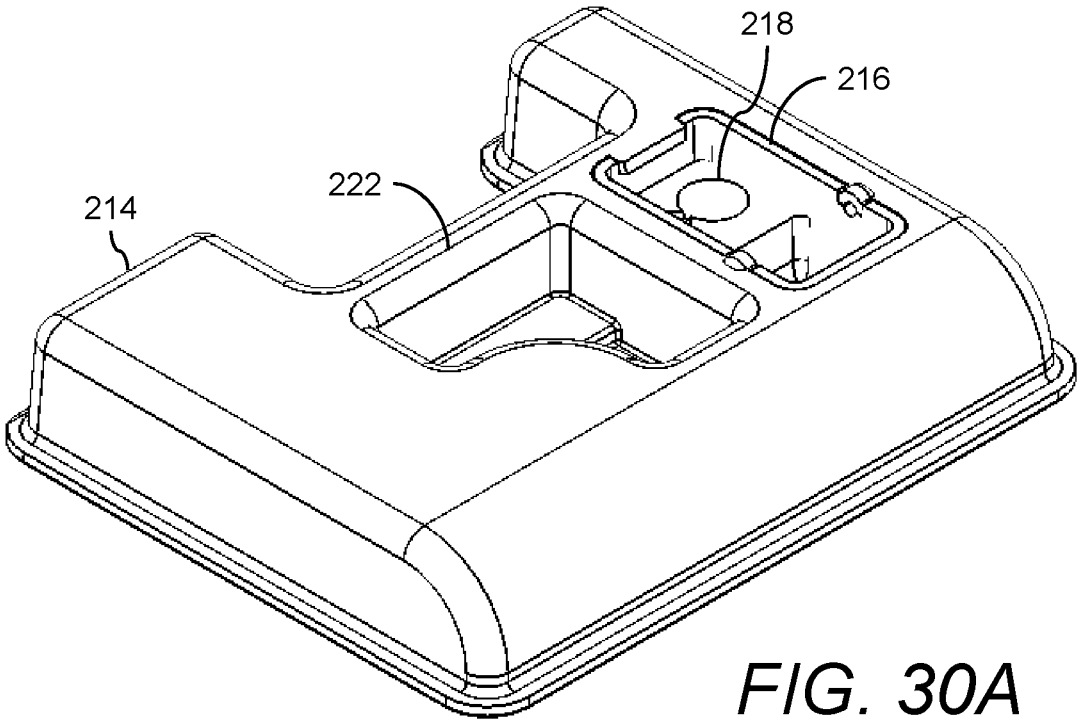

FIG. 30A

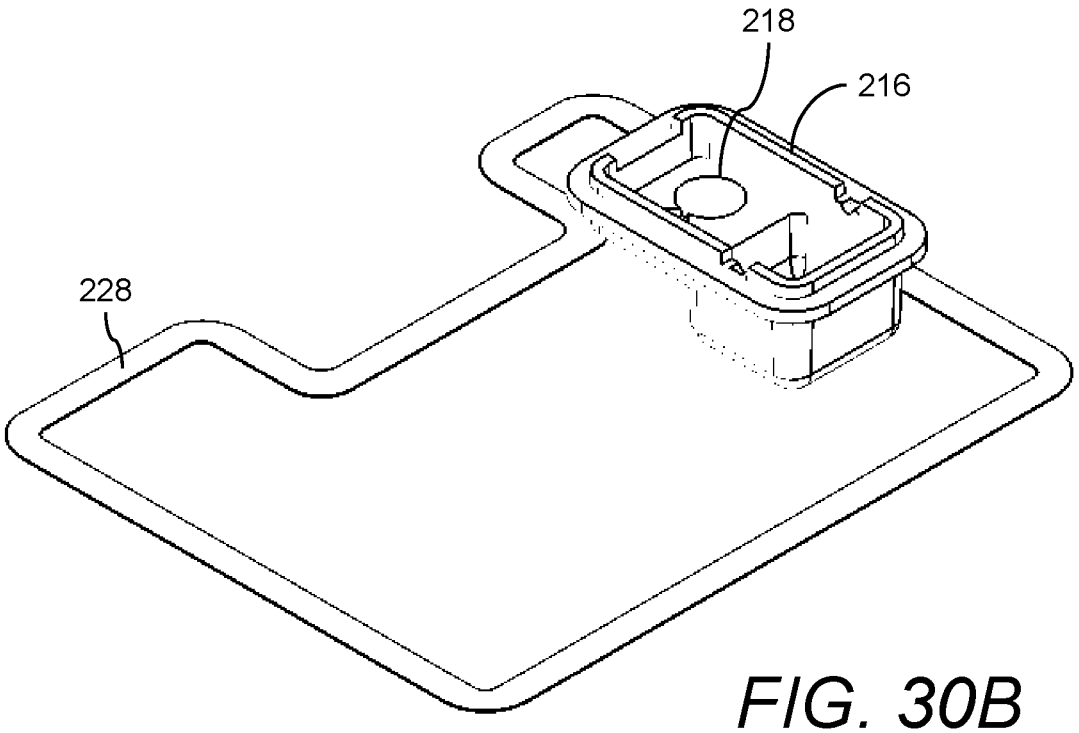

FIG. 30B

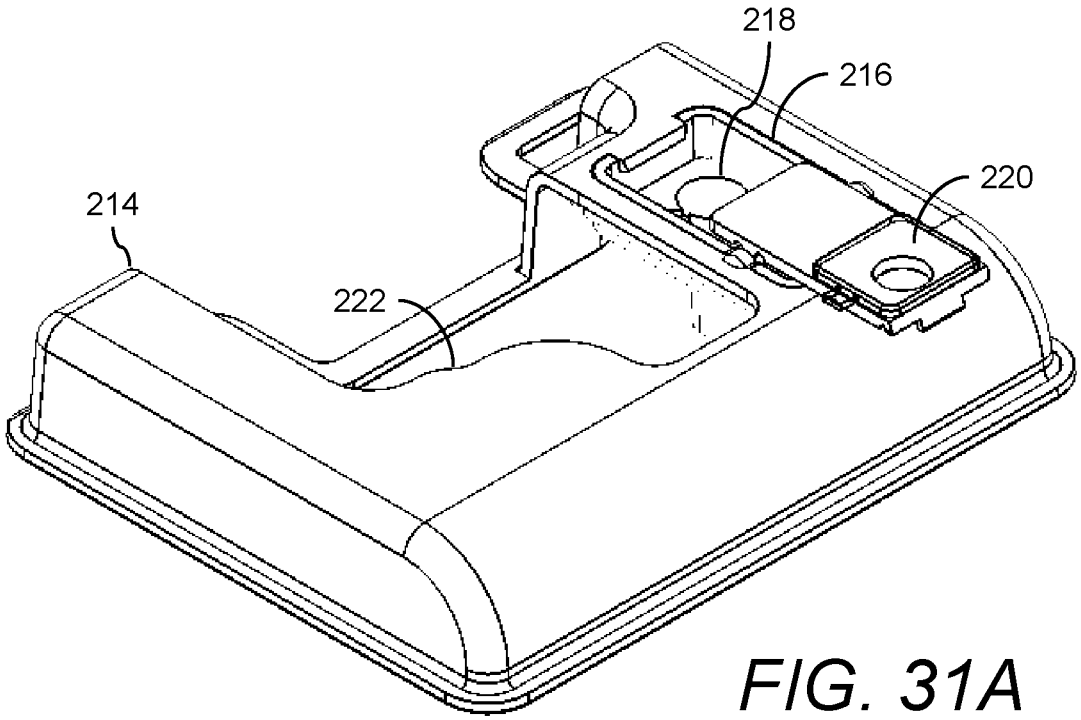

FIG. 31A

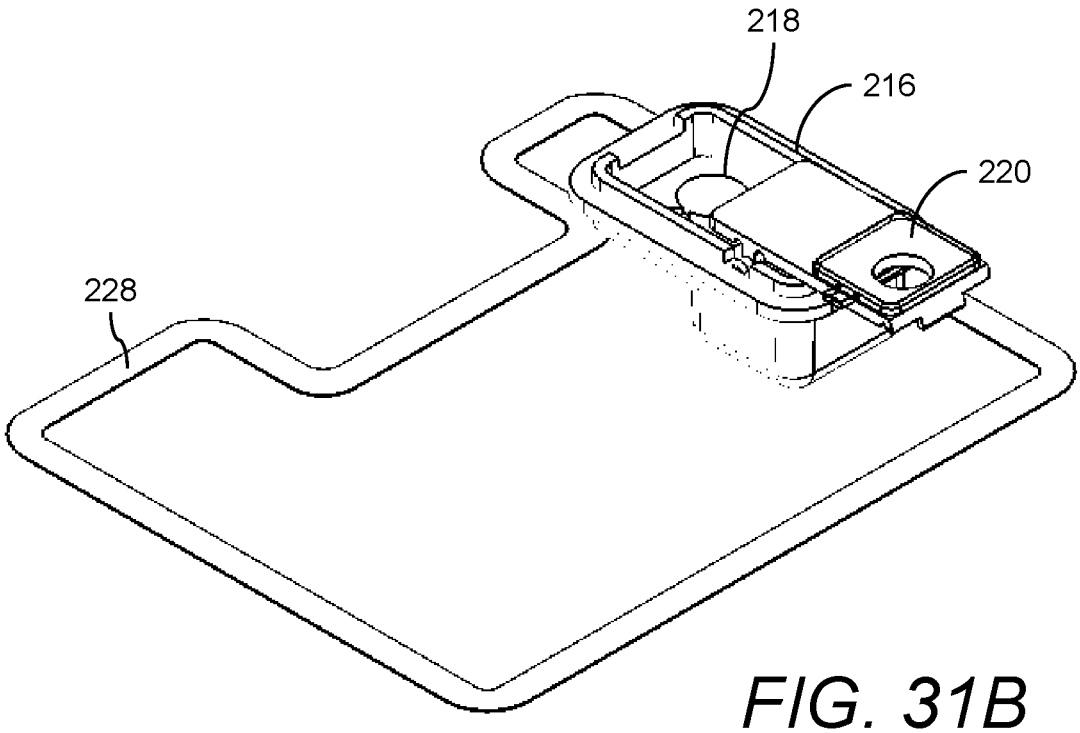

FIG. 31B

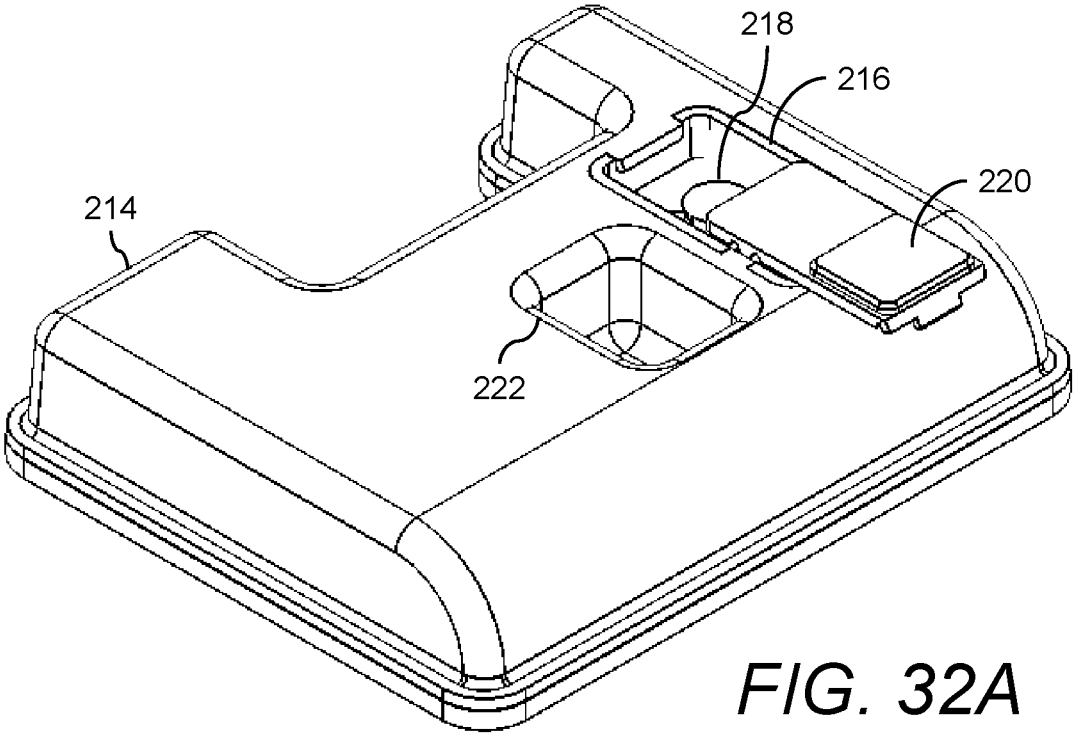

FIG. 32A

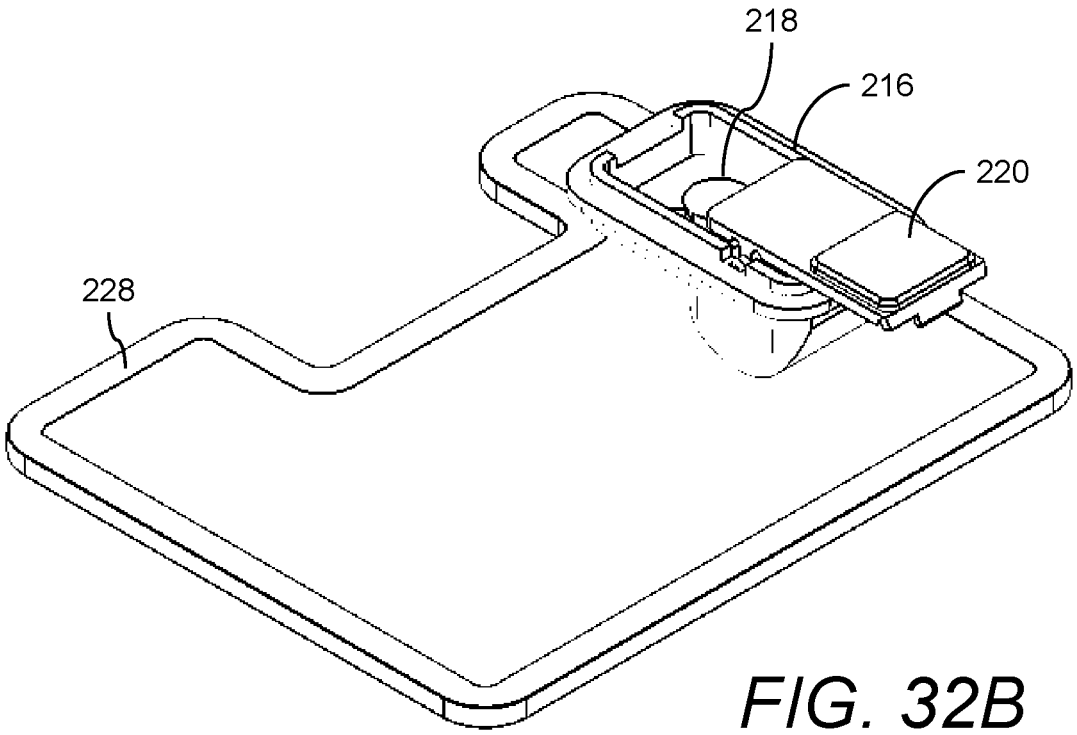

FIG. 32B

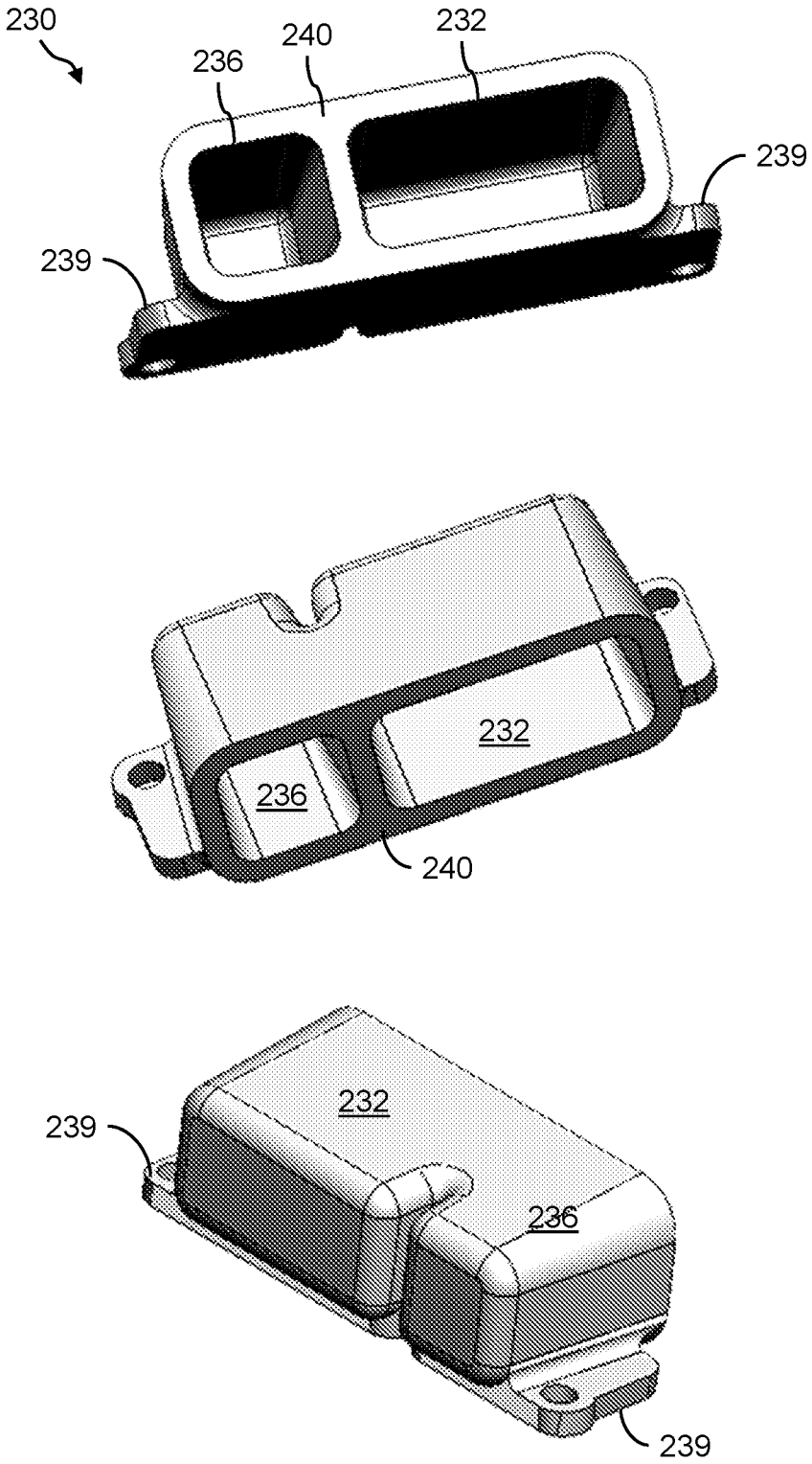

FIG. 33A

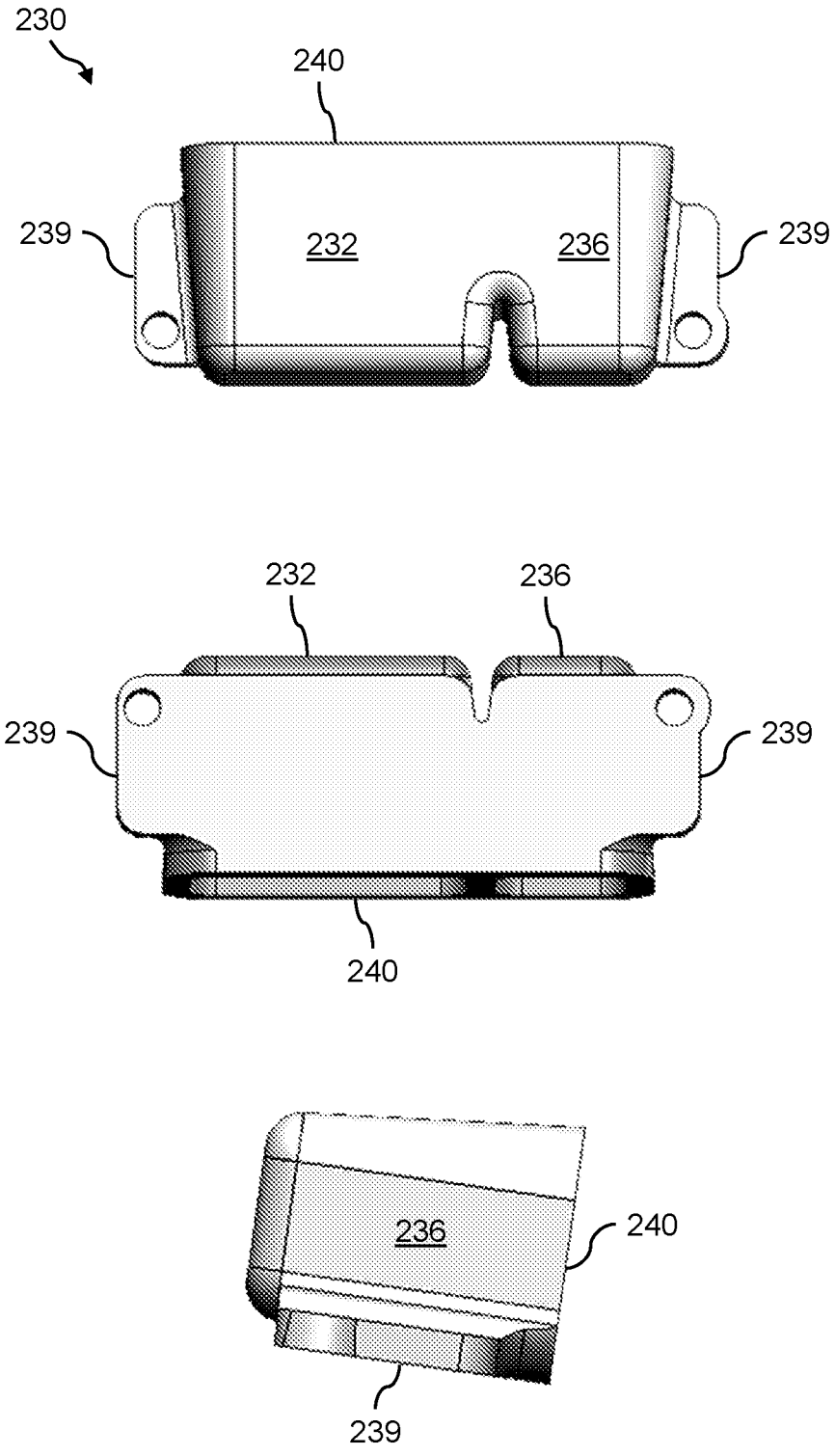

FIG. 33B

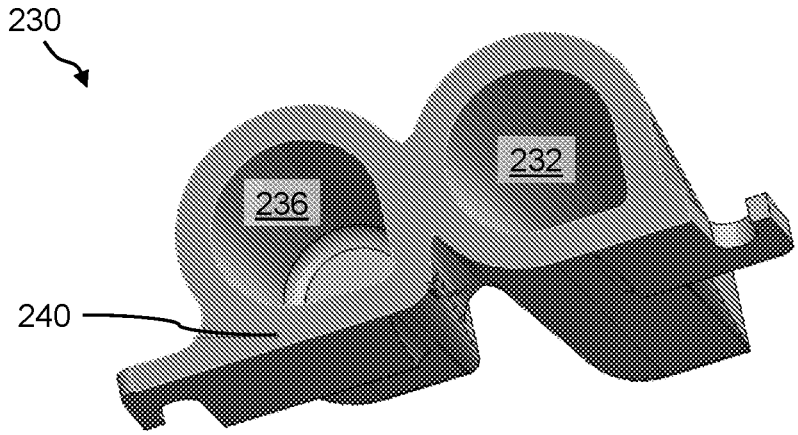

FIG. 34A

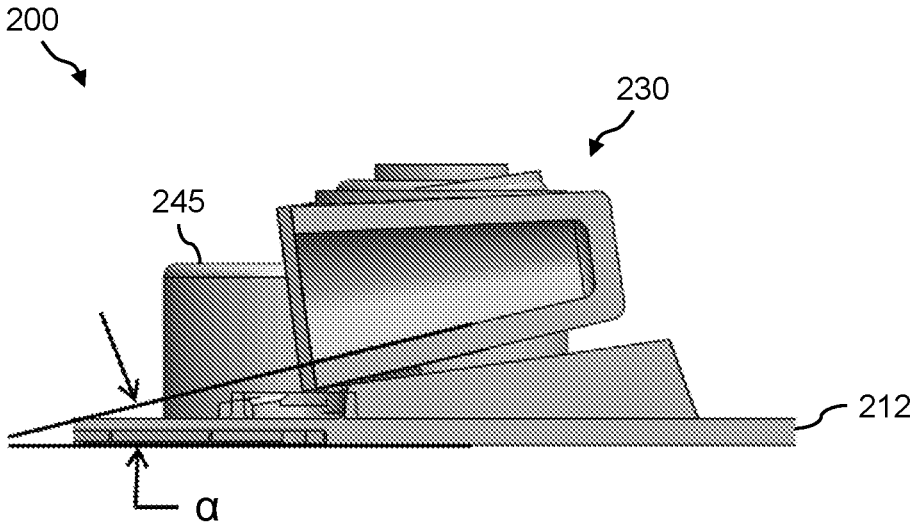

FIG. 34B

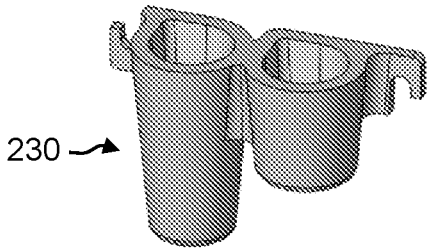

FIG. 35A

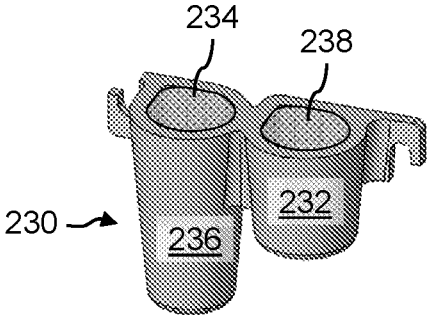

FIG. 35B

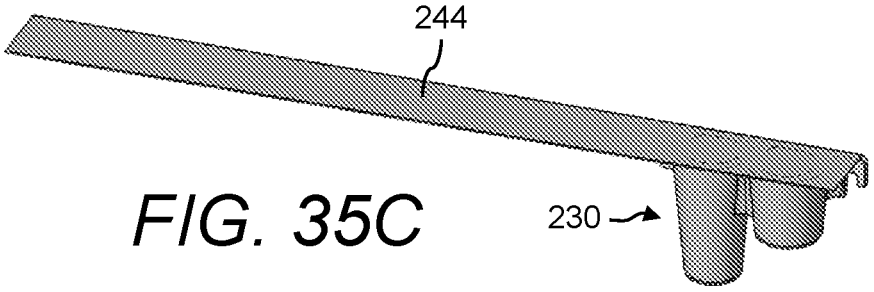

FIG. 35C

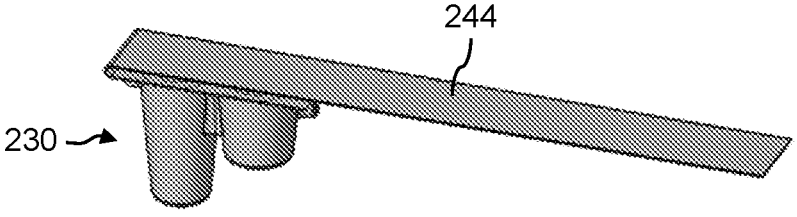

FIG. 35D

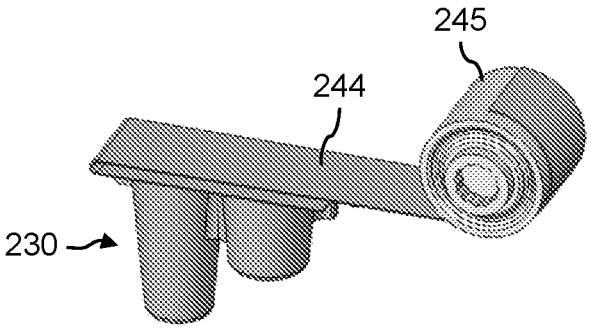

FIG. 35E

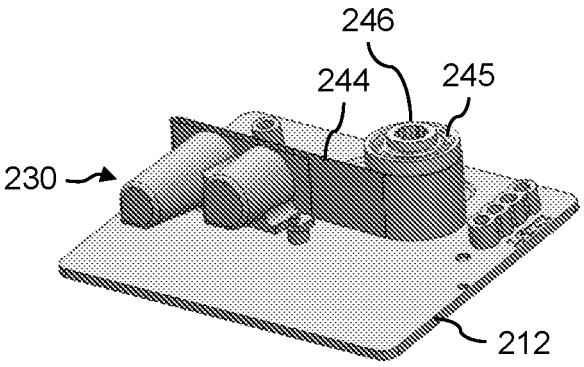

FIG. 35F

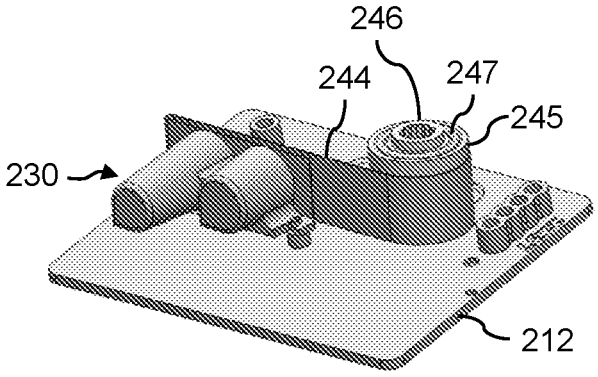

FIG. 35G

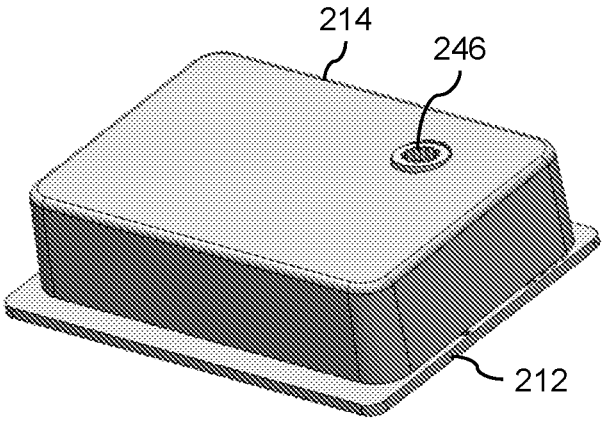

FIG. 35H

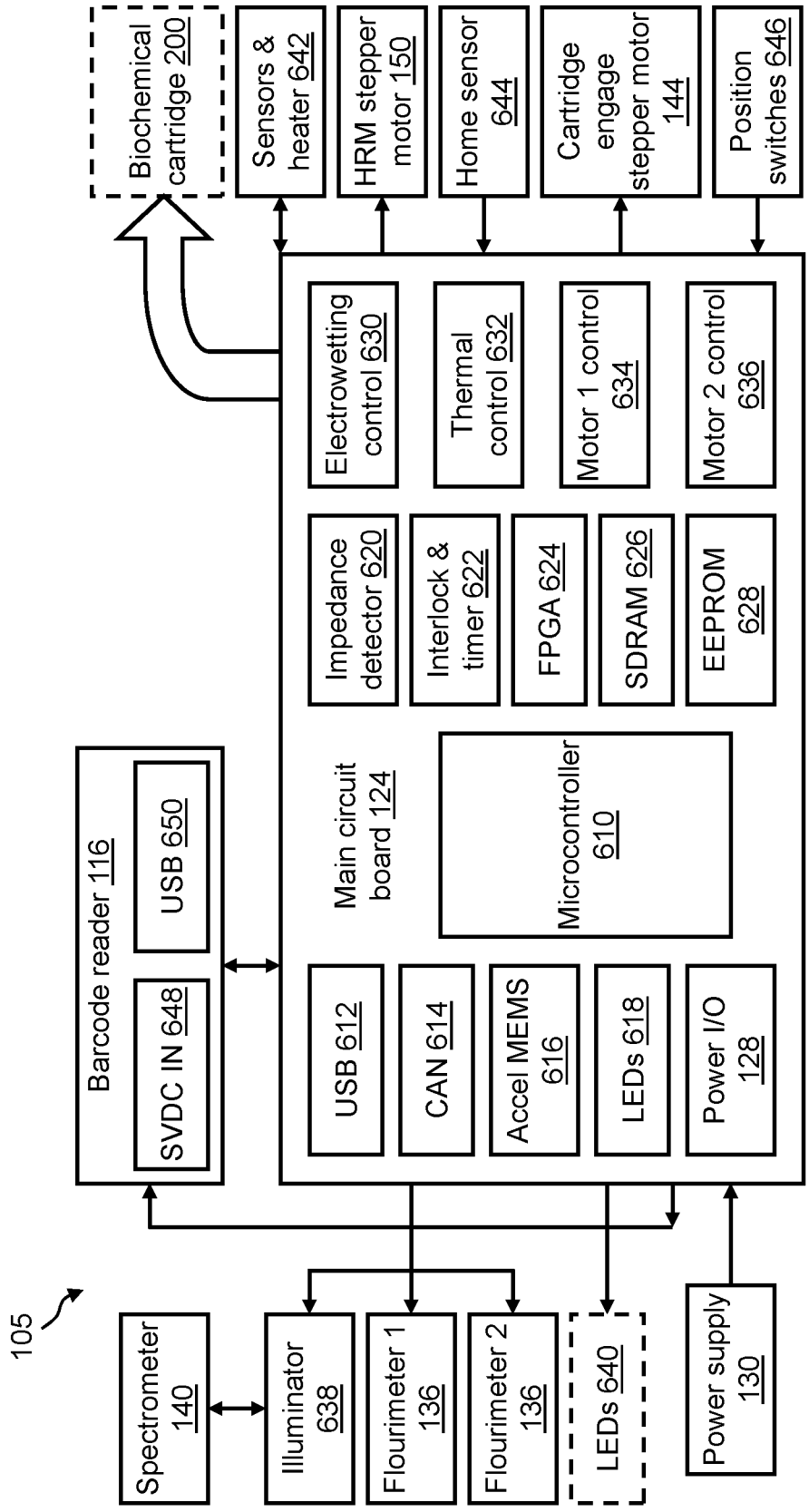
105
Spectrometer 140
Illuminator 638
Flourimeter 1 136
Flourimeter 2 136
LEDs 640
Power supply 130
Barcode reader 116
SVDC IN 648
USB 650
Main circuit board 124
USB 612
CAN 614
Accel MEMS 616
LEDs 618
Power I/O 128
Microcontroller 610
Impedance detector 620
Interlock & timer 622
FPGA 624
SDRAM 626
EEPROM 628
Electrowetting control 630
Thermal control 632
Motor 1 control 634
Motor 2 control 636
Biochemical cartridge 200
Sensors & heater 642
HRM stepper motor 150
Home sensor 644
Cartridge engage stepper motor 144
Position switches 646

FIG. 36

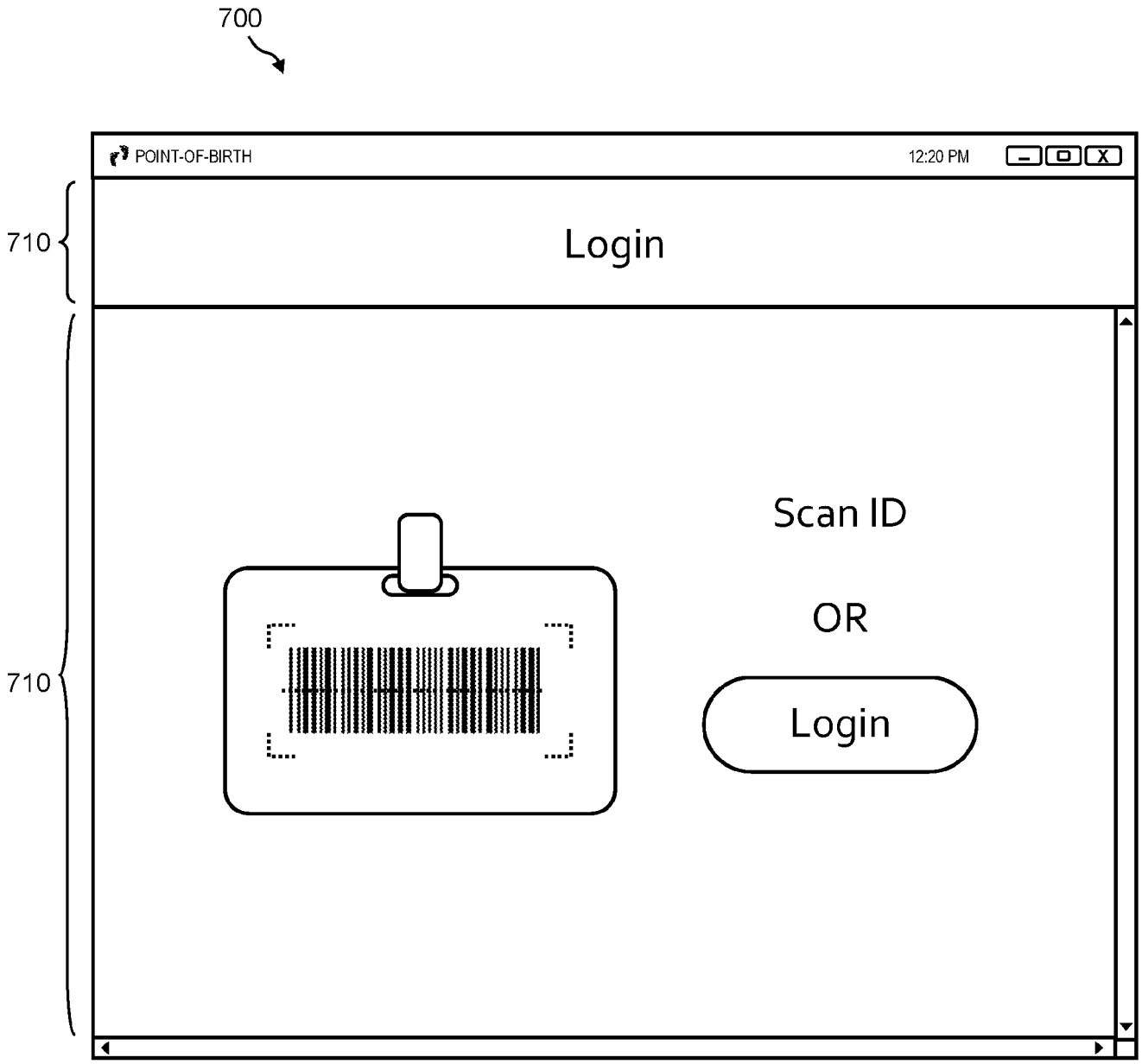

FIG. 37

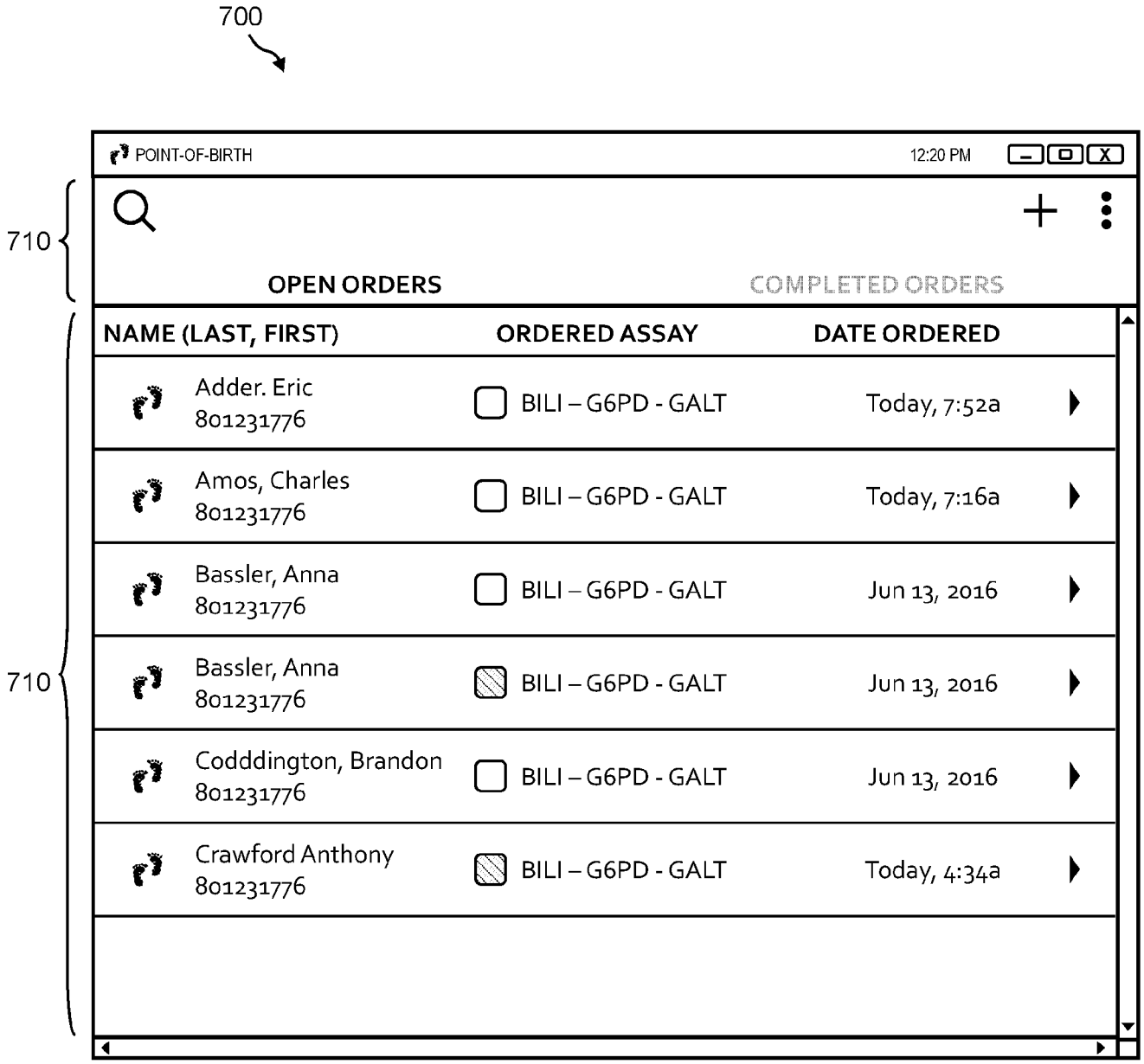
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
COMPLETED ORDERS
NAME (LAST, FIRST)
ORDERED ASSAY
DATE ORDERED
Adder. Eric
801231776
BILI – G6PD - GALT
Today, 7:52a
Amos, Charles
801231776
BILI – G6PD - GALT
Today, 7:16a
Bassler, Anna
801231776
BILI – G6PD - GALT
Jun 13, 2016
710
Bassler, Anna
801231776
BILI – G6PD - GALT
Jun 13, 2016
Codddington, Brandon
801231776
BILI – G6PD - GALT
Jun 13, 2016
Crawford Anthony
801231776
BILI – G6PD - GALT
Today, 4:34a

FIG. 38

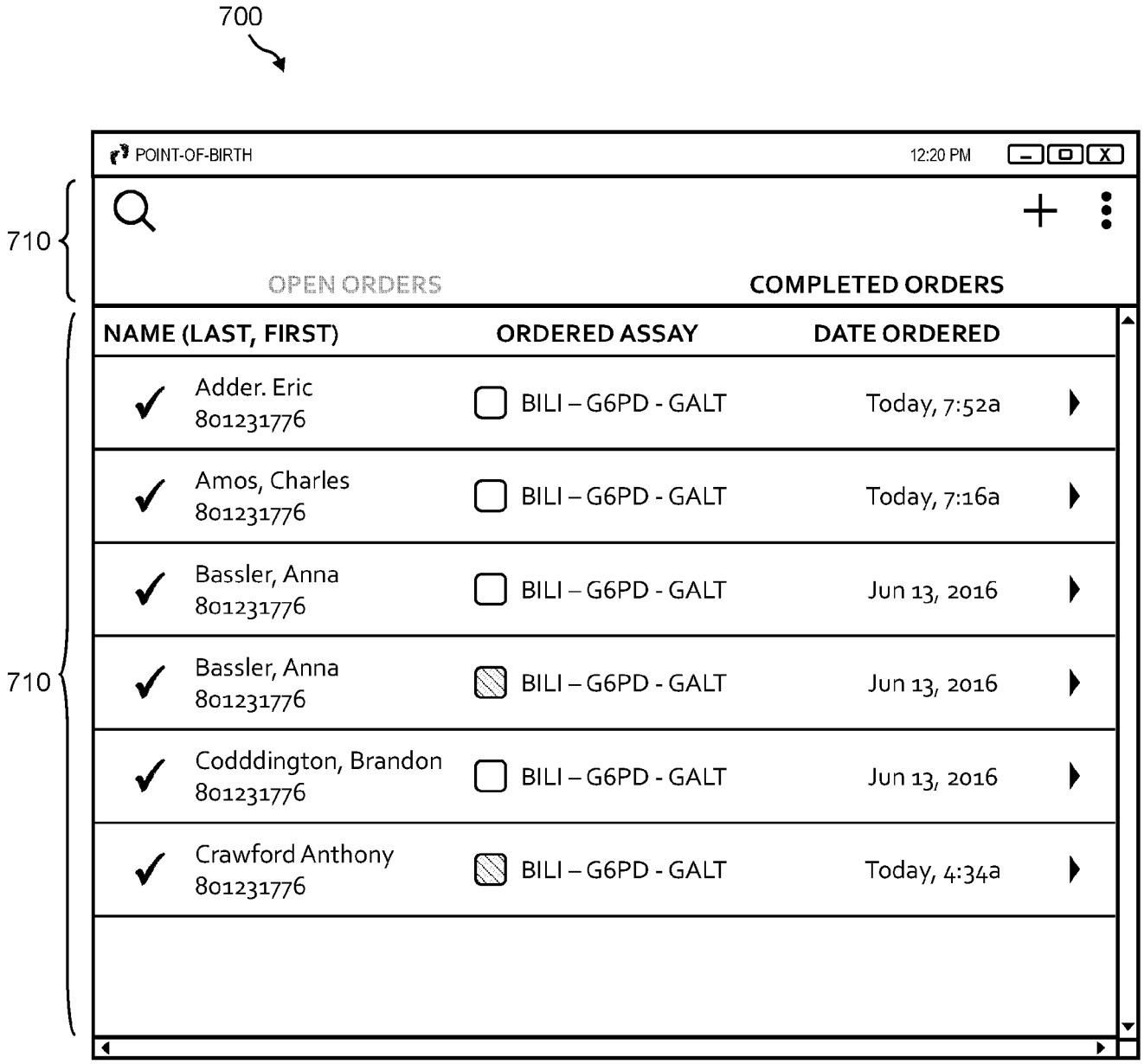
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
COMPLETED ORDERS
NAME (LAST, FIRST)
ORDERED ASSAY
DATE ORDERED
Adder. Eric
801231776
BILI – G6PD - GALT
Today, 7:52a
Amos, Charles
801231776
BILI – G6PD - GALT
Today, 7:16a
Bassler, Anna
801231776
BILI – G6PD - GALT
Jun 13, 2016
710
Bassler, Anna
801231776
BILI – G6PD - GALT
Jun 13, 2016
Codddington, Brandon
801231776
BILI – G6PD - GALT
Jun 13, 2016
Crawford Anthony
801231776
BILI – G6PD - GALT
Today, 4:34a

FIG. 39

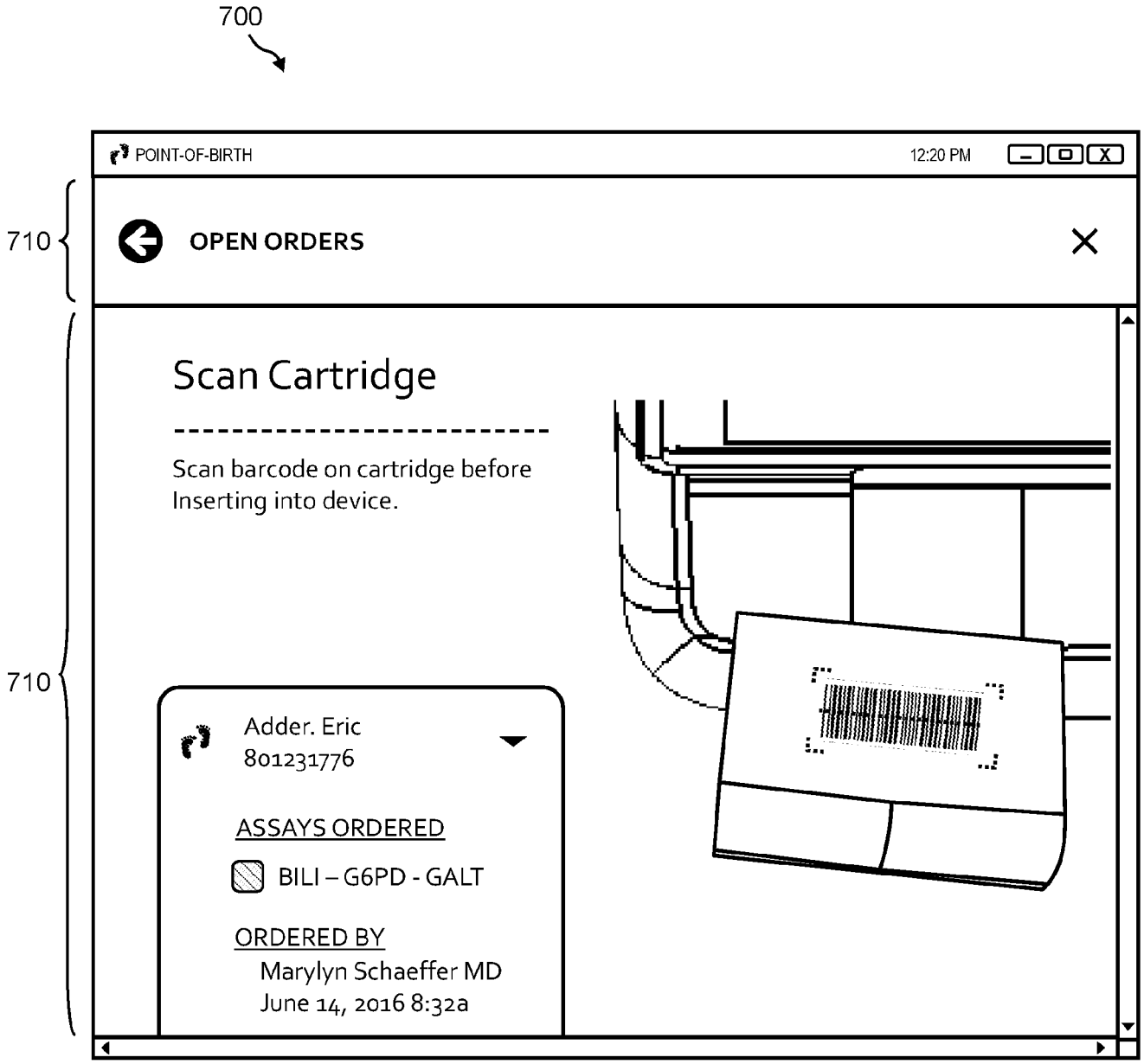
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
Scan Cartridge
Scan barcode on cartridge before
Inserting into device.
710
Adder. Eric
801231776
ASSAYS ORDERED
BILI – G6PD - GALT
ORDERED BY
Marylyn Schaeffer MD
June 14, 2016 8:32a

FIG. 40

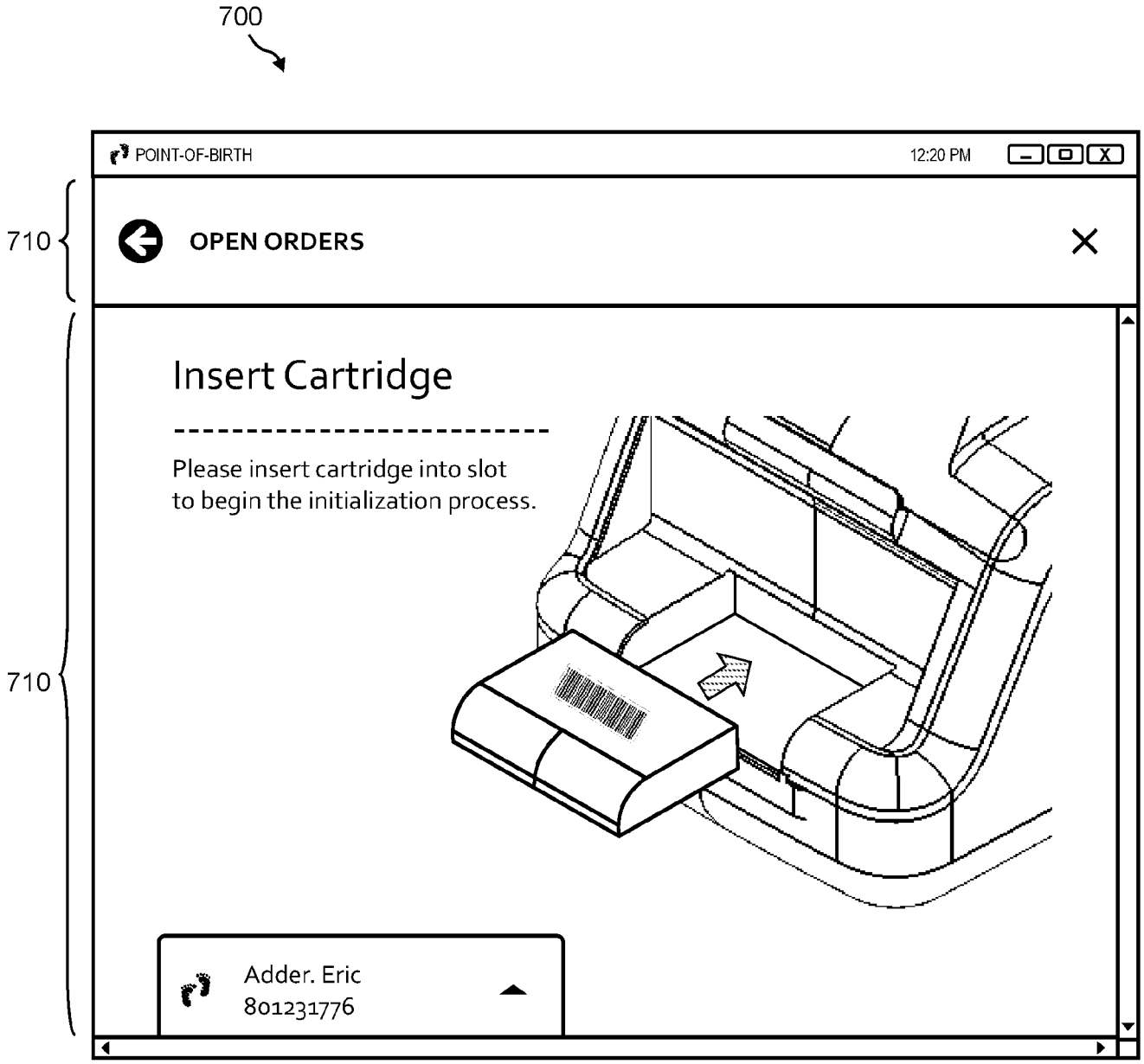
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
Insert Cartridge
Please insert cartridge into slot
to begin the initialization process.
710
Adder. Eric
801231776

FIG. 41

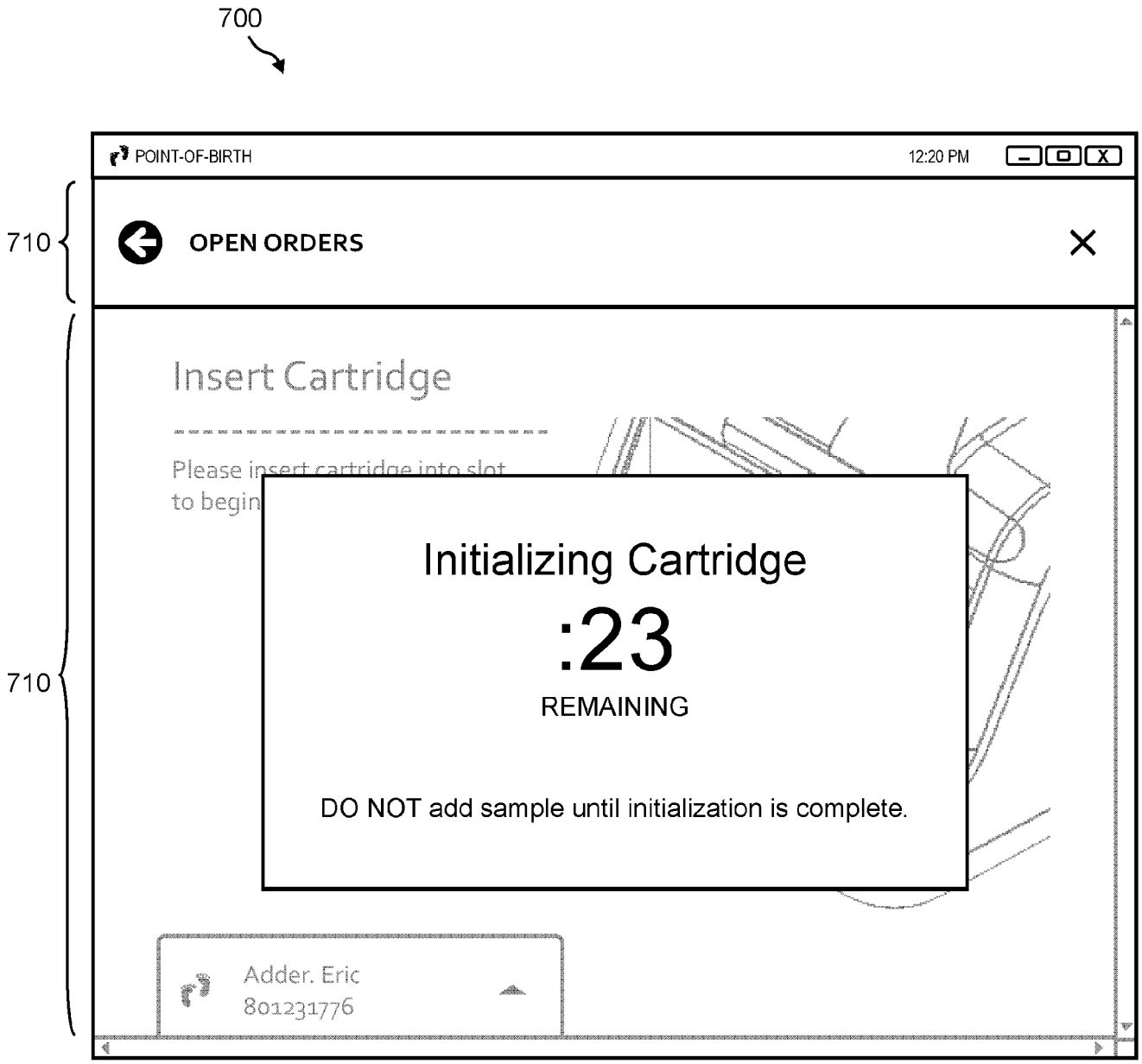
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
Insert Cartridge
Please insert cartridge into slot
to begin
Initializing Cartridge
:23
REMAINING
DO NOT add sample until initialization is complete.
710
Adder. Eric
801231776

FIG. 42

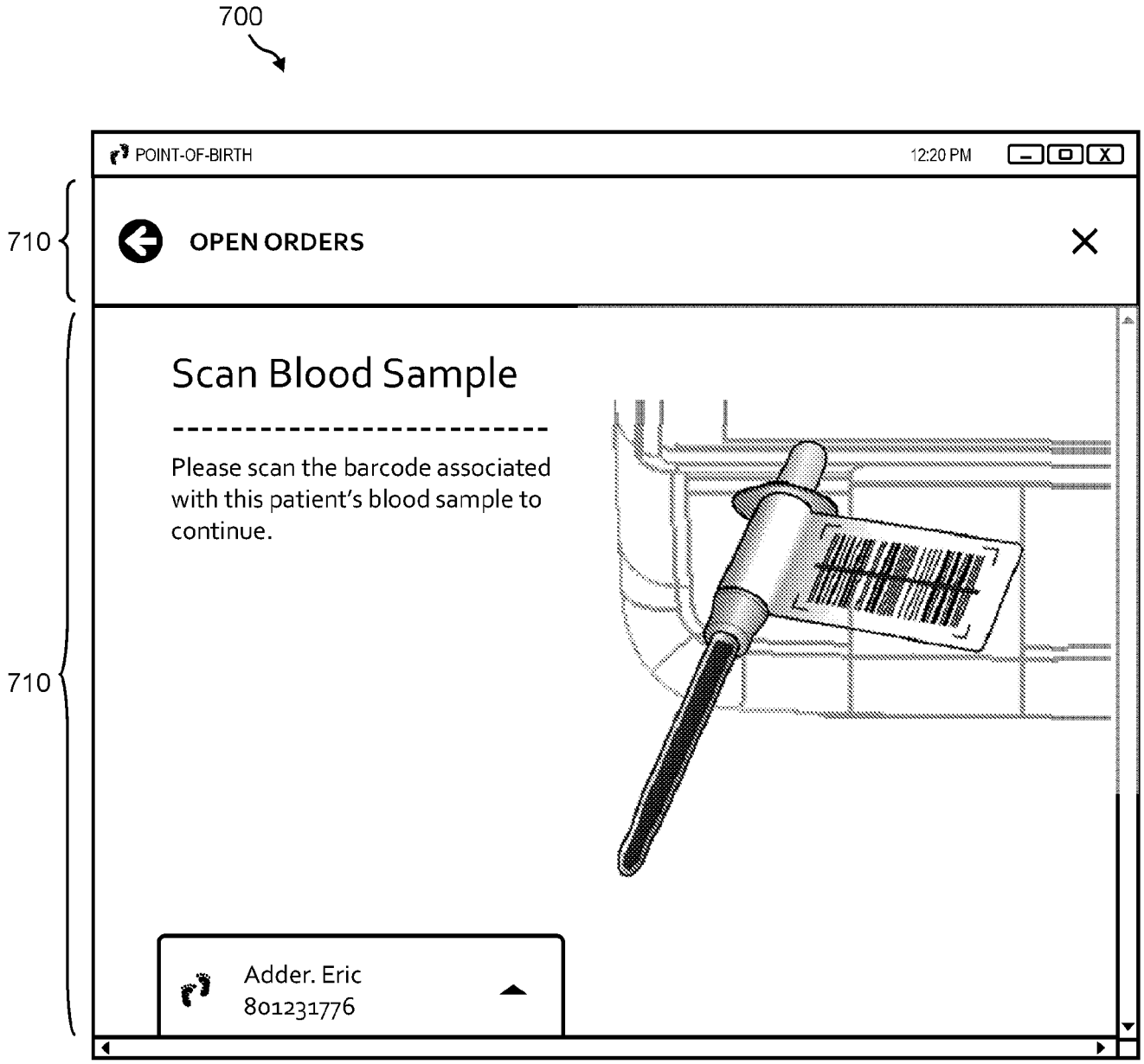
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
Scan Blood Sample
Please scan the barcode associated with this patient's blood sample to continue.
710
Adder. Eric
801231776

FIG. 43

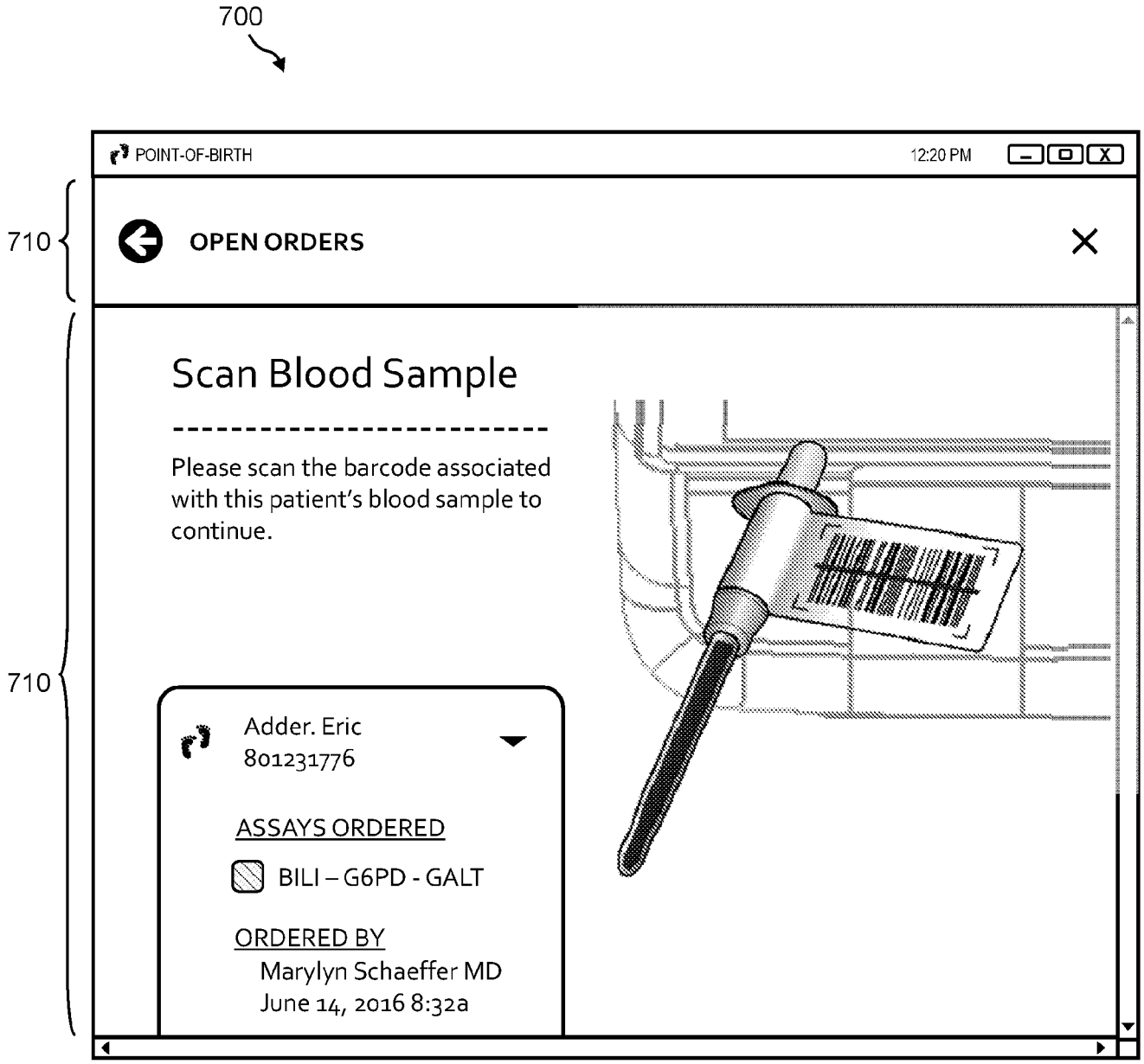
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
Scan Blood Sample
Please scan the barcode associated with this patient's blood sample to continue.
710
Adder. Eric
801231776
ASSAYS ORDERED
BILI – G6PD - GALT
ORDERED BY
Marylyn Schaeffer MD
June 14, 2016 8:32a

FIG. 44

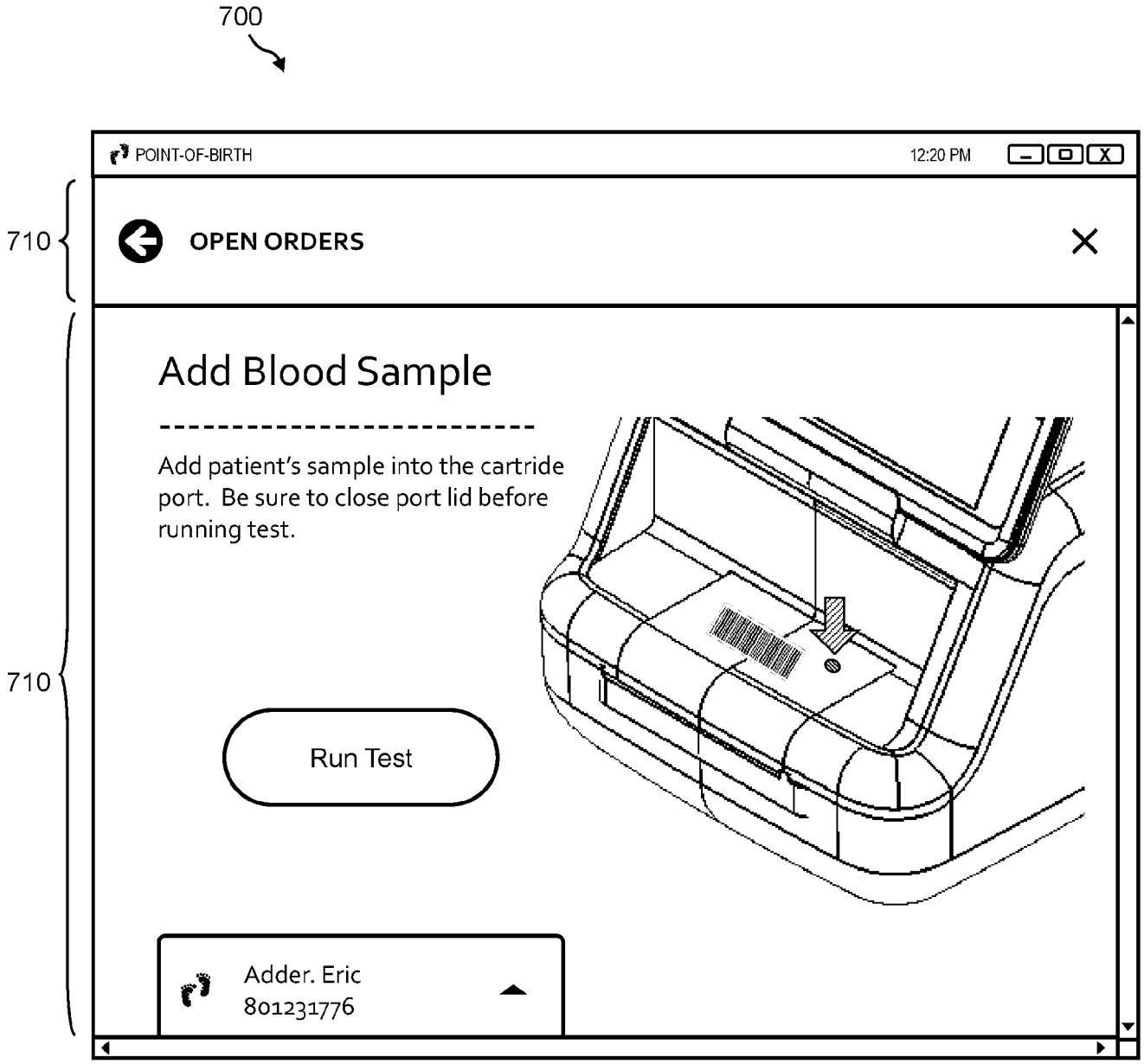
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
Add Blood Sample
Add patient's sample into the cartride port. Be sure to close port lid before running test.
710
Run Test
Adder. Eric
801231776

FIG. 45

700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
Add Blood Sample
Add patient's sample into the cartride
port. Be s
running te
Verifying sample quantity .....
DO NOT remove cartridge.
710
Run Test
Adder. Eric
801231776

FIG. 46

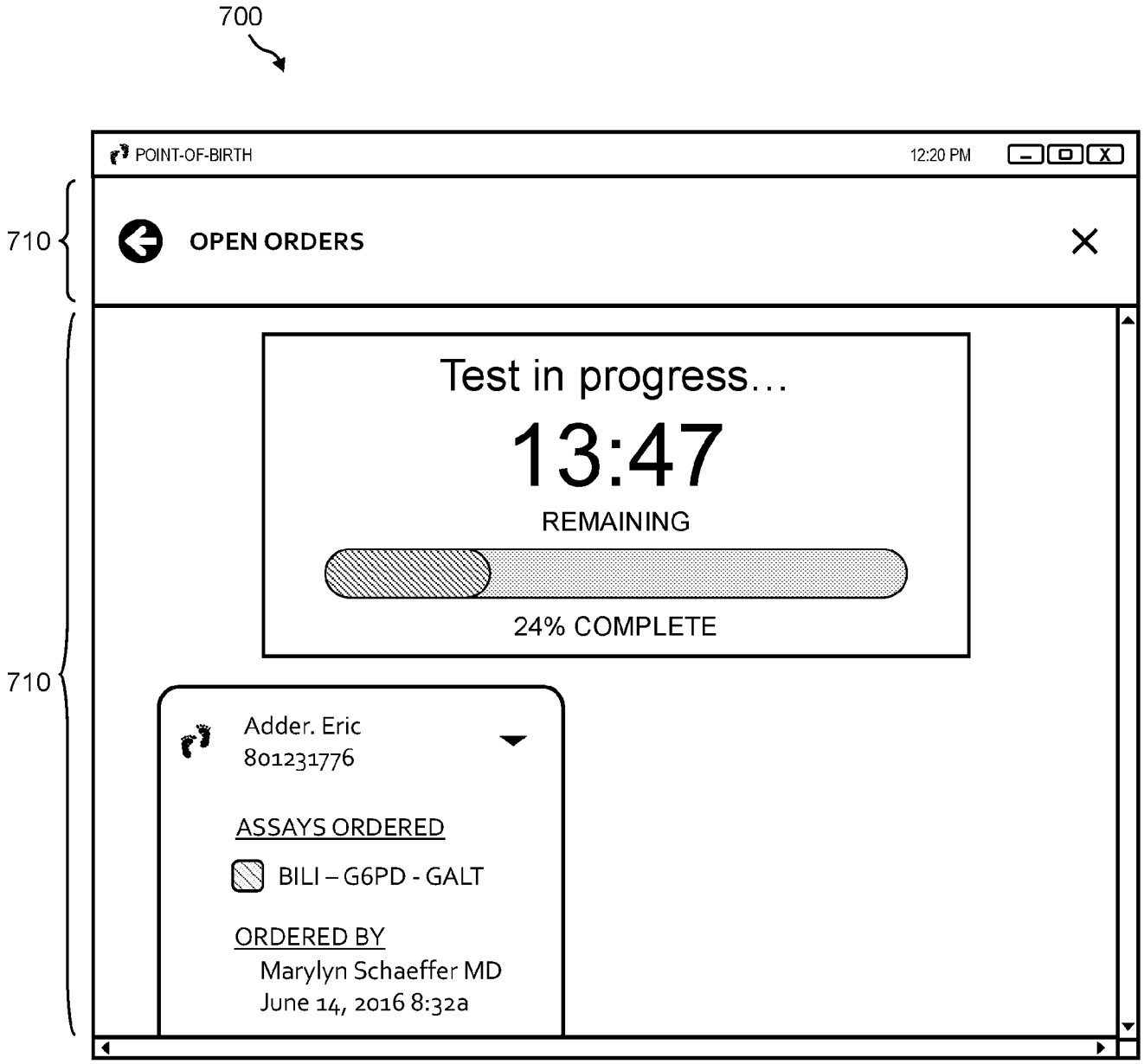
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
Test in progress...
13:47
REMAINING
24% COMPLETE
710
Adder. Eric
801231776
ASSAYS ORDERED
BILI – G6PD - GALT
ORDERED BY
Marylyn Schaeffer MD
June 14, 2016 8:32a

FIG. 47

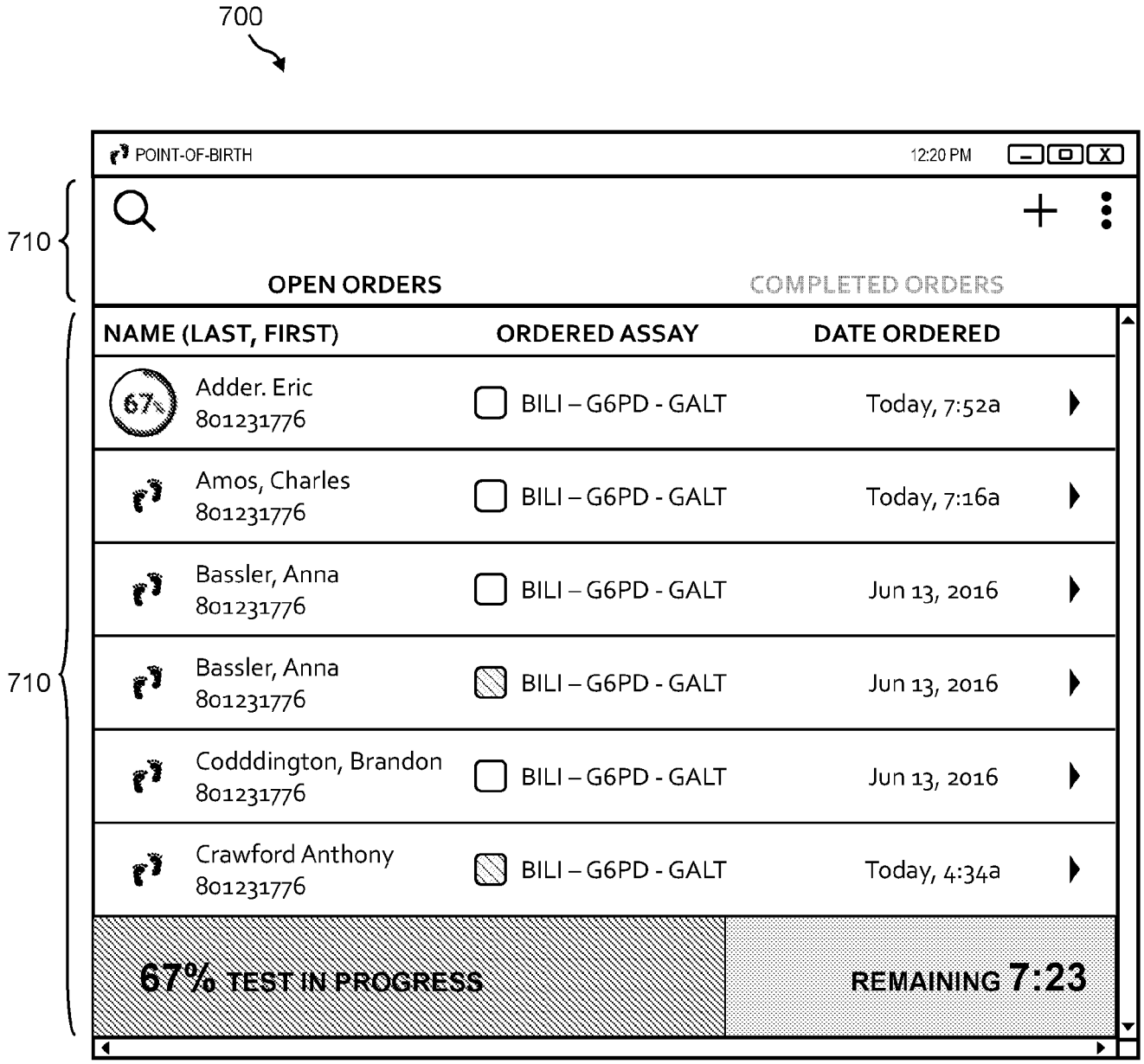
700
710
710
POINT-OF-BIRTH
12:20 PM
OPEN ORDERS
COMPLETED ORDERS
NAME (LAST, FIRST)
ORDERED ASSAY
DATE ORDERED
67%
Adder. Eric
801231776
BILI – G6PD - GALT
Today, 7:52a
Amos, Charles
801231776
BILI – G6PD - GALT
Today, 7:16a
Bassler, Anna
801231776
BILI – G6PD - GALT
Jun 13, 2016
Bassler, Anna
801231776
BILI – G6PD - GALT
Jun 13, 2016
Codddington, Brandon
801231776
BILI – G6PD - GALT
Jun 13, 2016
Crawford Anthony
801231776
BILI – G6PD - GALT
Today, 4:34a
67% TEST IN PROGRESS
REMAINING 7:23

FIG. 48

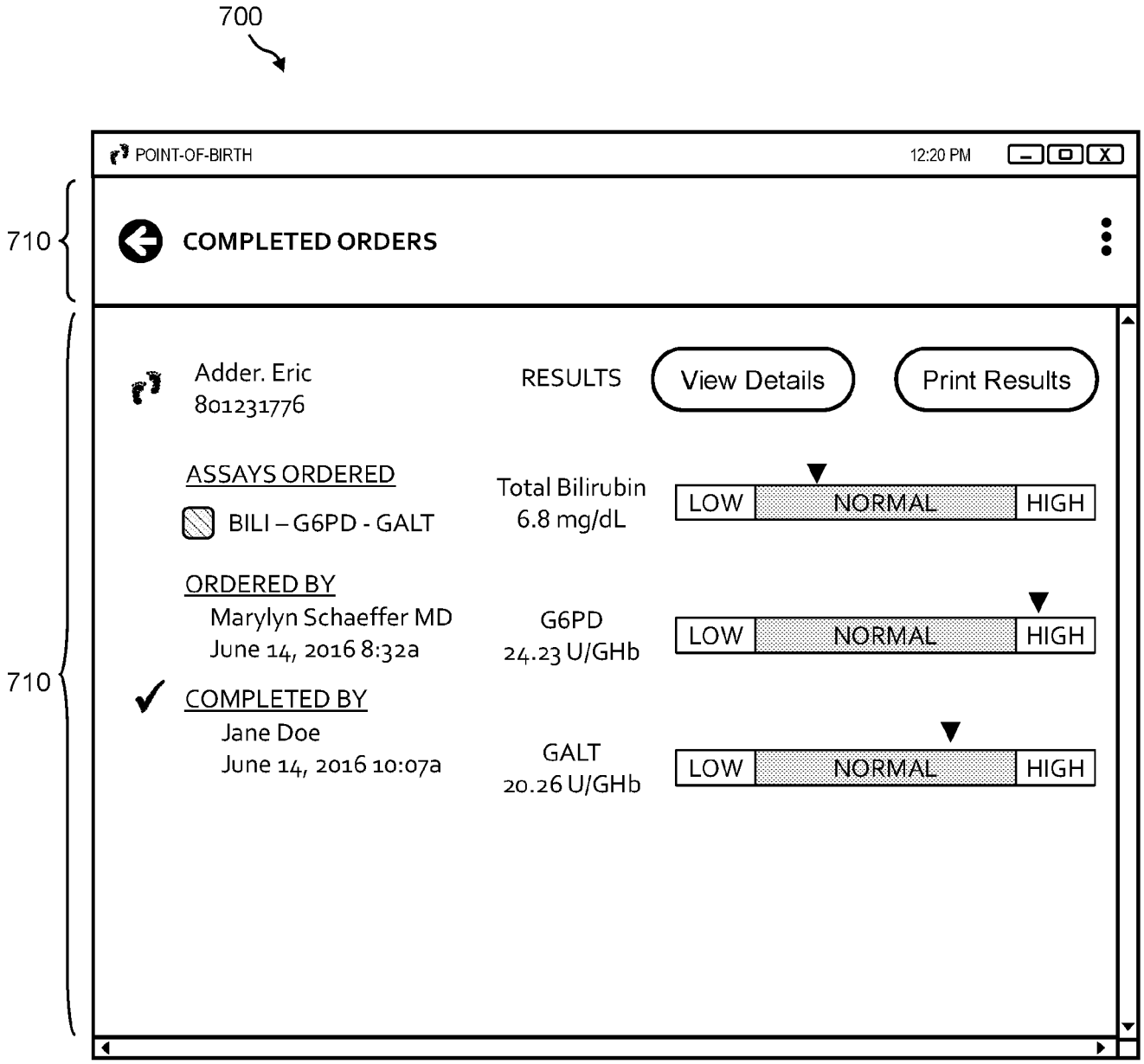
700
POINT-OF-BIRTH
12:20 PM
710
COMPLETED ORDERS
Adder. Eric
801231776
RESULTS
View Details
Print Results
ASSAYS ORDERED
BILI – G6PD - GALT
Total Bilirubin
6.8 mg/dL
LOW
NORMAL
HIGH
ORDERED BY
Marylyn Schaeffer MD
June 14, 2016 8:32a
G6PD
24.23 U/GHb
LOW
NORMAL
HIGH
710
COMPLETED BY
Jane Doe
June 14, 2016 10:07a
GALT
20.26 U/GHb
LOW
NORMAL
HIGH

FIG. 49

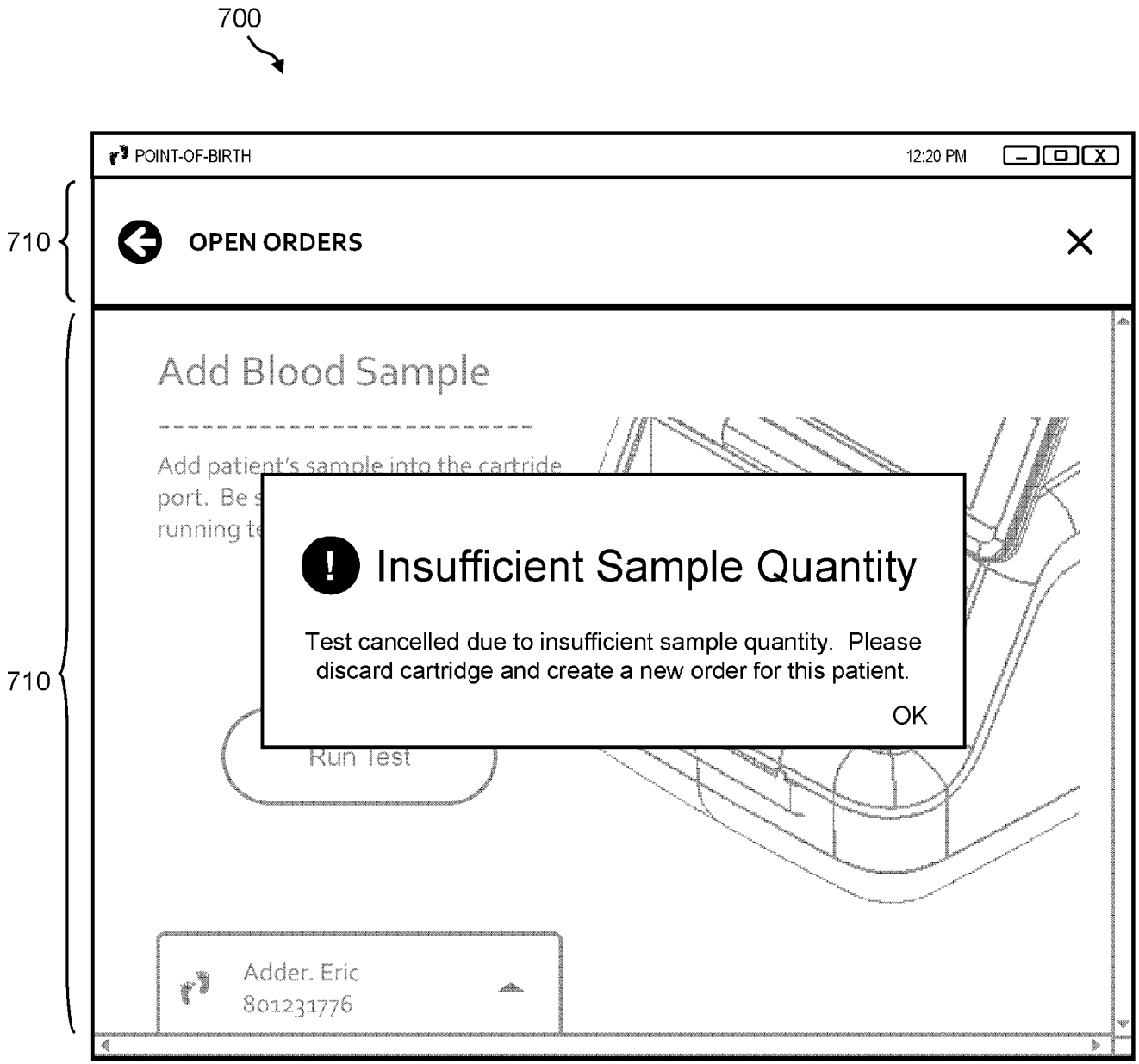
700
POINT-OF-BIRTH
12:20 PM
710
OPEN ORDERS
Add Blood Sample
Add patient's sample into the cartride
port. Be
running te
Insufficient Sample Quantity
Test cancelled due to insufficient sample quantity. Please discard cartridge and create a new order for this patient.
OK
710
Run Test
Adder. Eric
801231776

FIG. 50

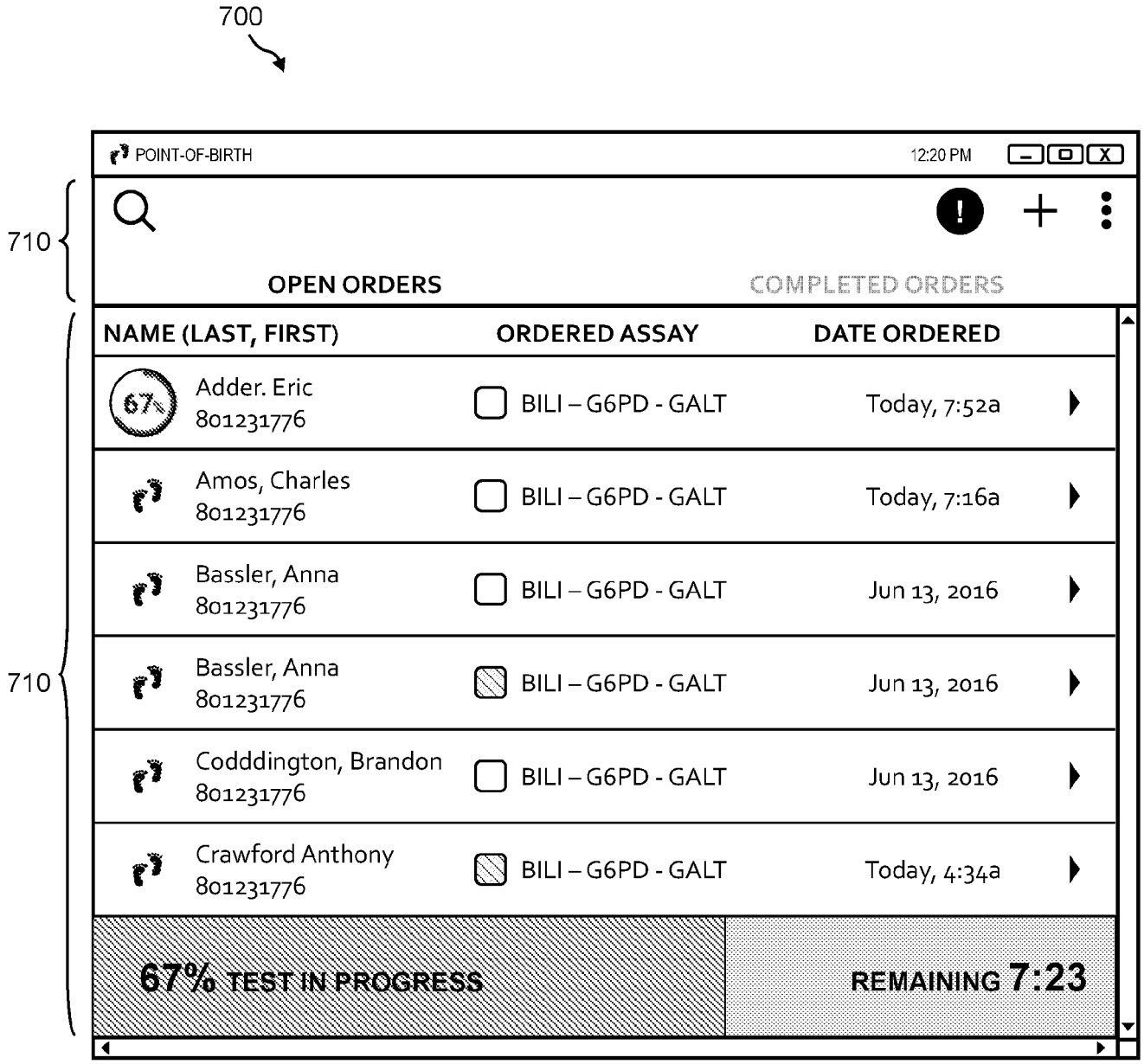
700
710
710
POINT-OF-BIRTH
12:20 PM
OPEN ORDERS
COMPLETED ORDERS
NAME (LAST, FIRST)
ORDERED ASSAY
DATE ORDERED
67%
Adder. Eric
801231776
BILI – G6PD - GALT
Today, 7:52a
Amos, Charles
801231776
BILI – G6PD - GALT
Today, 7:16a
Bassler, Anna
801231776
BILI – G6PD - GALT
Jun 13, 2016
Bassler, Anna
801231776
BILI – G6PD - GALT
Jun 13, 2016
Codddington, Brandon
801231776
BILI – G6PD - GALT
Jun 13, 2016
Crawford Anthony
801231776
BILI – G6PD - GALT
Today, 4:34a
67% TEST IN PROGRESS
REMAINING 7:23

FIG. 51

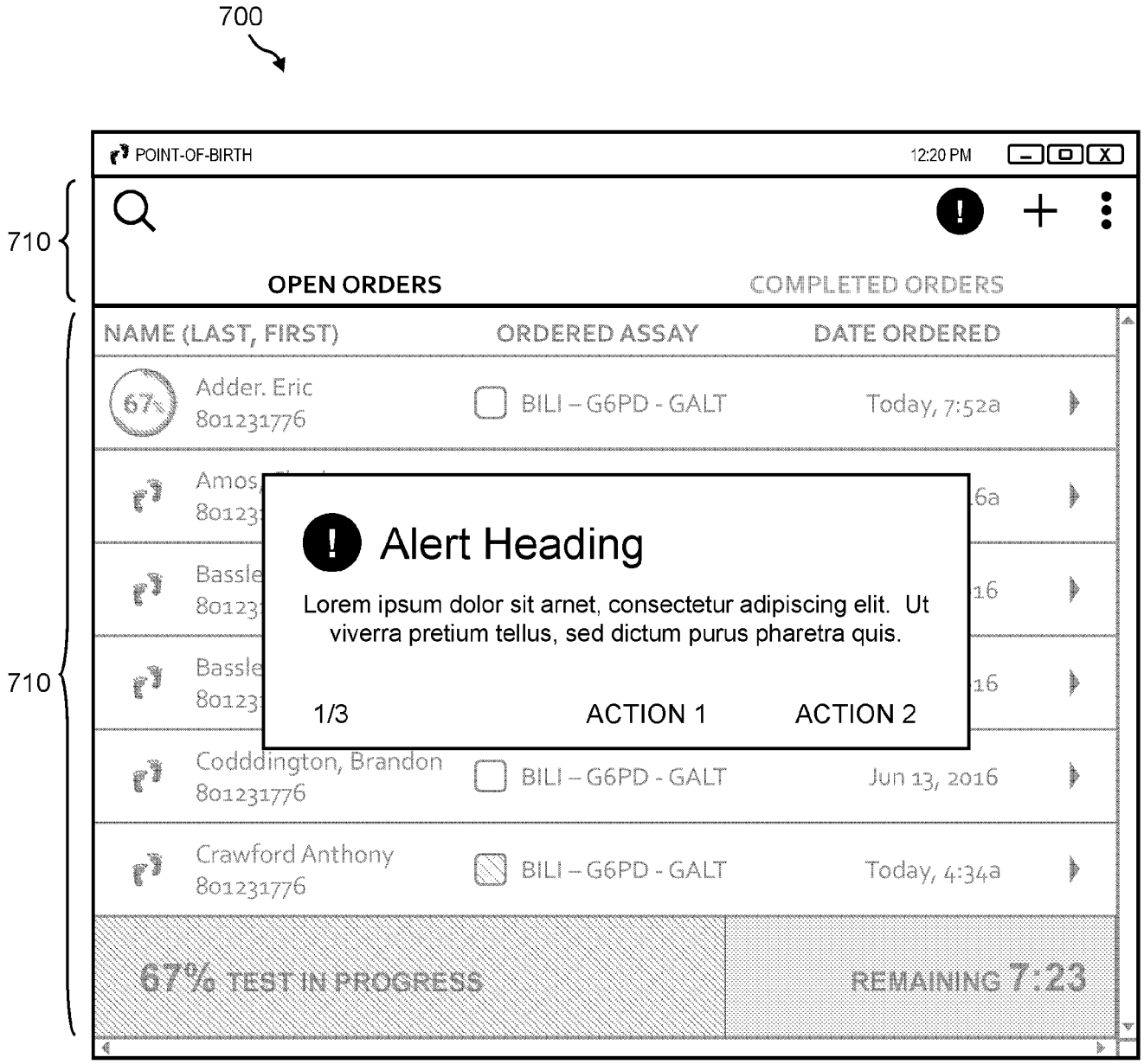
700
710
710
POINT-OF-BIRTH
12:20 PM
OPEN ORDERS
COMPLETED ORDERS
NAME (LAST, FIRST)
ORDERED ASSAY
DATE ORDERED
67%
Adder. Eric
801231776
BILI – G6PD - GALT
Today, 7:52a
Alert Heading
Lorem ipsum dolor sit arnet, consectetur adipiscing elit. Ut viverra pretium tellus, sed dictum purus pharetra quis.
1/3
ACTION 1
ACTION 2
Codddington, Brandon
801231776
BILI – G6PD - GALT
Jun 13, 2016
Crawford Anthony
801231776
BILI – G6PD - GALT
Today, 4:34a
67% TEST IN PROGRESS
REMAINING 7:23

FIG. 52

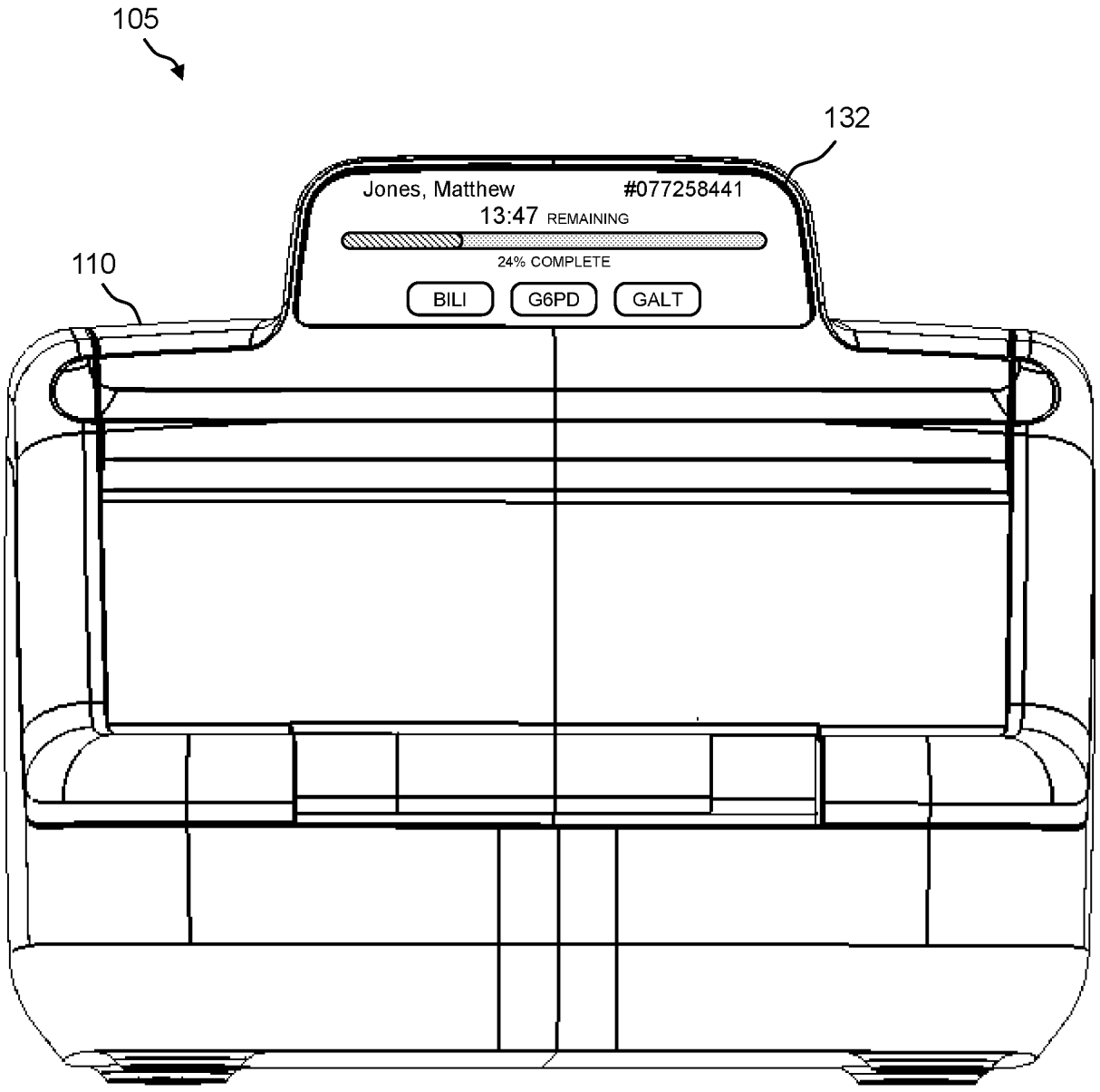
105
132
110
Jones, Matthew
#077258441
13:47 REMAINING
24% COMPLETE
BILI
G6PD
GALT

FIG. 53

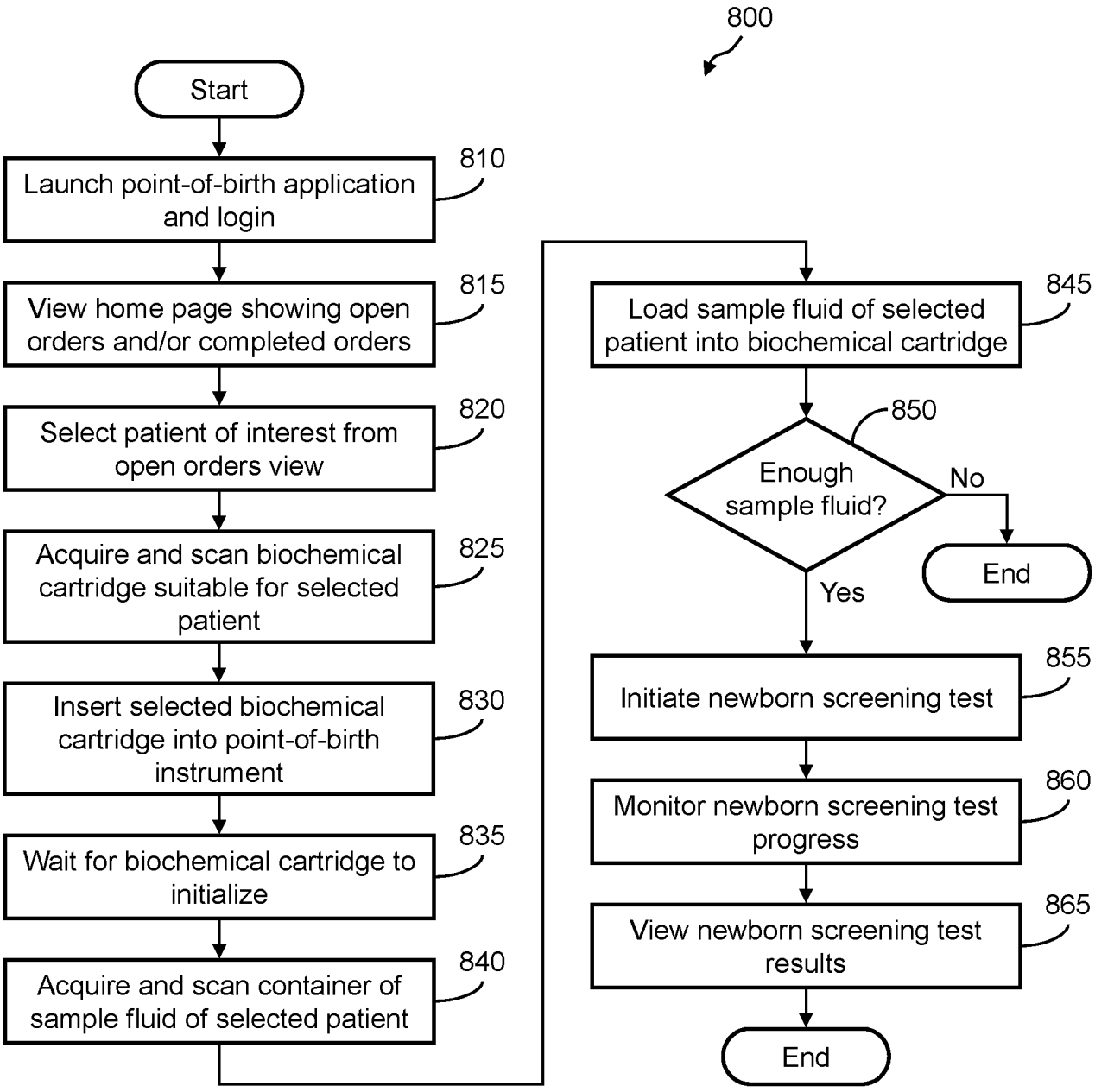
800
Start
Launch point-of-birth application and login
810
View home page showing open orders and/or completed orders
815
Select patient of interest from open orders view
820
Acquire and scan biochemical cartridge suitable for selected patient
825
Insert selected biochemical cartridge into point-of-birth instrument
830
Wait for biochemical cartridge to initialize
835
Acquire and scan container of sample fluid of selected patient
840
Load sample fluid of selected patient into biochemical cartridge
845
Enough sample fluid?
850
No
End
Yes
Initiate newborn screening test
855
Monitor newborn screening test progress
860
View newborn screening test results
865
End

FIG. 54

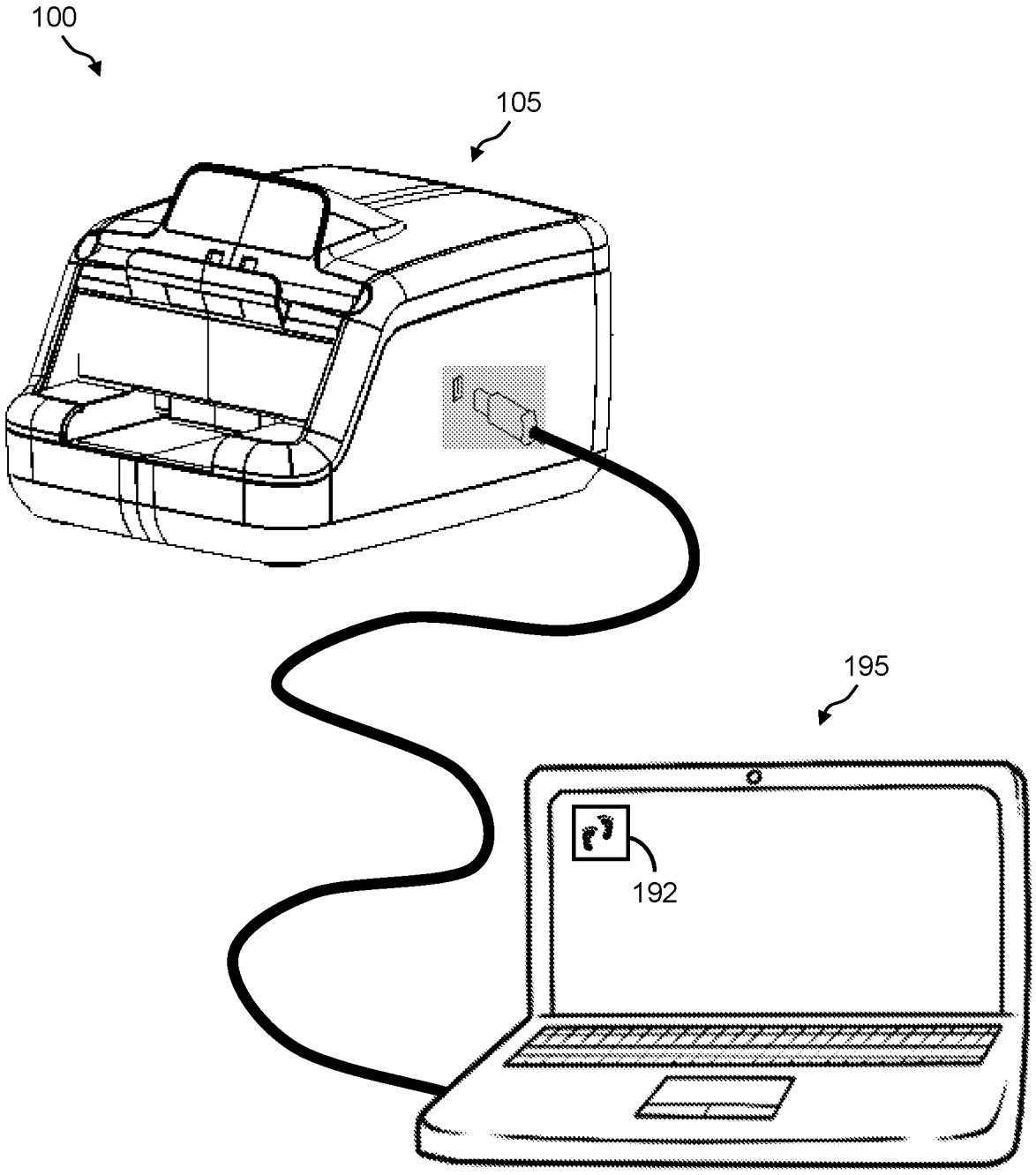

FIG. 55

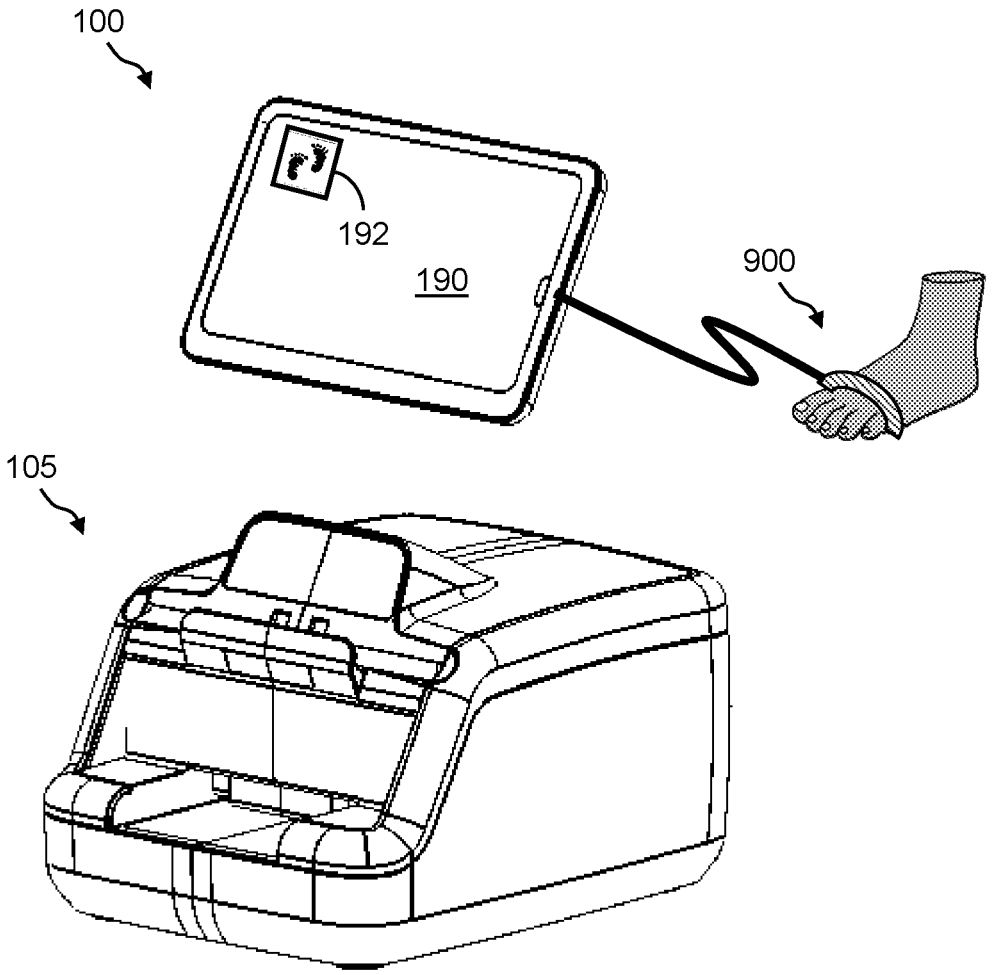

FIG. 56

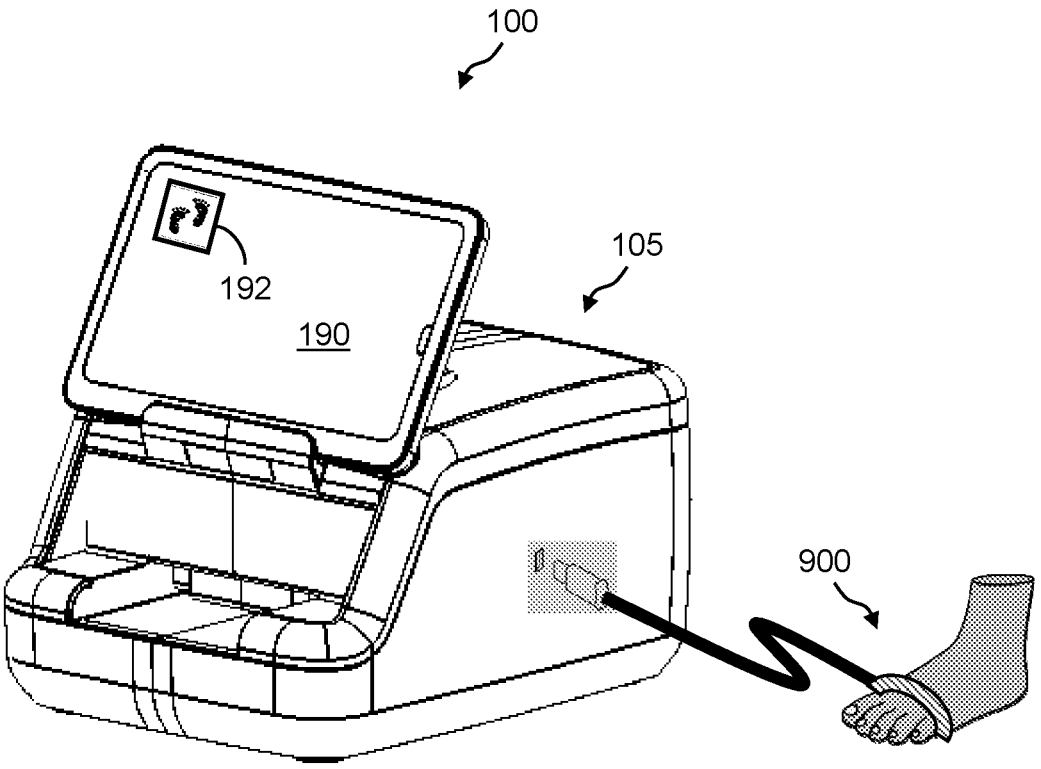

FIG. 57

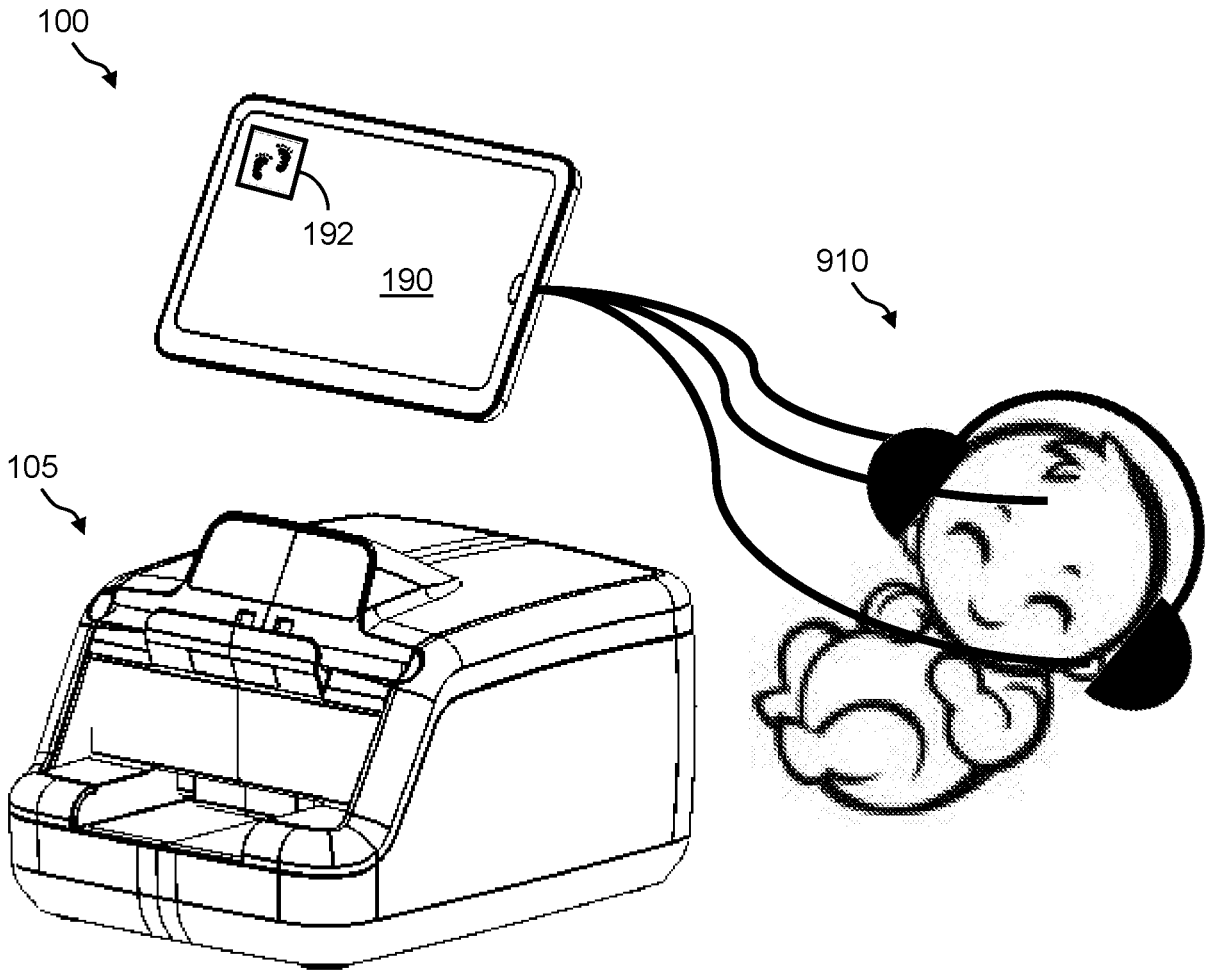

FIG. 58

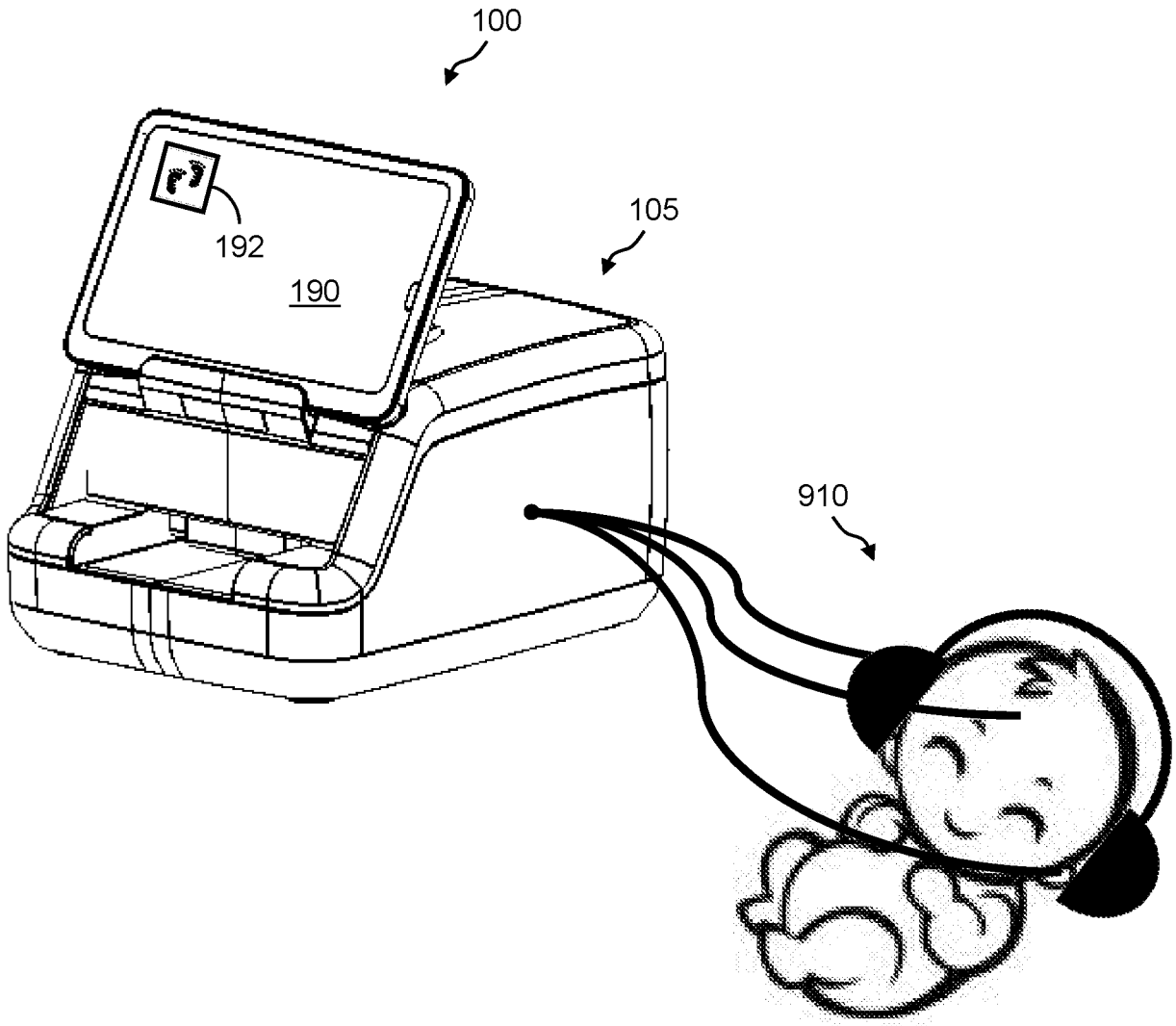

FIG. 59