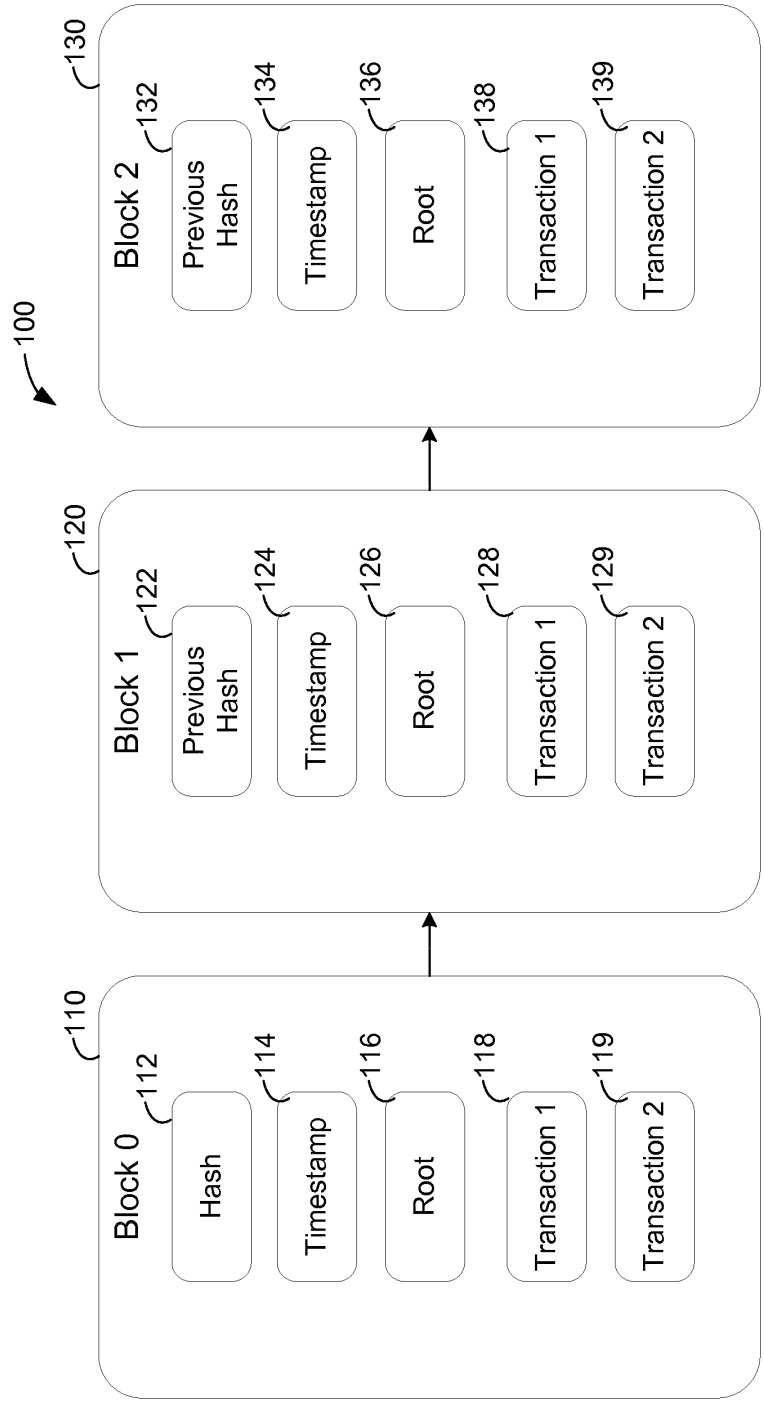
100
110
Block 0
112
Hash
114
Timestamp
116
Root
118
Transaction 1
119
Transaction 2
120
Block 1
122
Previous Hash
124
Timestamp
126
Root
128
Transaction 1
129
Transaction 2
130
Block 2
132
Previous Hash
134
Timestamp
136
Root
138
Transaction 1
139
Transaction 2

FIG. 1

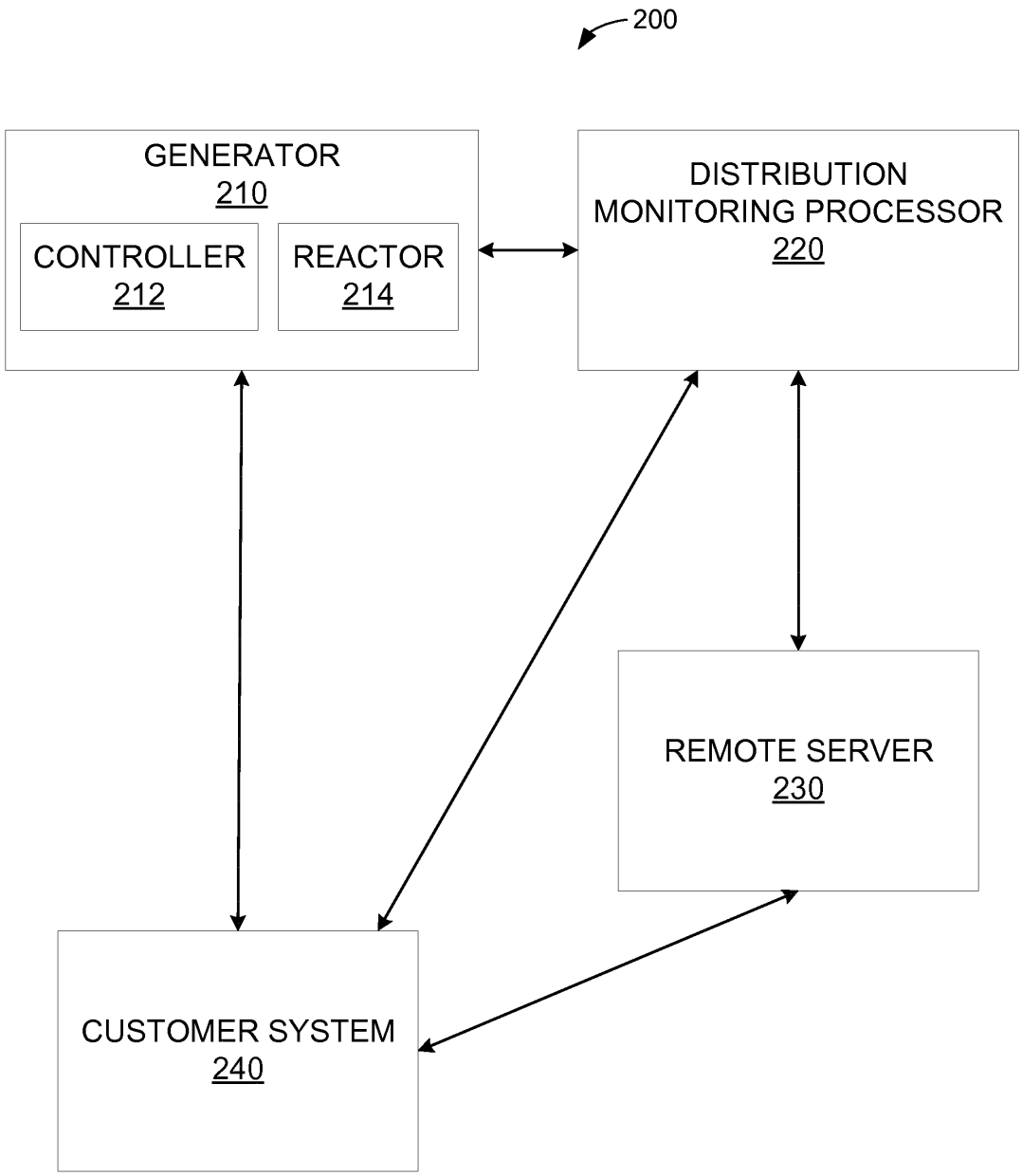
200
GENERATOR
210
CONTROLLER
212
REACTOR
214
DISTRIBUTION
MONITORING PROCESSOR
220
REMOTE SERVER
230
CUSTOMER SYSTEM
240

FIG. 2

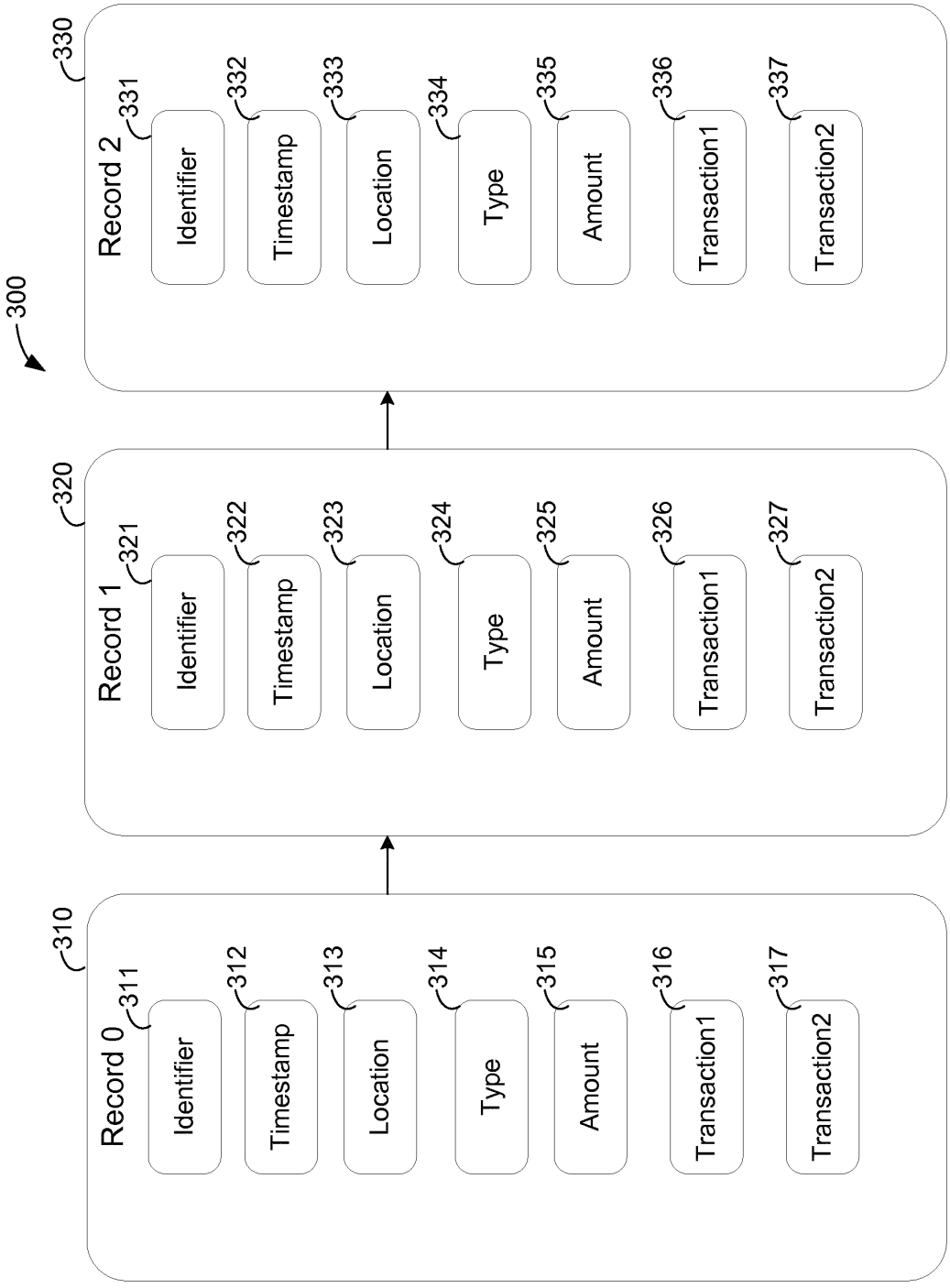
300
310
Record 0
311
Identifier
312
Timestamp
313
Location
314
Type
315
Amount
316
Transaction1
317
Transaction2
320
Record 1
321
Identifier
322
Timestamp
323
Location
324
Type
325
Amount
326
Transaction1
327
Transaction2
330
Record 2
331
Identifier
332
Timestamp
333
Location
334
Type
335
Amount
336
Transaction1
337
Transaction2

FIG. 3

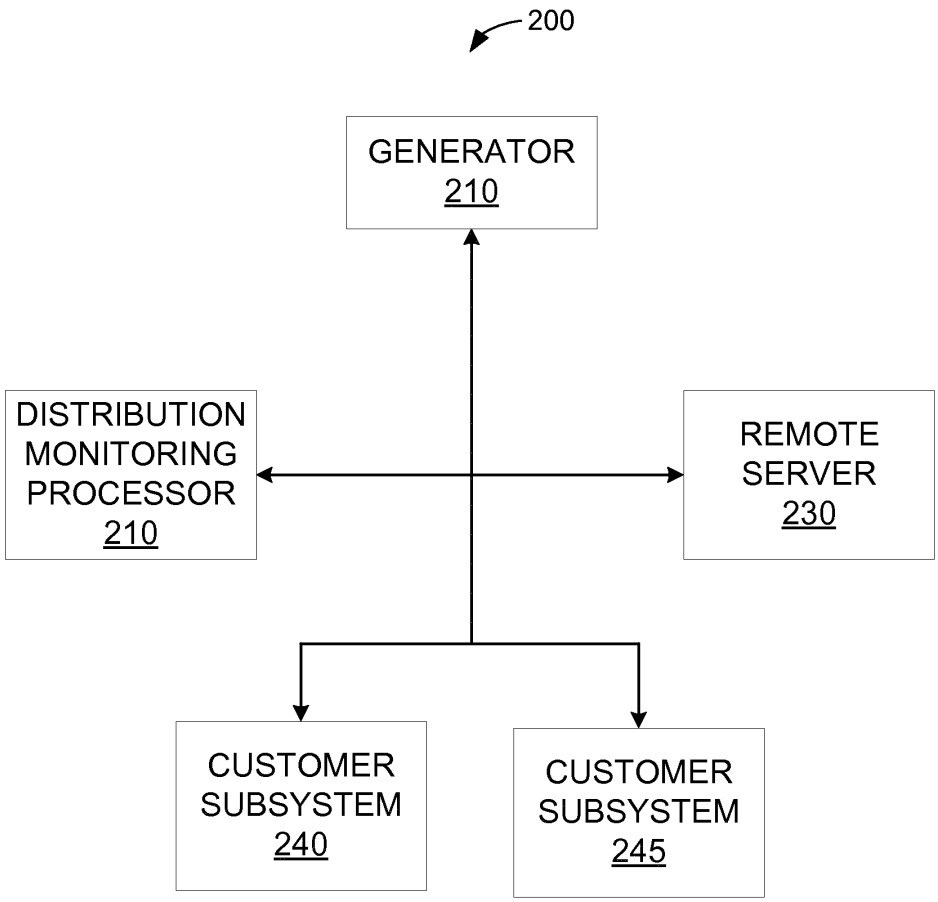
200
GENERATOR
210
DISTRIBUTION
MONITORING
PROCESSOR
210
REMOTE
SERVER
230
CUSTOMER
SUBSYSTEM
240
CUSTOMER
SUBSYSTEM
245

FIG. 4

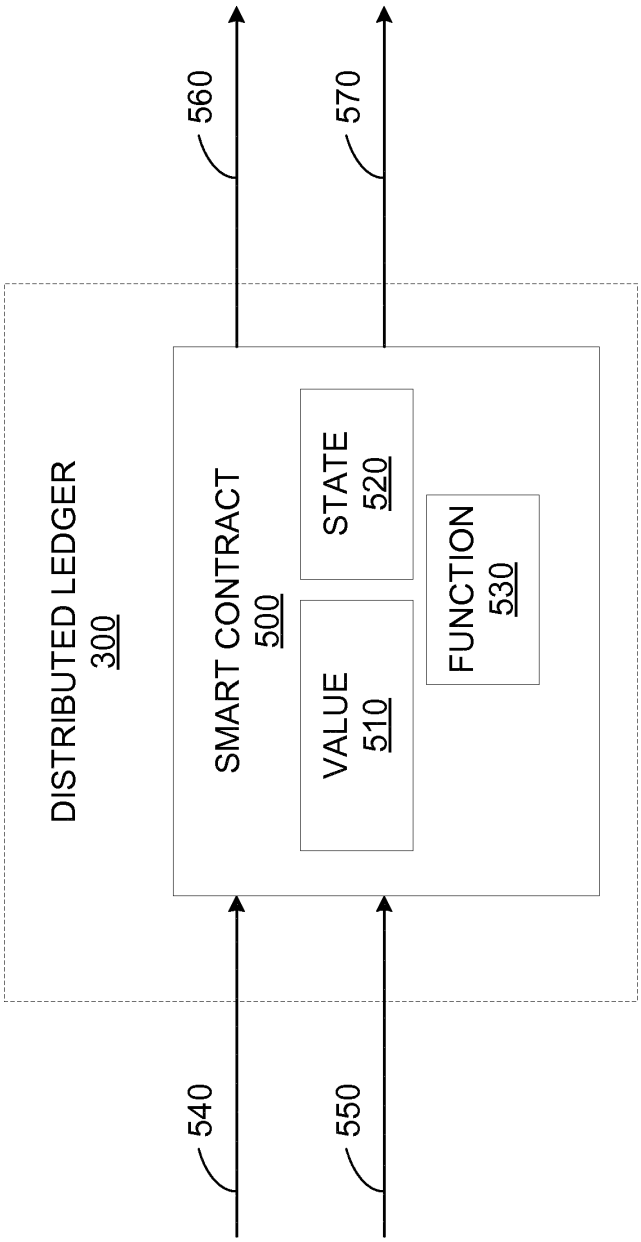
560
570
DISTRIBUTED LEDGER
300
SMART CONTRACT
500
STATE
520
VALUE
510
FUNCTION
530
540
550

FIG. 5

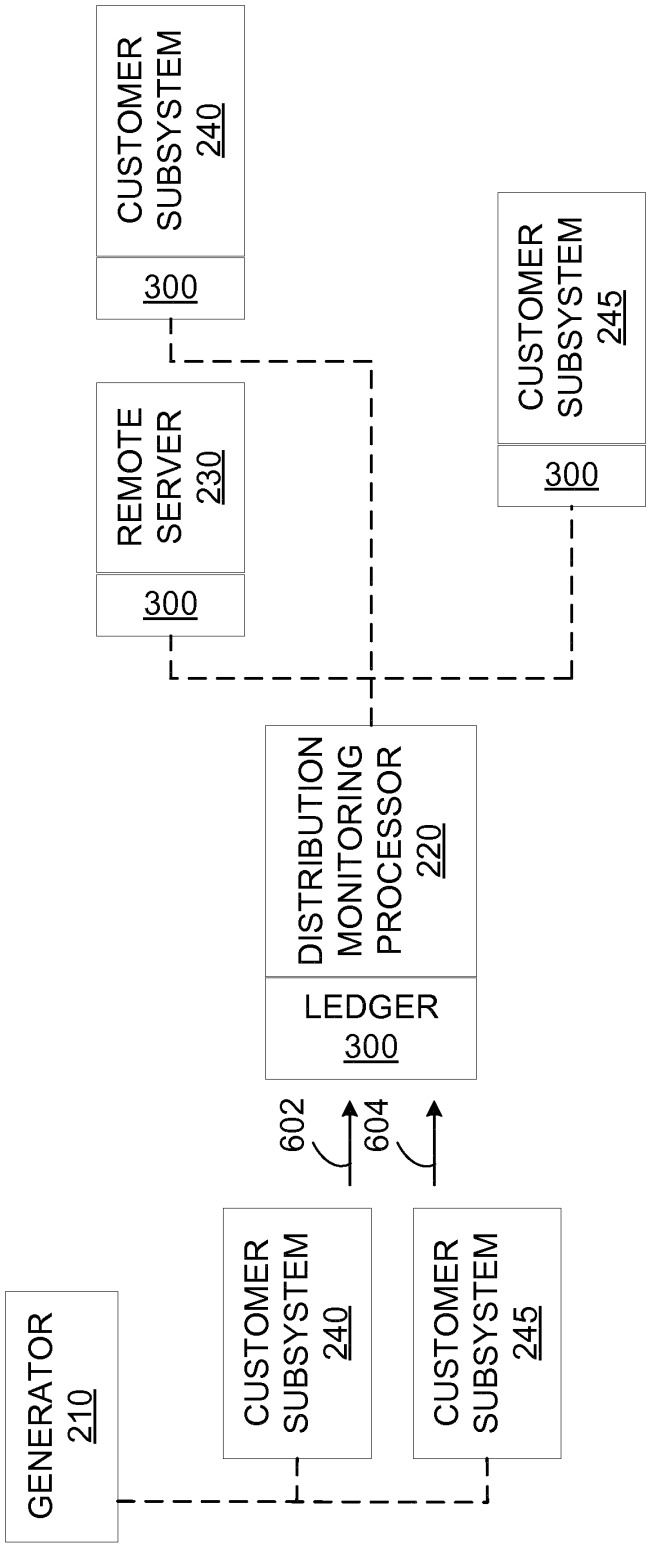
GENERATOR
210
CUSTOMER SUBSYSTEM
240
CUSTOMER SUBSYSTEM
245
602
604
DISTRIBUTION MONITORING PROCESSOR
220
LEDGER
300
REMOTE SERVER
230
300
CUSTOMER SUBSYSTEM
240
300
CUSTOMER SUBSYSTEM
245
300

FIG. 6

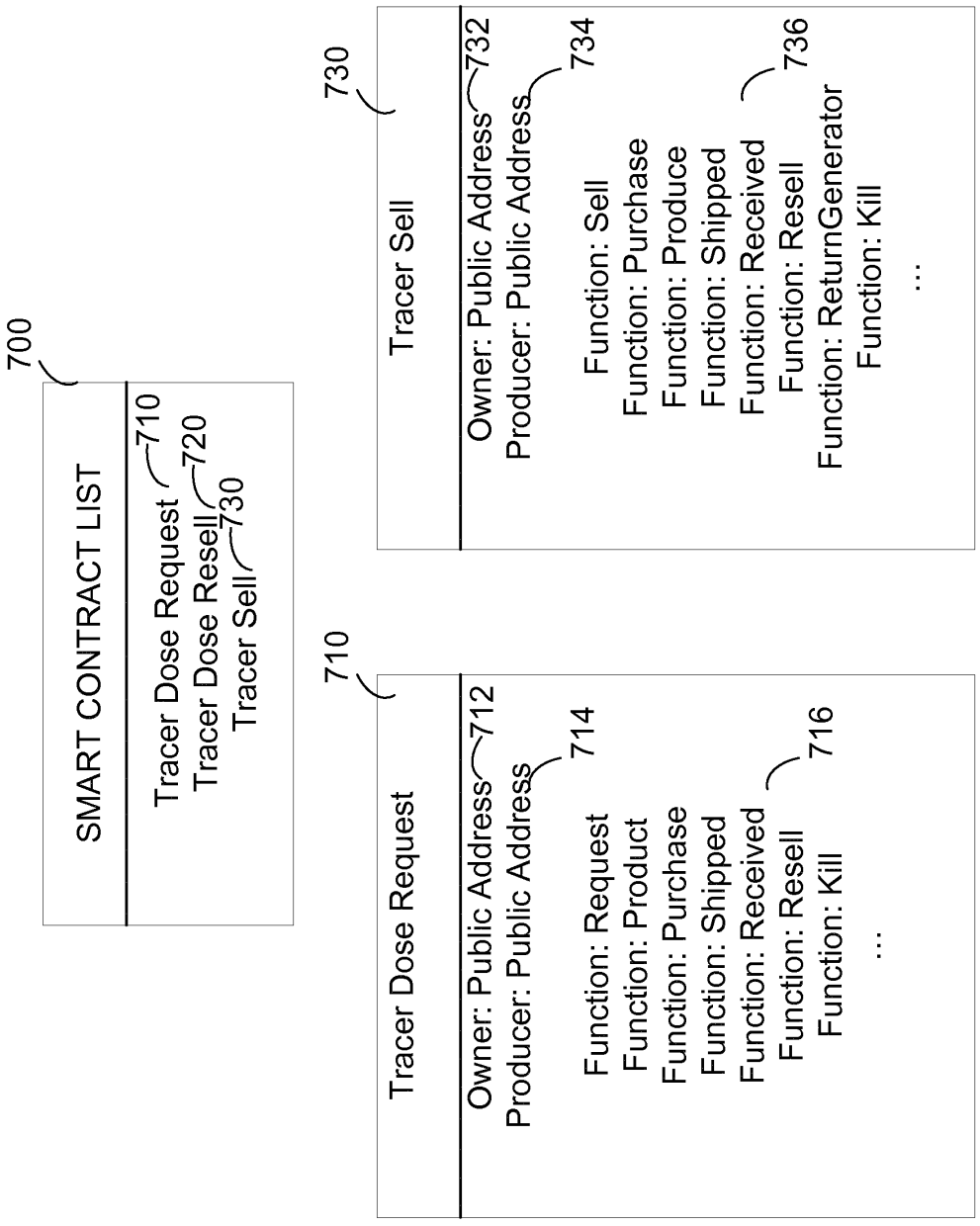
700
SMART CONTRACT LIST
Tracer Dose Request
Tracer Dose Resell
Tracer Sell
710
720
730
710
Tracer Dose Request
Owner: Public Address
Producer: Public Address
712
714
Function: Request
Function: Product
Function: Purchase
Function: Shipped
Function: Received
Function: Resell
Function: Kill
...
716
730
Tracer Sell
Owner: Public Address
Producer: Public Address
732
734
Function: Sell
Function: Purchase
Function: Produce
Function: Shipped
Function: Received
Function: Resell
Function: ReturnGenerator
Function: Kill
...
736

FIG. 7

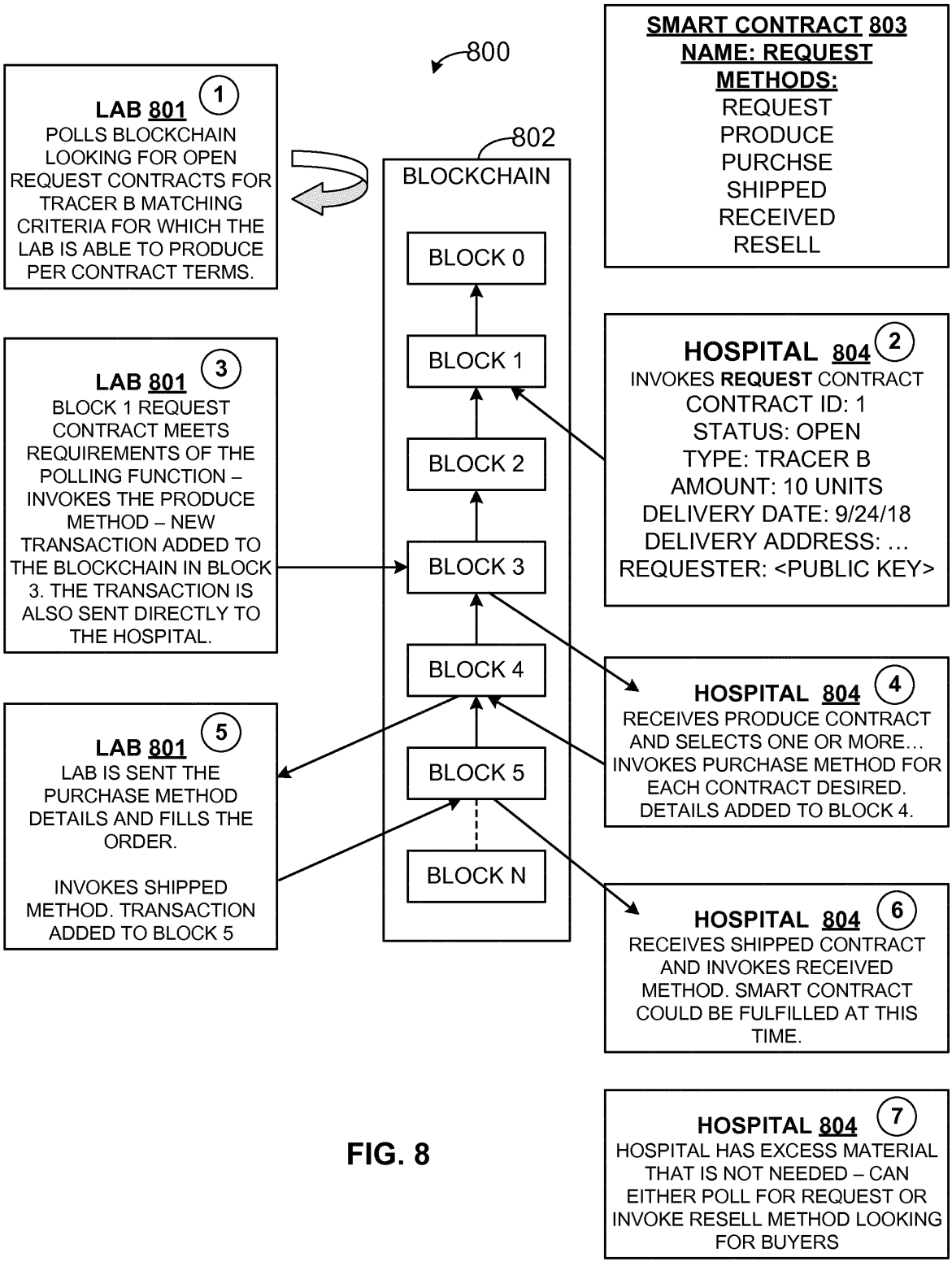
800
802
BLOCKCHAIN
BLOCK 0
BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 4
BLOCK 5
BLOCK N
LAB 801
1
POLLS BLOCKCHAIN LOOKING FOR OPEN REQUEST CONTRACTS FOR TRACER B MATCHING CRITERIA FOR WHICH THE LAB IS ABLE TO PRODUCE PER CONTRACT TERMS.
SMART CONTRACT 803
NAME: REQUEST
METHODS:
REQUEST
PRODUCE
PURCHSE
SHIPPED
RECEIVED
RESELL
HOSPITAL 804
2
INVOKES REQUEST CONTRACT
CONTRACT ID: 1
STATUS: OPEN
TYPE: TRACER B
AMOUNT: 10 UNITS
DELIVERY DATE: 9/24/18
DELIVERY ADDRESS: …
REQUESTER: <PUBLIC KEY>
LAB 801
3
BLOCK 1 REQUEST CONTRACT MEETS REQUIREMENTS OF THE POLLING FUNCTION – INVOKES THE PRODUCE METHOD – NEW TRANSACTION ADDED TO THE BLOCKCHAIN IN BLOCK 3. THE TRANSACTION IS ALSO SENT DIRECTLY TO THE HOSPITAL.
HOSPITAL 804
4
RECEIVES PRODUCE CONTRACT AND SELECTS ONE OR MORE… INVOKES PURCHASE METHOD FOR EACH CONTRACT DESIRED. DETAILS ADDED TO BLOCK 4.
LAB 801
5
LAB IS SENT THE PURCHASE METHOD DETAILS AND FILLS THE ORDER.
INVOKES SHIPPED METHOD. TRANSACTION ADDED TO BLOCK 5
HOSPITAL 804
6
RECEIVES SHIPPED CONTRACT AND INVOKES RECEIVED METHOD. SMART CONTRACT COULD BE FULFILLED AT THIS TIME.
HOSPITAL 804
7
HOSPITAL HAS EXCESS MATERIAL THAT IS NOT NEEDED – CAN EITHER POLL FOR REQUEST OR INVOKE RESELL METHOD LOOKING FOR BUYERS

FIG. 8

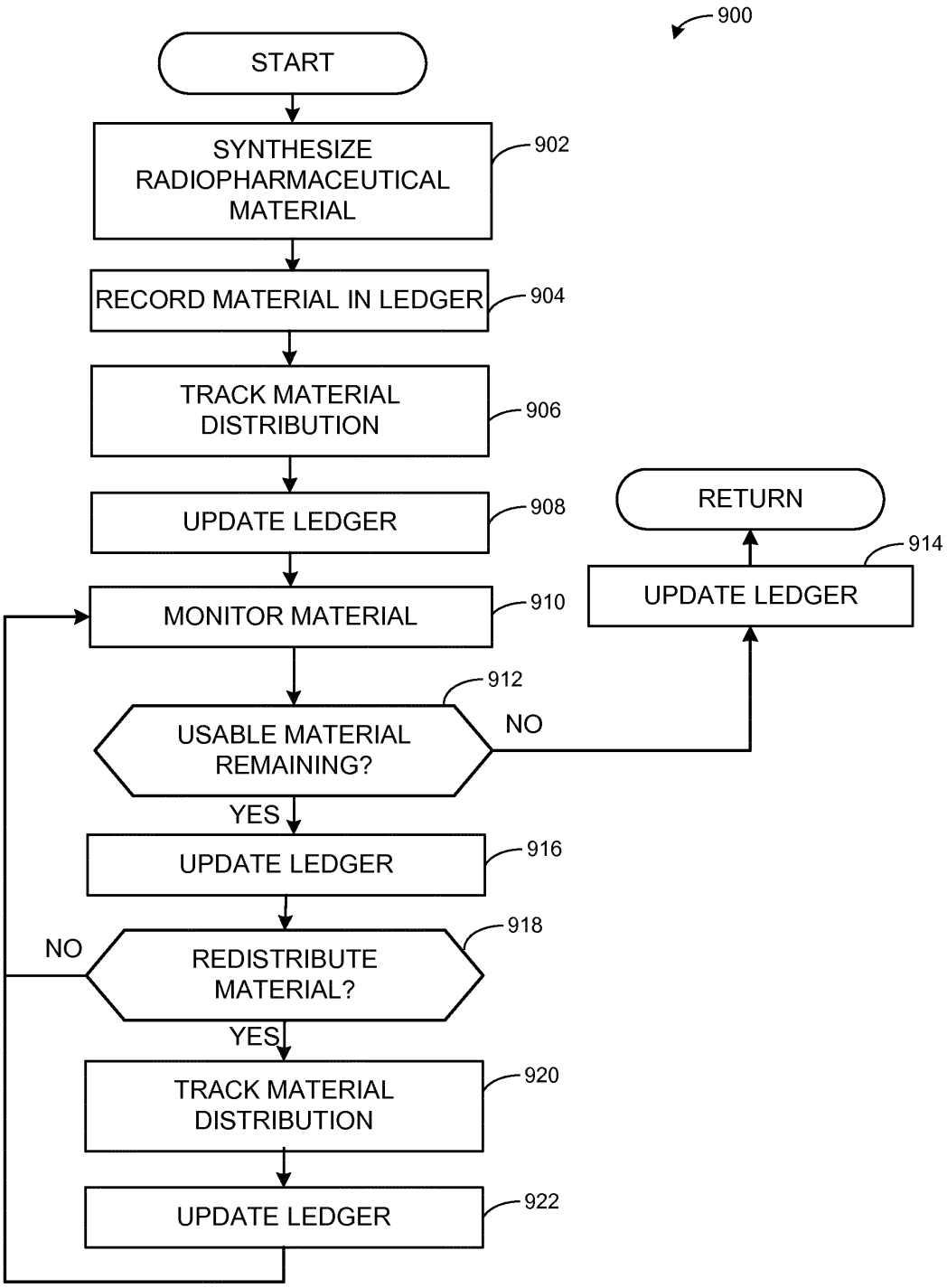
900
START
SYNTHESIZE RADIOPHARMACEUTICAL MATERIAL
902
RECORD MATERIAL IN LEDGER
904
TRACK MATERIAL DISTRIBUTION
906
UPDATE LEDGER
908
MONITOR MATERIAL
910
USABLE MATERIAL REMAINING?
912
NO
YES
RETURN
UPDATE LEDGER
914
UPDATE LEDGER
916
REDISTRIBUTE MATERIAL?
918
NO
YES
TRACK MATERIAL DISTRIBUTION
920
UPDATE LEDGER
922

FIG. 9

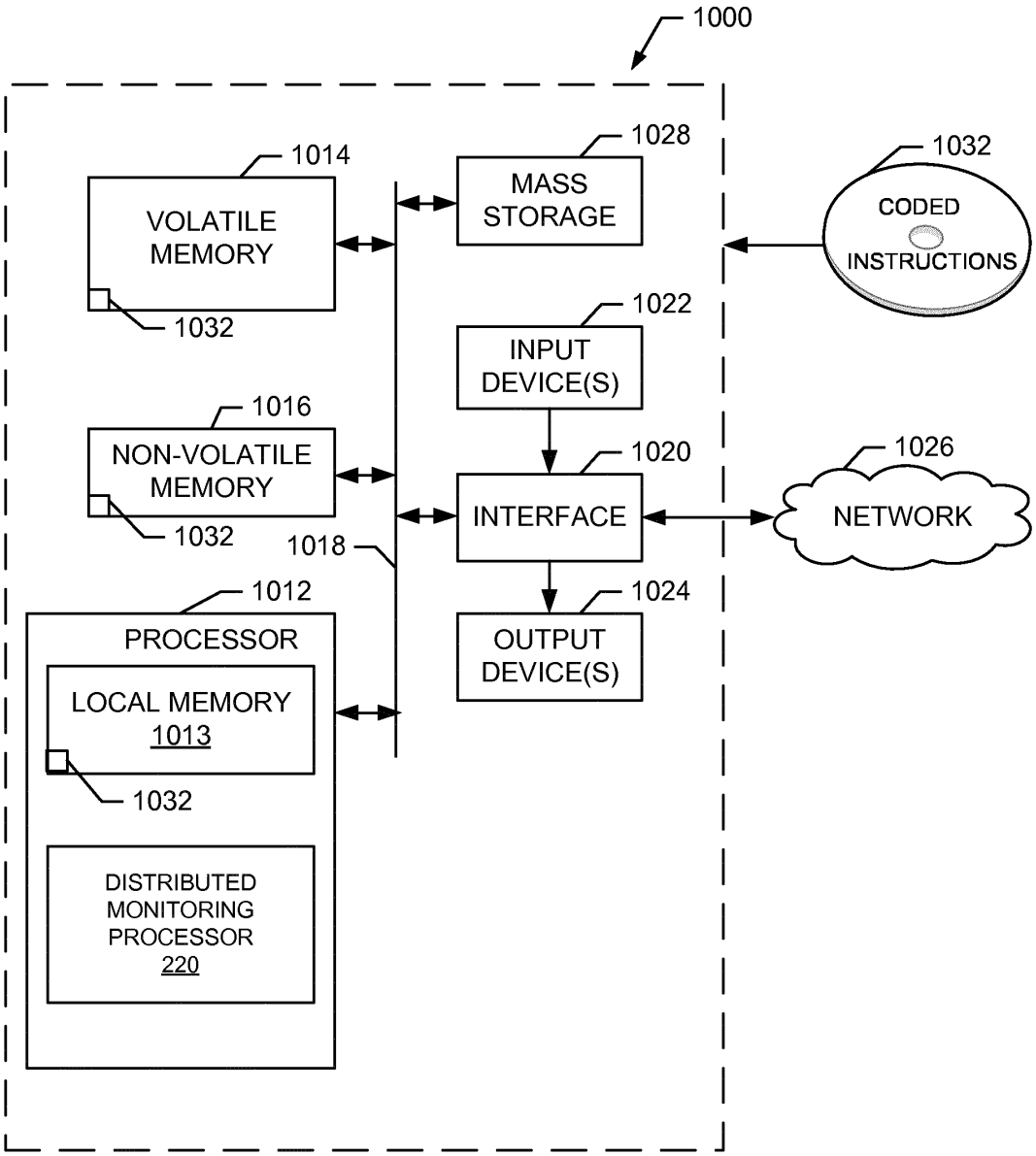
1000
1014
VOLATILE MEMORY
1032
1028
MASS STORAGE
1032
CODED INSTRUCTIONS
1022
INPUT DEVICE(S)
1016
NON-VOLATILE MEMORY
1032
1020
INTERFACE
1026
NETWORK
1018
1012
PROCESSOR
LOCAL MEMORY 1013
1032
1024
OUTPUT DEVICE(S)
DISTRIBUTED MONITORING PROCESSOR 220

FIG. 10

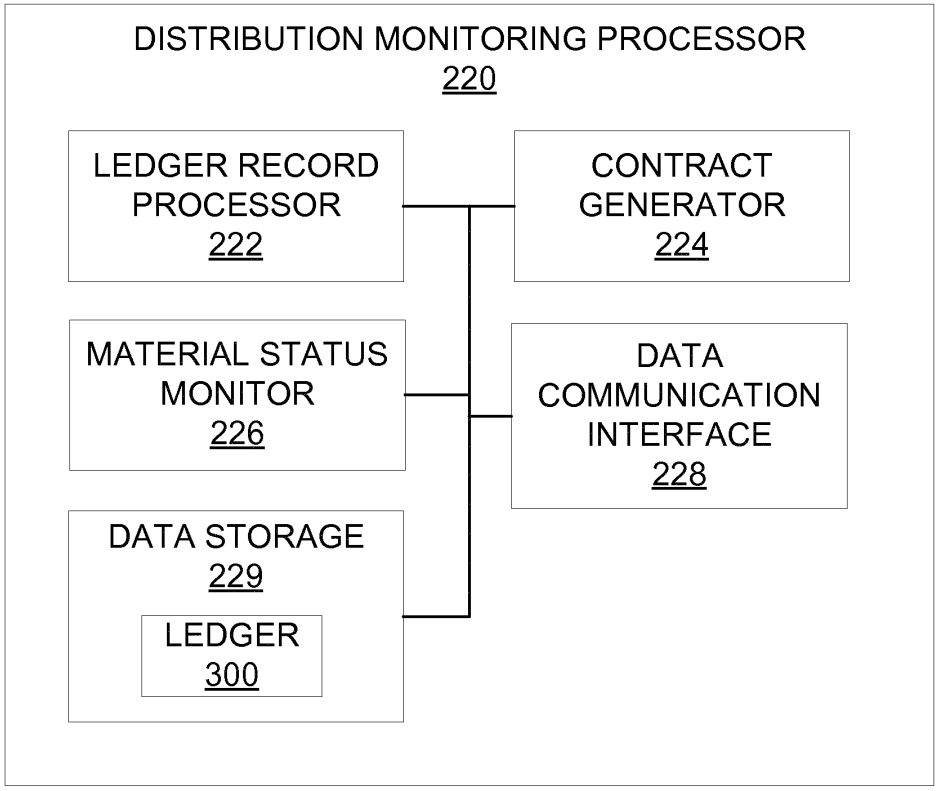
DISTRIBUTION MONITORING PROCESSOR
220
LEDGER RECORD PROCESSOR
222
CONTRACT GENERATOR
224
MATERIAL STATUS MONITOR
226
DATA COMMUNICATION INTERFACE
228
DATA STORAGE
229
LEDGER
300

FIG. 11