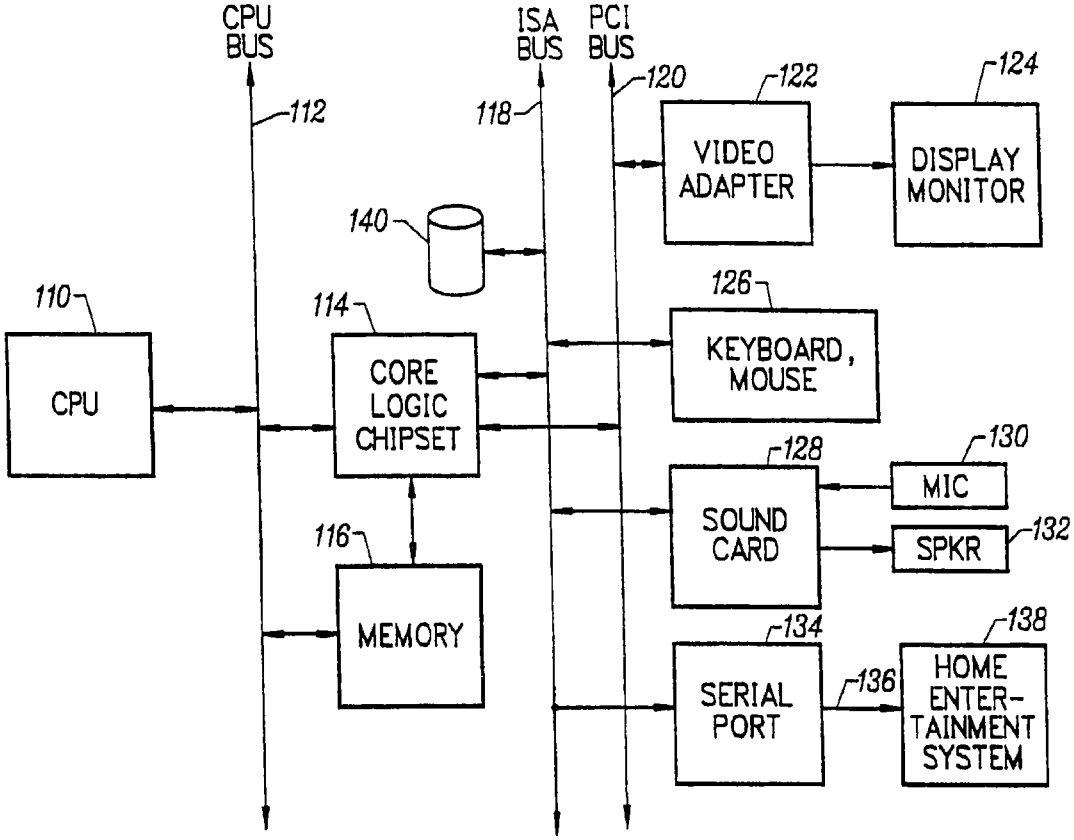

CPU BUS
ISA BUS
PCI BUS
112
118
120
122
124
VIDEO ADAPTER
DISPLAY MONITOR
140
110
114
126
CPU
CORE LOGIC CHIPSET
KEYBOARD, MOUSE
128
130
MIC
SOUND CARD
SPKR
132
116
MEMORY
134
138
SERIAL PORT
136
HOME ENTER-TAINMENT SYSTEM

FIG. 1

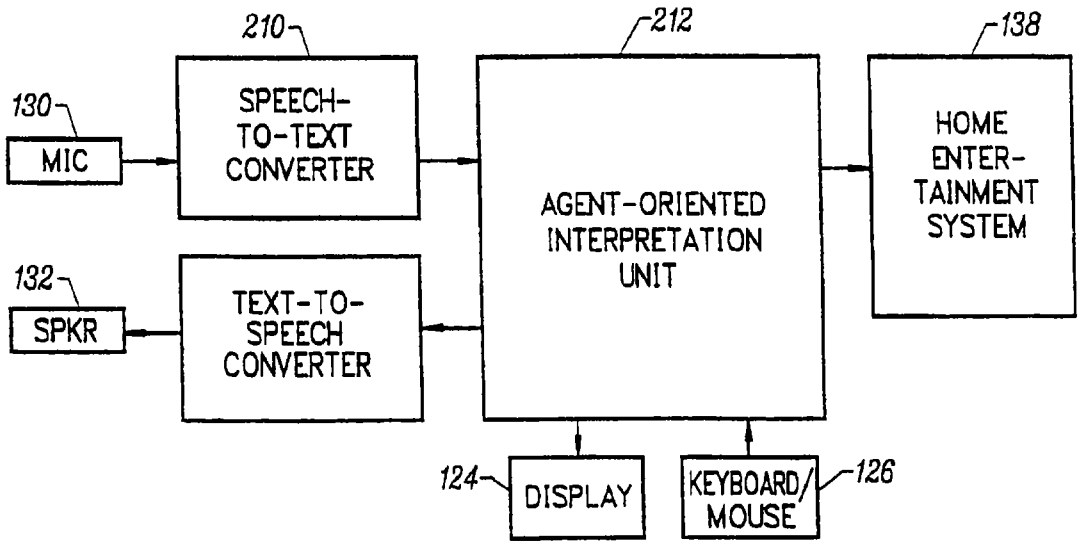

210
212
138
130
MIC
SPEECH-TO-TEXT CONVERTER
AGENT-ORIENTED INTERPRETATION UNIT
HOME ENTER-TAINMENT SYSTEM
132
SPKR
TEXT-TO-SPEECH CONVERTER
124
DISPLAY
KEYBOARD/ MOUSE
126

FIG. 2

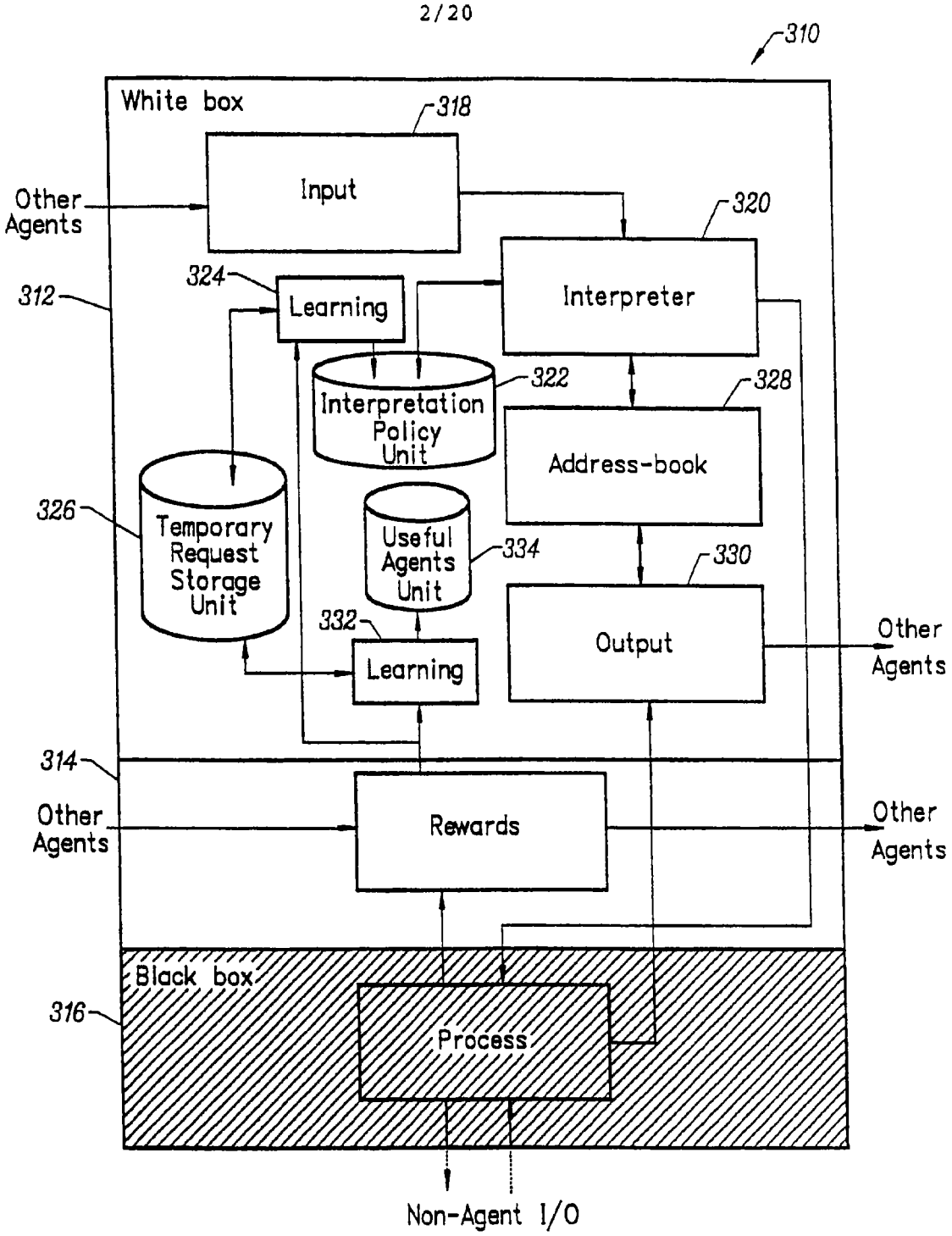

310
White box
318
Input
Other Agents
320
324
Learning
Interpreter
312
322
328
Interpretation Policy Unit
Address-book
326
Temporary Request Storage Unit
Useful Agents Unit
334
330
332
Learning
Output
Other Agents
314
Other Agents
Rewards
Other Agents
Black box
316
Process
Non-Agent I/O

FIG. 3

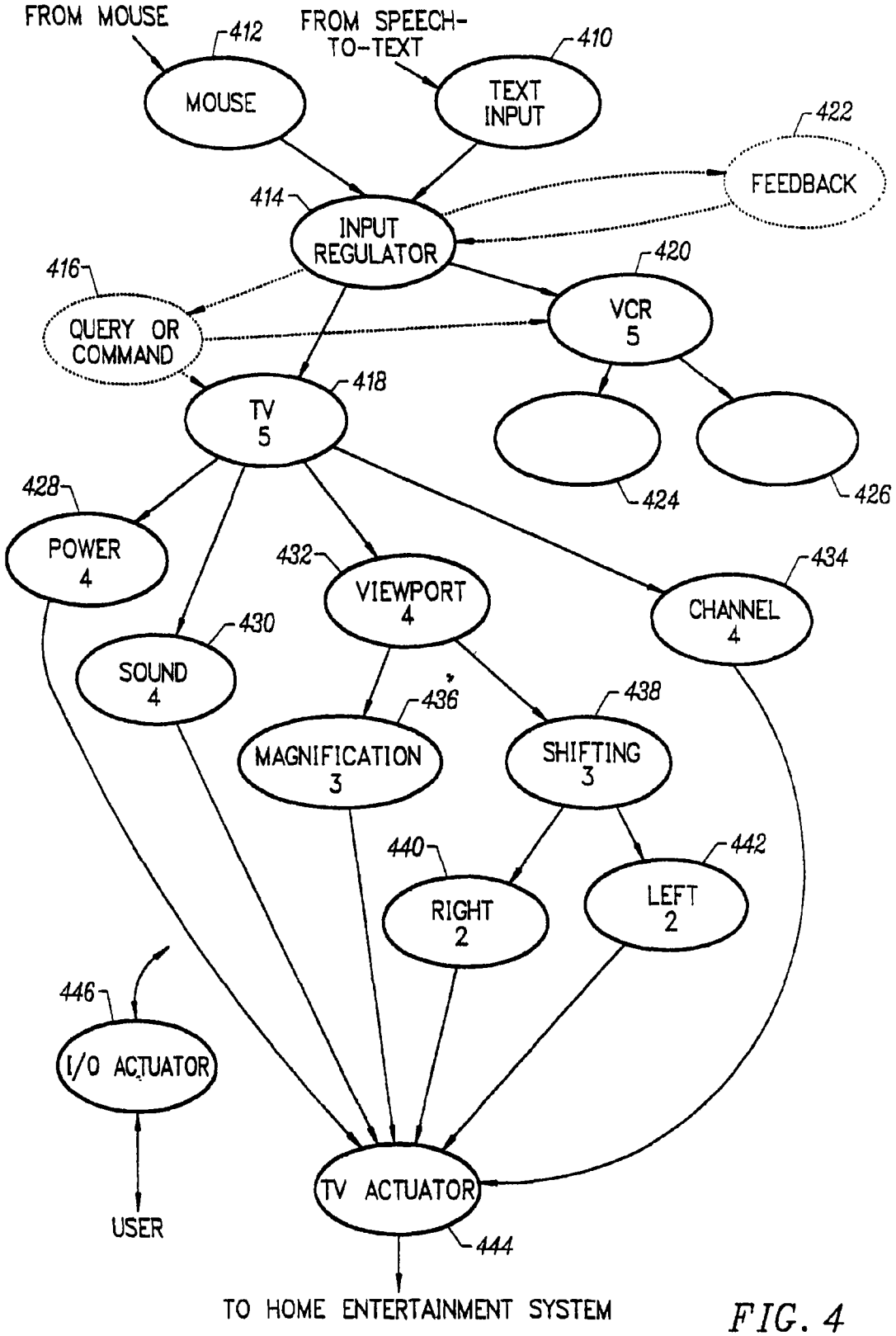

FROM MOUSE
412
MOUSE
FROM SPEECH-TO-TEXT
410
TEXT INPUT
422
FEEDBACK
414
INPUT REGULATOR
416
QUERY OR COMMAND
420
VCR 5
418
TV 5
424
426
428
POWER 4
432
VIEWPORT 4
434
CHANNEL 4
430
SOUND 4
436
MAGNIFICATION 3
438
SHIFTING 3
440
RIGHT 2
442
LEFT 2
446
I/O ACTUATOR
USER
TV ACTUATOR
444
TO HOME ENTERTAINMENT SYSTEM

FIG. 4

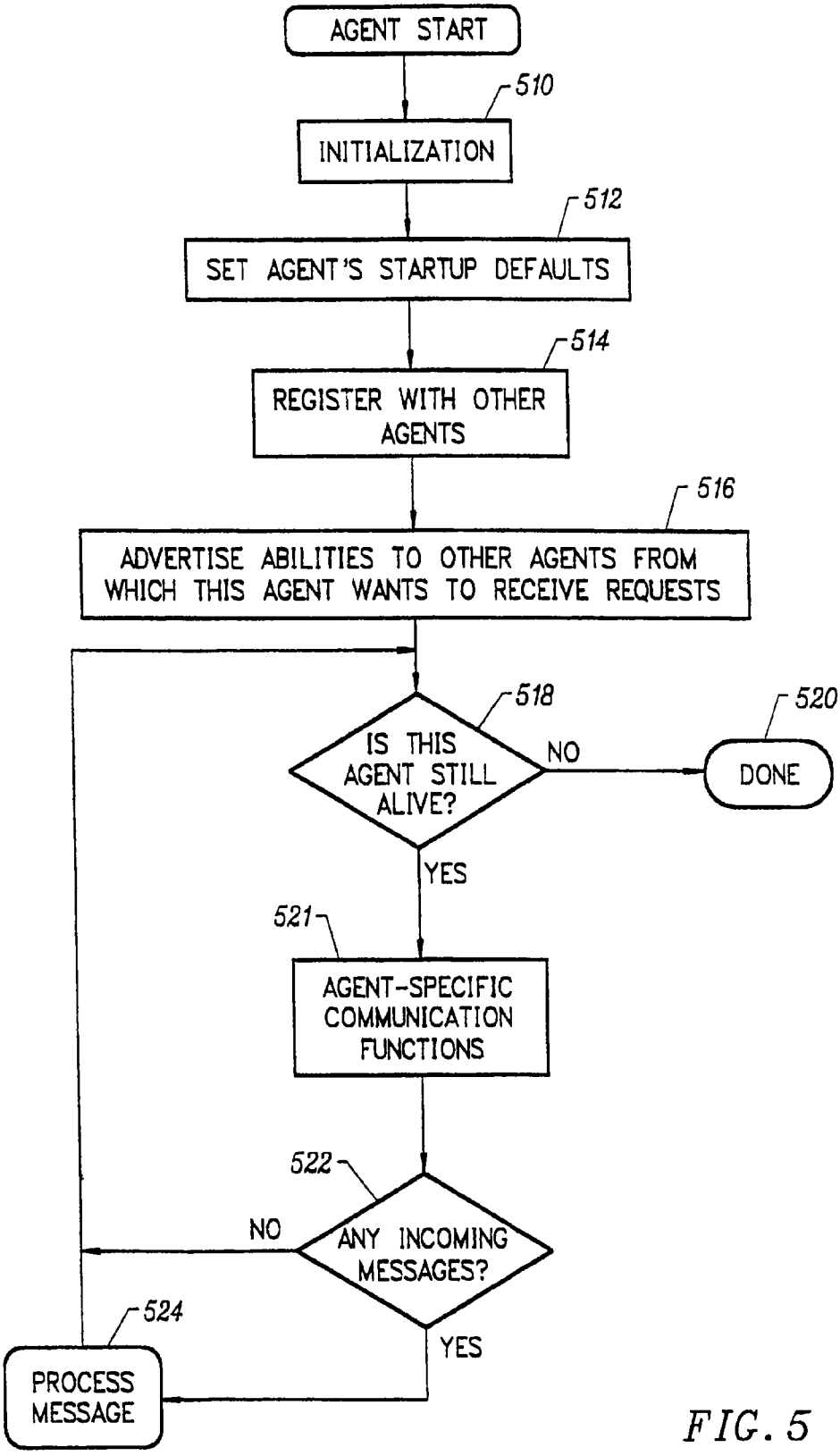

AGENT START
510
INITIALIZATION
512
SET AGENT'S STARTUP DEFAULTS
514
REGISTER WITH OTHER AGENTS
516
ADVERTISE ABILITIES TO OTHER AGENTS FROM WHICH THIS AGENT WANTS TO RECEIVE REQUESTS
518
IS THIS AGENT STILL ALIVE?
NO
520
DONE
YES
521
AGENT-SPECIFIC COMMUNICATION FUNCTIONS
522
ANY INCOMING MESSAGES?
NO
YES
524
PROCESS MESSAGE

FIG. 5

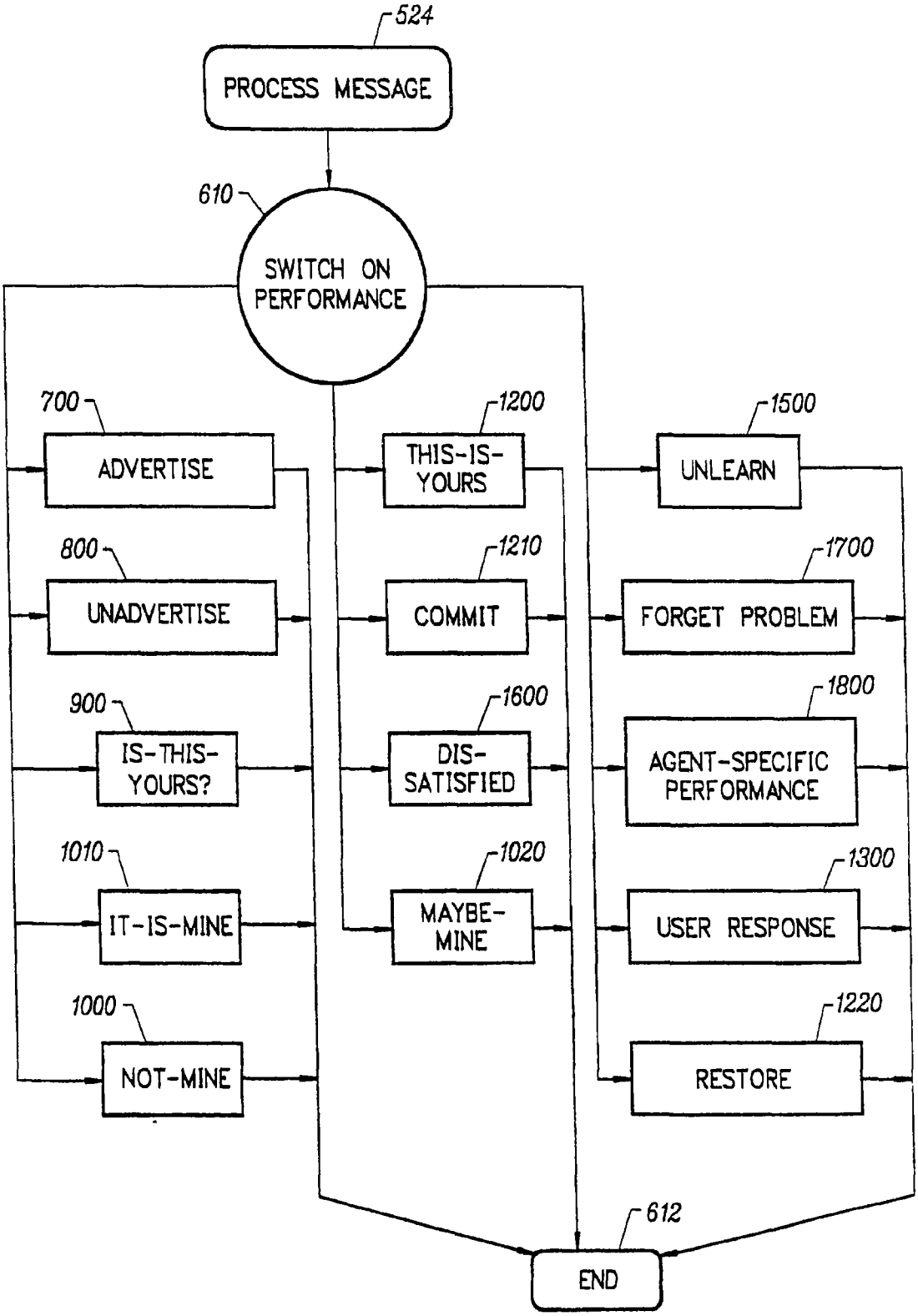

524
PROCESS MESSAGE
610
SWITCH ON PERFORMANCE
700
ADVERTISE
800
UNADVERTISE
900
IS-THIS-YOURS?
1010
IT-IS-MINE
1000
NOT-MINE
1200
THIS-IS-YOURS
1210
COMMIT
1600
DIS-SATISFIED
1020
MAYBE-MINE
1500
UNLEARN
1700
FORGET PROBLEM
1800
AGENT-SPECIFIC PERFORMANCE
1300
USER RESPONSE
1220
RESTORE
612
END

FIG. 6

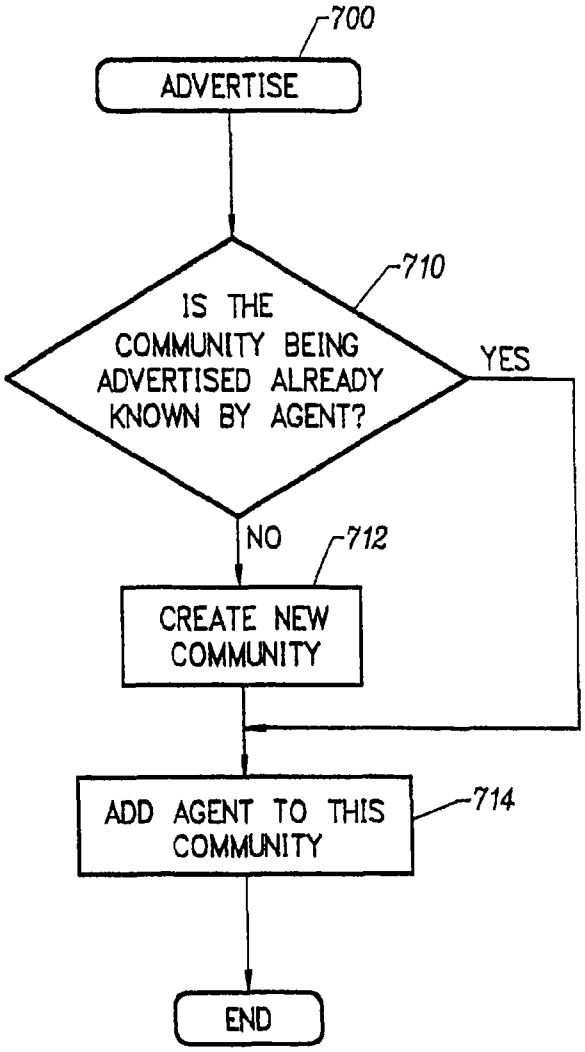

700
ADVERTISE
710
IS THE COMMUNITY BEING ADVERTISED ALREADY KNOWN BY AGENT?
YES
NO
712
CREATE NEW COMMUNITY
ADD AGENT TO THIS COMMUNITY
714
END

FIG. 7

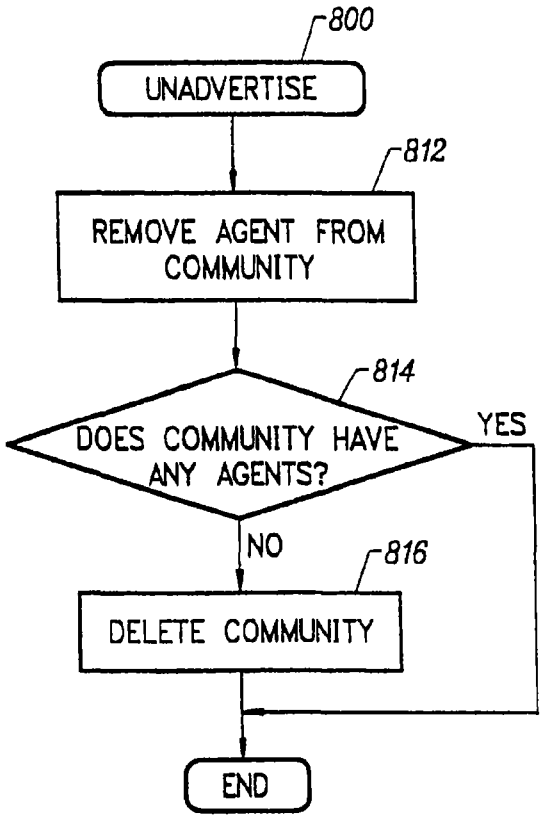

800
UNADVERTISE
812
REMOVE AGENT FROM COMMUNITY
814
DOES COMMUNITY HAVE ANY AGENTS?
YES
NO
816
DELETE COMMUNITY
END

FIG. 8

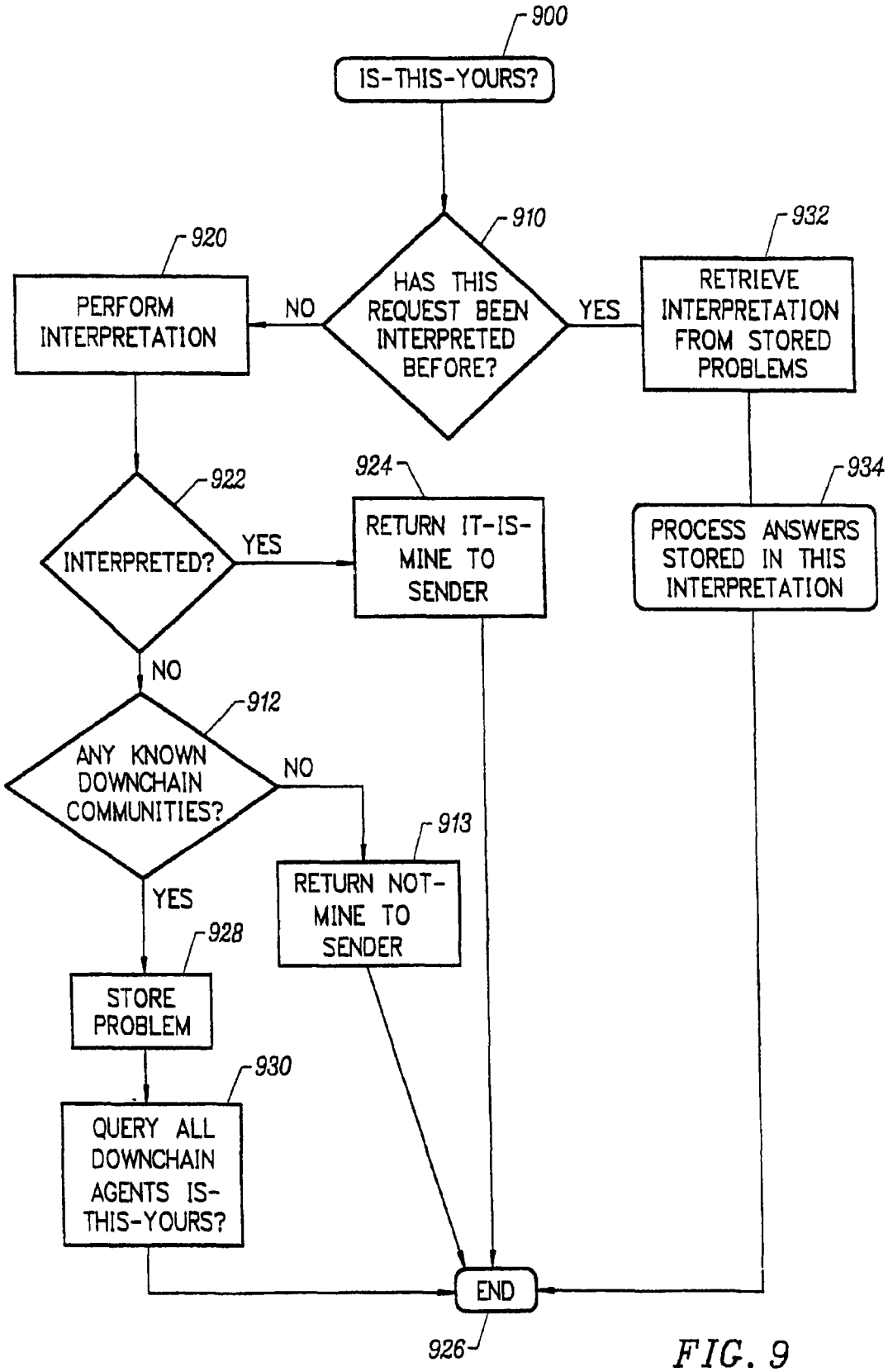

900
IS-THIS-YOURS?
910
HAS THIS REQUEST BEEN INTERPRETED BEFORE?
NO
YES
920
PERFORM INTERPRETATION
932
RETRIEVE INTERPRETATION FROM STORED PROBLEMS
922
INTERPRETED?
YES
924
RETURN IT-IS-MINE TO SENDER
934
PROCESS ANSWERS STORED IN THIS INTERPRETATION
NO
912
ANY KNOWN DOWNCHAIN COMMUNITIES?
NO
913
RETURN NOT-MINE TO SENDER
YES
928
STORE PROBLEM
930
QUERY ALL DOWNCHAIN AGENTS IS-THIS-YOURS?
END
926

FIG. 9

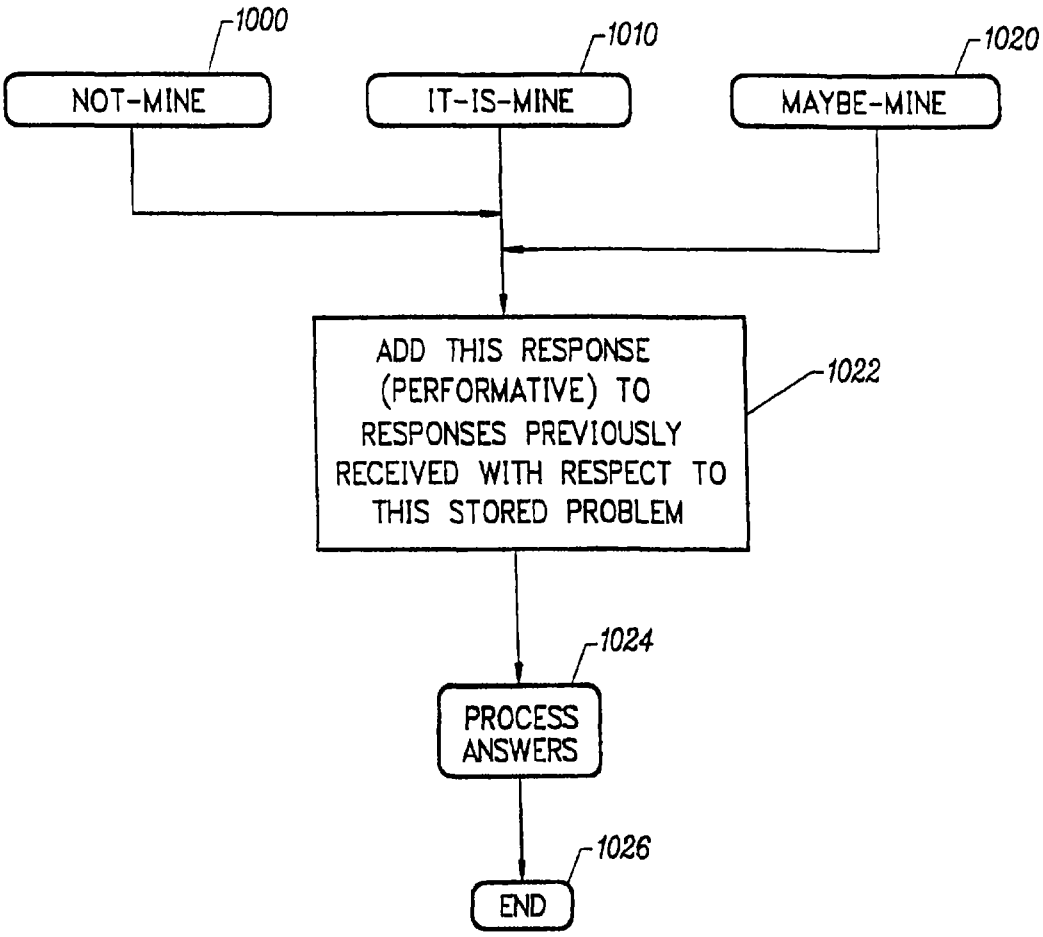
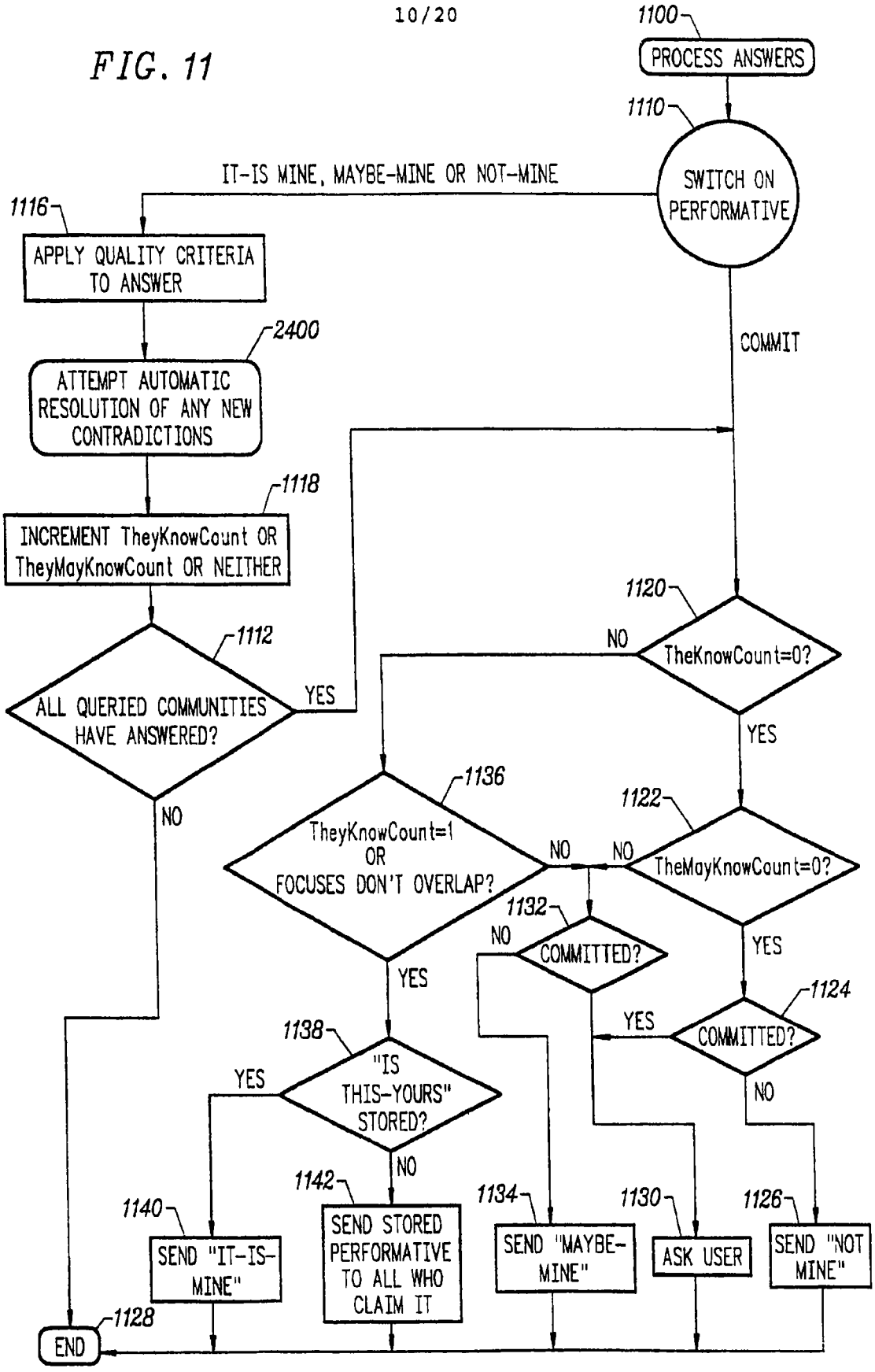

1000
NOT-MINE
1010
IT-IS-MINE
1020
MAYBE-MINE
ADD THIS RESPONSE (PERFORMATIVE) TO RESPONSES PREVIOUSLY RECEIVED WITH RESPECT TO THIS STORED PROBLEM
1022
1024
PROCESS ANSWERS
1026
END

FIG. 10

FIG. 11


1100
PROCESS ANSWERS
1110
SWITCH ON PERFORMATIVE
IT-IS MINE, MAYBE-MINE OR NOT-MINE
COMMIT
1116
APPLY QUALITY CRITERIA TO ANSWER
2400
ATTEMPT AUTOMATIC RESOLUTION OF ANY NEW CONTRADICTIONS
1118
INCREMENT TheyKnowCount OR TheyMayKnowCount OR NEITHER
1112
ALL QUERIED COMMUNITIES HAVE ANSWERED?
YES
NO
1120
TheKnowCount=0?
NO
YES
1136
TheyKnowCount=1 OR FOCUSES DON'T OVERLAP?
NO
YES
1122
TheMayKnowCount=0?
NO
YES
1132
COMMITTED?
NO
YES
1124
COMMITTED?
YES
NO
1138
"IS THIS-YOURS" STORED?
YES
NO
1140
SEND "IT-IS-MINE"
1142
SEND STORED PERFORMATIVE TO ALL WHO CLAIM IT
1134
SEND "MAYBE-MINE"
1130
ASK USER
1126
SEND "NOT MINE"
1128
END

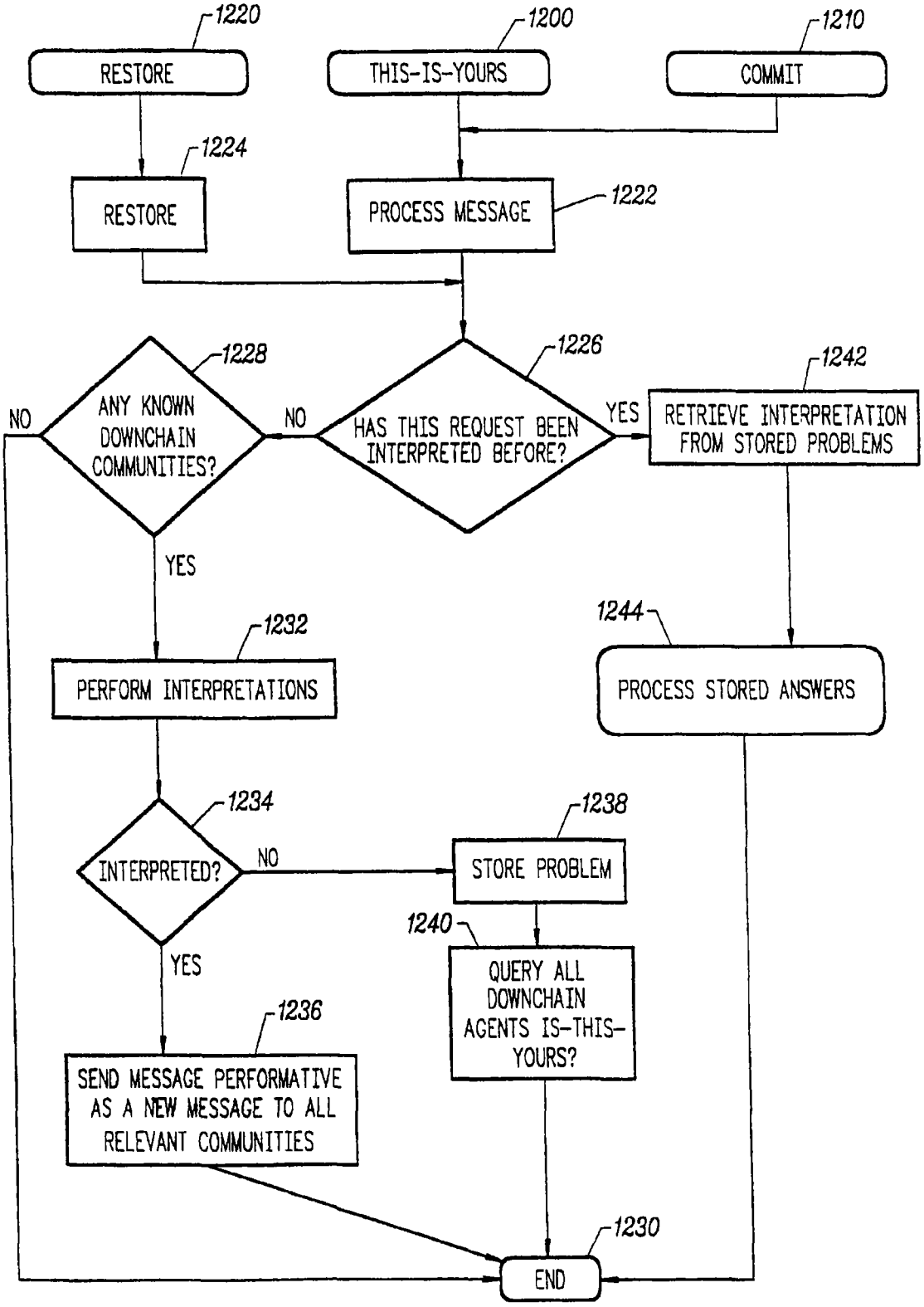

1220
RESTORE
1200
THIS-IS-YOURS
1210
COMMIT
1224
RESTORE
PROCESS MESSAGE
1222
1228
ANY KNOWN DOWNCHAIN COMMUNITIES?
NO
NO
1226
HAS THIS REQUEST BEEN INTERPRETED BEFORE?
YES
1242
RETRIEVE INTERPRETATION FROM STORED PROBLEMS
YES
1232
PERFORM INTERPRETATIONS
1244
PROCESS STORED ANSWERS
1234
INTERPRETED?
NO
1238
STORE PROBLEM
1240
QUERY ALL DOWNCHAIN AGENTS IS-THIS-YOURS?
YES
1236
SEND MESSAGE PERFORMATIVE AS A NEW MESSAGE TO ALL RELEVANT COMMUNITIES
1230
END

FIG. 12

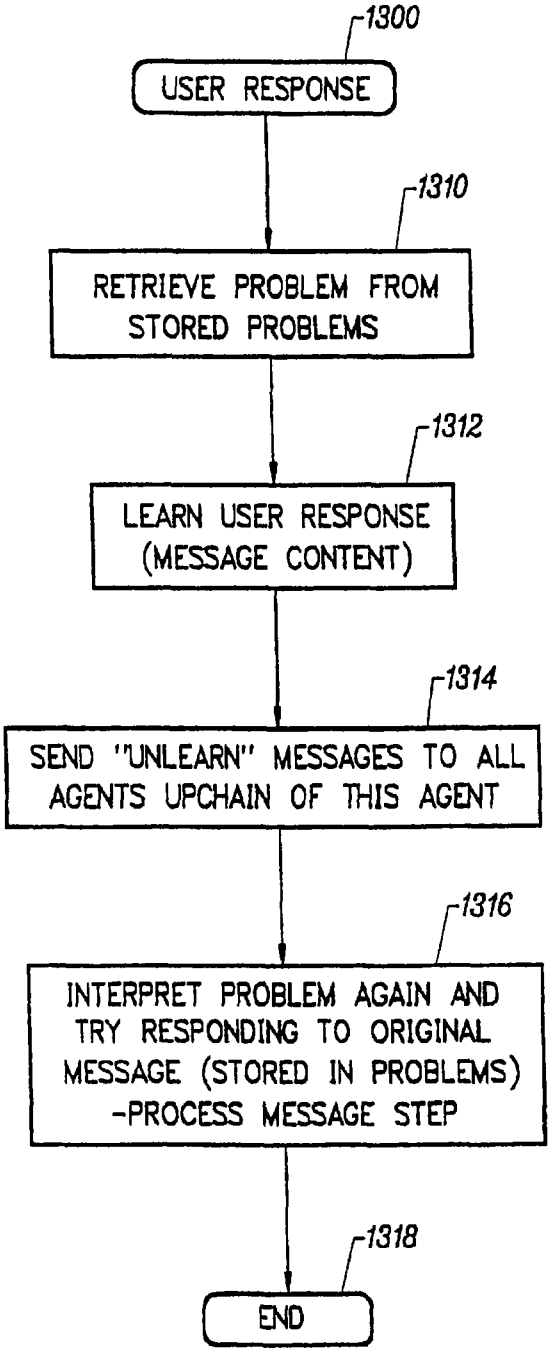


FIG. 13

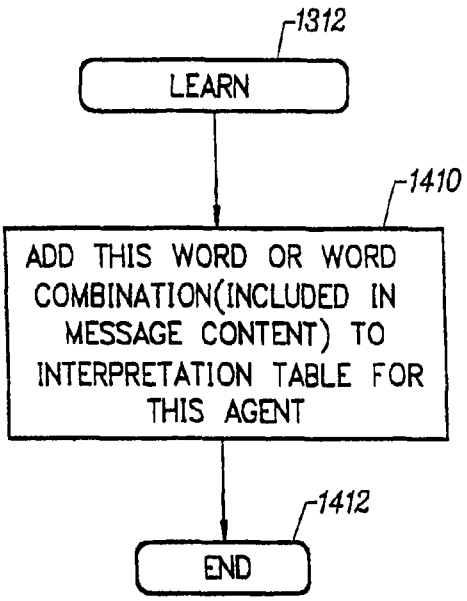


FIG. 14

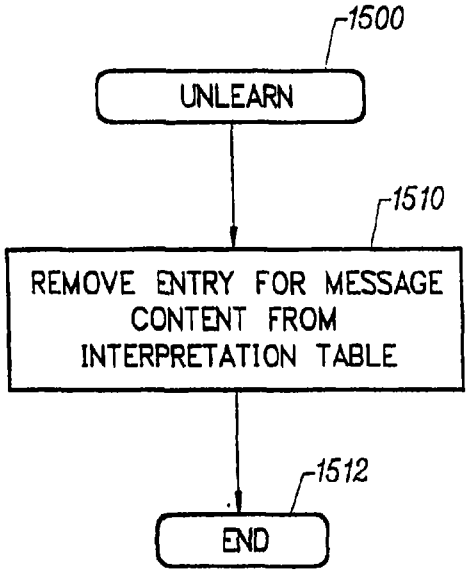


FIG. 15

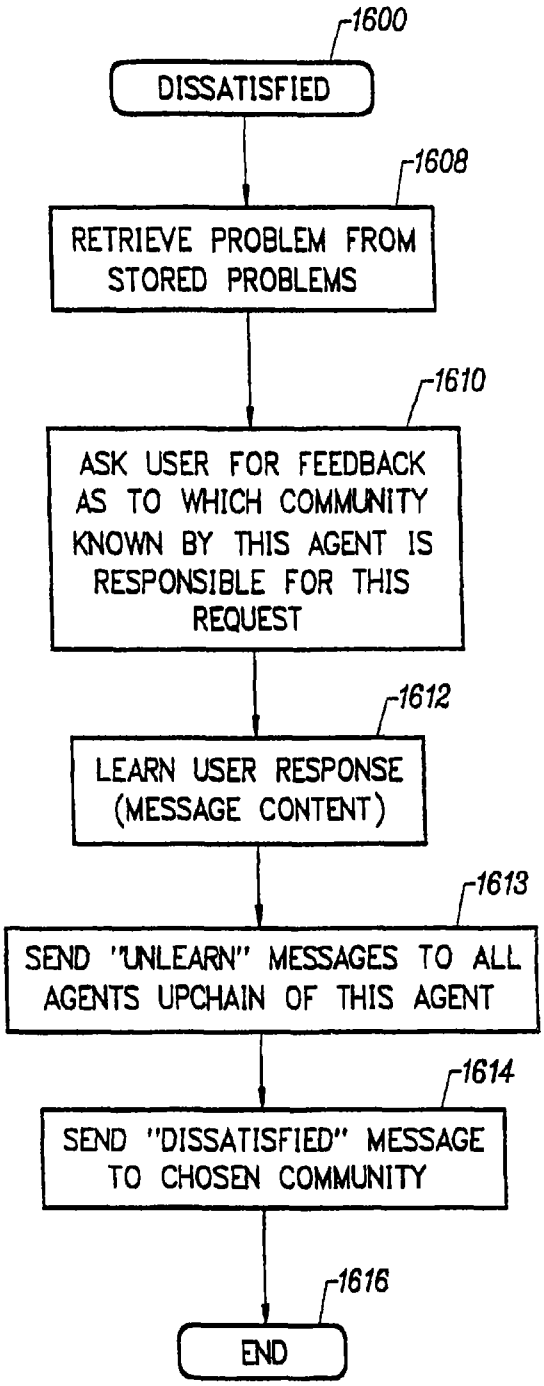


FIG. 16

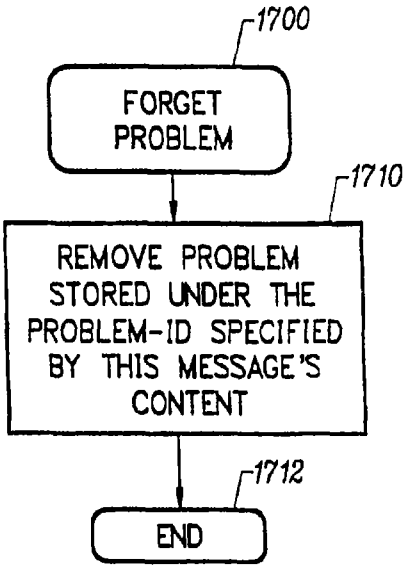


FIG. 17

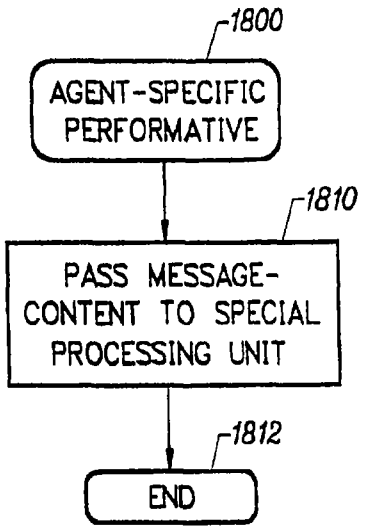


FIG. 18

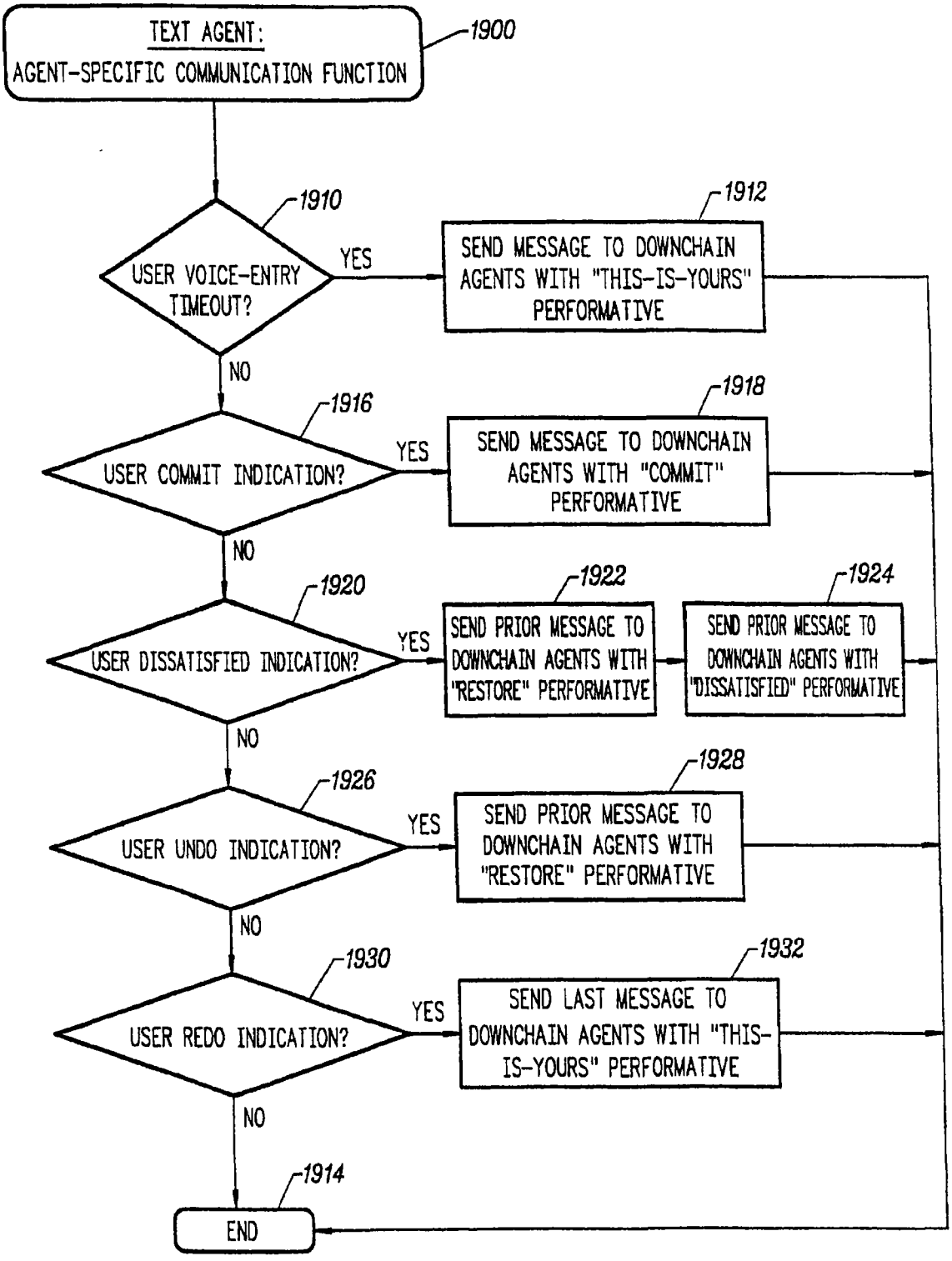

TEXT AGENT:
AGENT-SPECIFIC COMMUNICATION FUNCTION
1900
1910
USER VOICE-ENTRY TIMEOUT?
YES
1912
SEND MESSAGE TO DOWNCHAIN AGENTS WITH "THIS-IS-YOURS" PERFORMATIVE
NO
1916
USER COMMIT INDICATION?
YES
1918
SEND MESSAGE TO DOWNCHAIN AGENTS WITH "COMMIT" PERFORMATIVE
NO
1920
USER DISSATISFIED INDICATION?
YES
1922
SEND PRIOR MESSAGE TO DOWNCHAIN AGENTS WITH "RESTORE" PERFORMATIVE
1924
SEND PRIOR MESSAGE TO DOWNCHAIN AGENTS WITH "DISSATISFIED" PERFORMATIVE
NO
1926
USER UNDO INDICATION?
YES
1928
SEND PRIOR MESSAGE TO DOWNCHAIN AGENTS WITH "RESTORE" PERFORMATIVE
NO
1930
USER REDO INDICATION?
YES
1932
SEND LAST MESSAGE TO DOWNCHAIN AGENTS WITH "THIS-IS-YOURS" PERFORMATIVE
NO
1914
END

FIG. 19

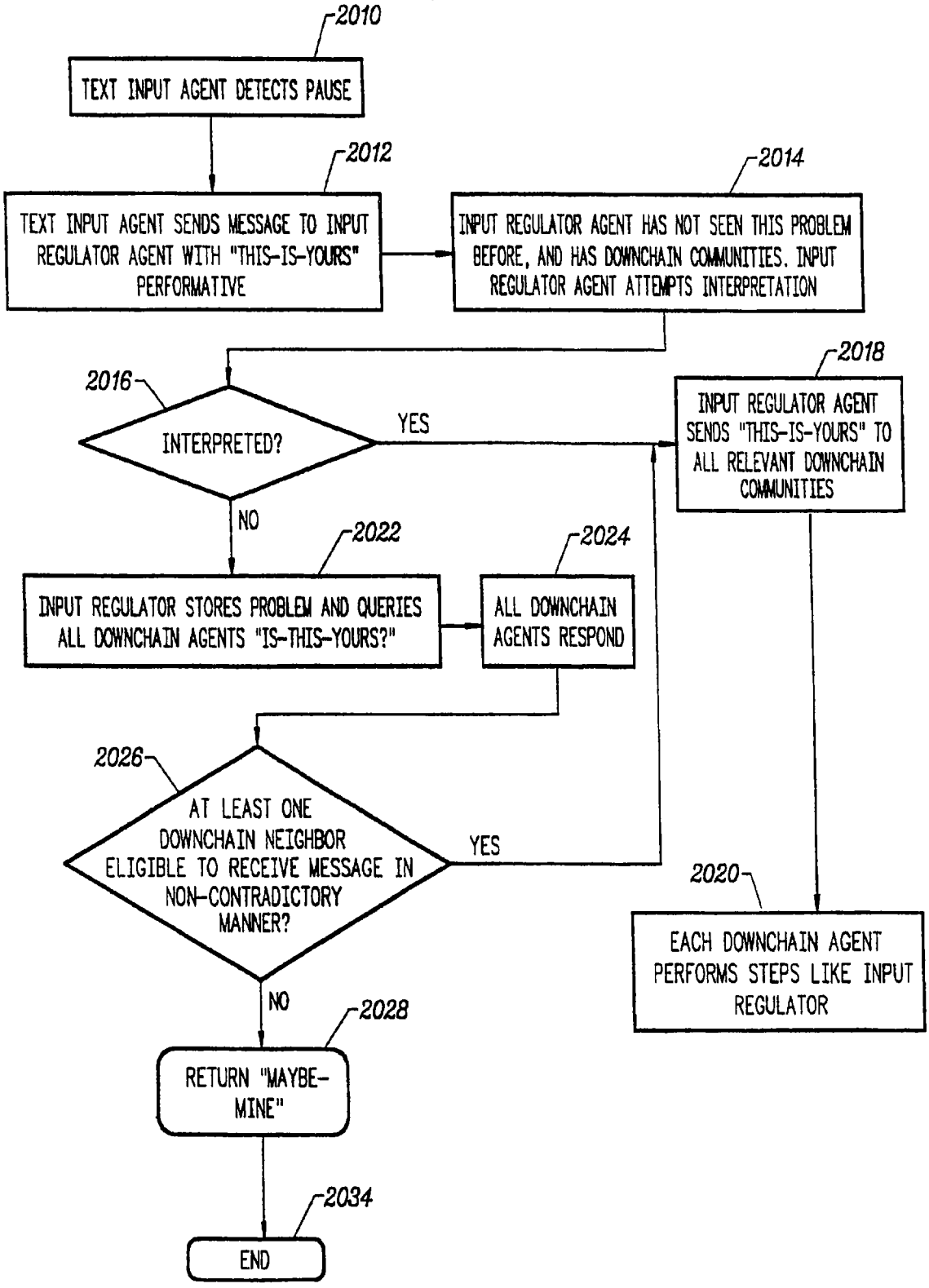

2010
TEXT INPUT AGENT DETECTS PAUSE
2012
TEXT INPUT AGENT SENDS MESSAGE TO INPUT REGULATOR AGENT WITH "THIS-IS-YOURS" PERFORMATIVE
2014
INPUT REGULATOR AGENT HAS NOT SEEN THIS PROBLEM BEFORE, AND HAS DOWNCHAIN COMMUNITIES. INPUT REGULATOR AGENT ATTEMPTS INTERPRETATION
2016
INTERPRETED?
YES
2018
INPUT REGULATOR AGENT SENDS "THIS-IS-YOURS" TO ALL RELEVANT DOWNCHAIN COMMUNITIES
NO
2022
INPUT REGULATOR STORES PROBLEM AND QUERIES ALL DOWNCHAIN AGENTS "IS-THIS-YOURS?"
2024
ALL DOWNCHAIN AGENTS RESPOND
2026
AT LEAST ONE DOWNCHAIN NEIGHBOR ELIGIBLE TO RECEIVE MESSAGE IN NON-CONTRADICTORY MANNER?
YES
2020
EACH DOWNCHAIN AGENT PERFORMS STEPS LIKE INPUT REGULATOR
NO
2028
RETURN "MAYBE-MINE"
2034
END

FIG. 20

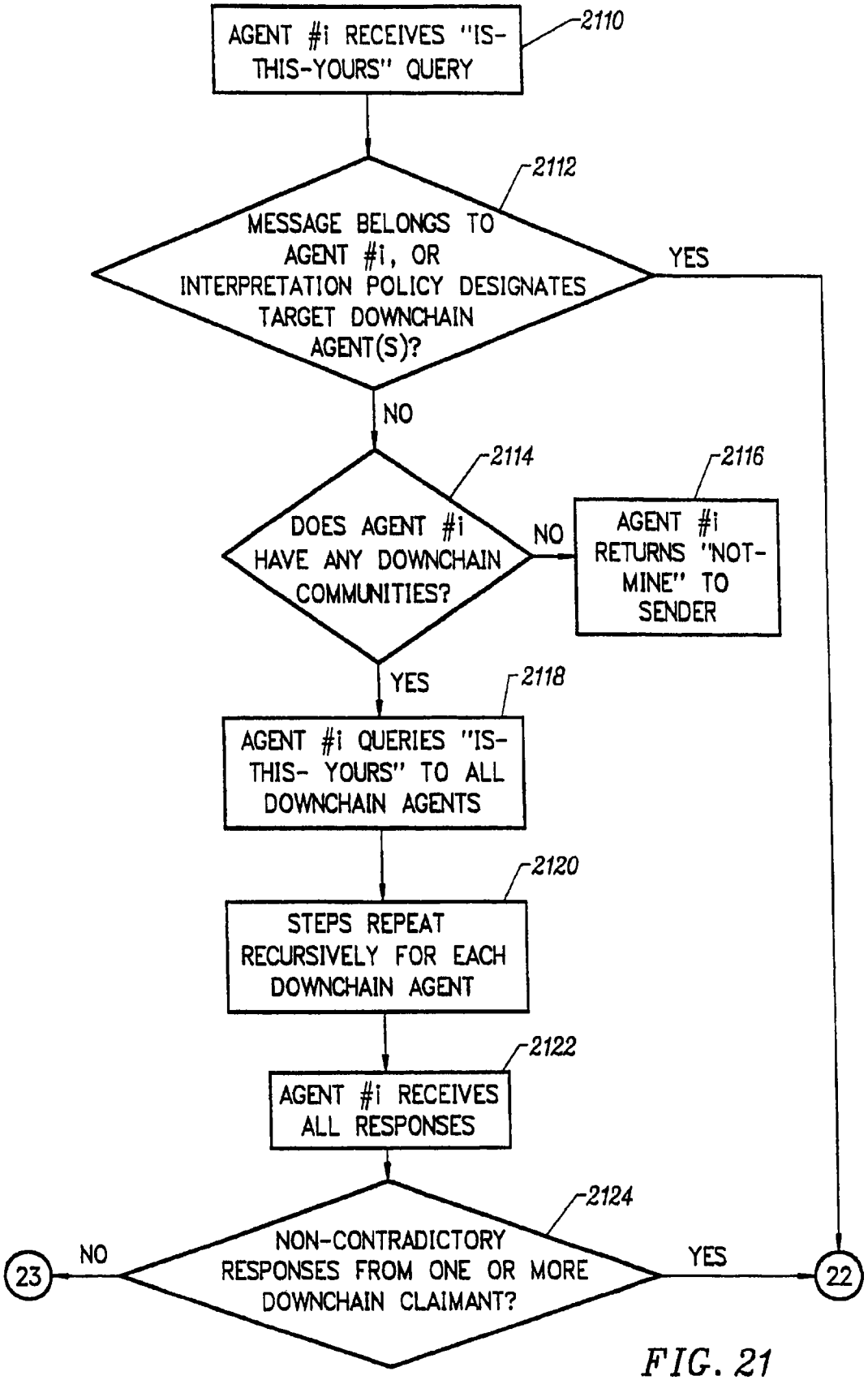

AGENT #i RECEIVES "IS-THIS-YOURS" QUERY
2110
MESSAGE BELONGS TO AGENT #i, OR INTERPRETATION POLICY DESIGNATES TARGET DOWNCHAIN AGENT(S)?
2112
YES
NO
DOES AGENT #i HAVE ANY DOWNCHAIN COMMUNITIES?
2114
NO
AGENT #i RETURNS "NOT-MINE" TO SENDER
2116
YES
AGENT #i QUERIES "IS-THIS- YOURS" TO ALL DOWNCHAIN AGENTS
2118
STEPS REPEAT RECURSIVELY FOR EACH DOWNCHAIN AGENT
2120
AGENT #i RECEIVES ALL RESPONSES
2122
NON-CONTRADICTORY RESPONSES FROM ONE OR MORE DOWNCHAIN CLAIMANT?
2124
NO
YES
23
22

FIG. 21

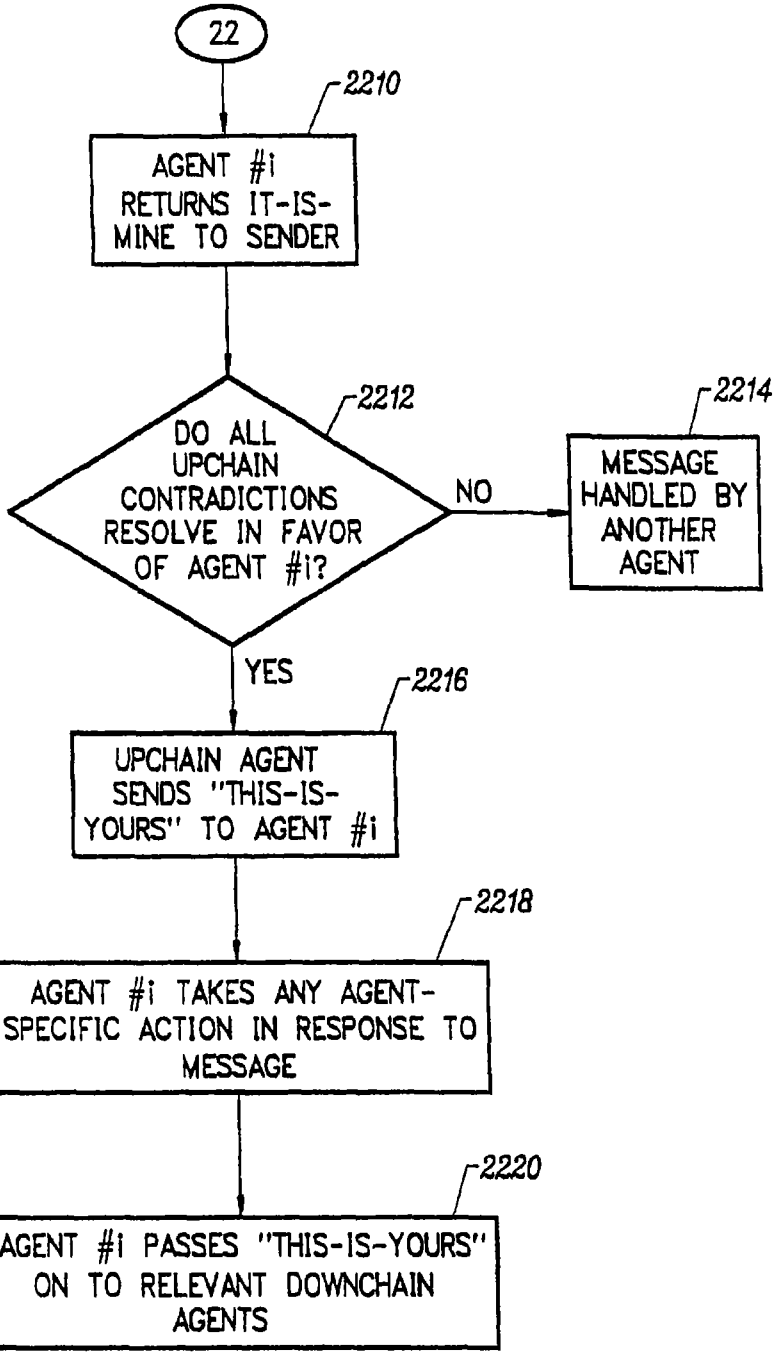

22
2210
AGENT #i RETURNS IT-IS-MINE TO SENDER
2212
DO ALL UPCHAIN CONTRADICTIONS RESOLVE IN FAVOR OF AGENT #i?
NO
2214
MESSAGE HANDLED BY ANOTHER AGENT
YES
2216
UPCHAIN AGENT SENDS "THIS-IS-YOURS" TO AGENT #i
2218
AGENT #i TAKES ANY AGENT-SPECIFIC ACTION IN RESPONSE TO MESSAGE
2220
AGENT #i PASSES "THIS-IS-YOURS" ON TO RELEVANT DOWNCHAIN AGENTS

FIG. 22

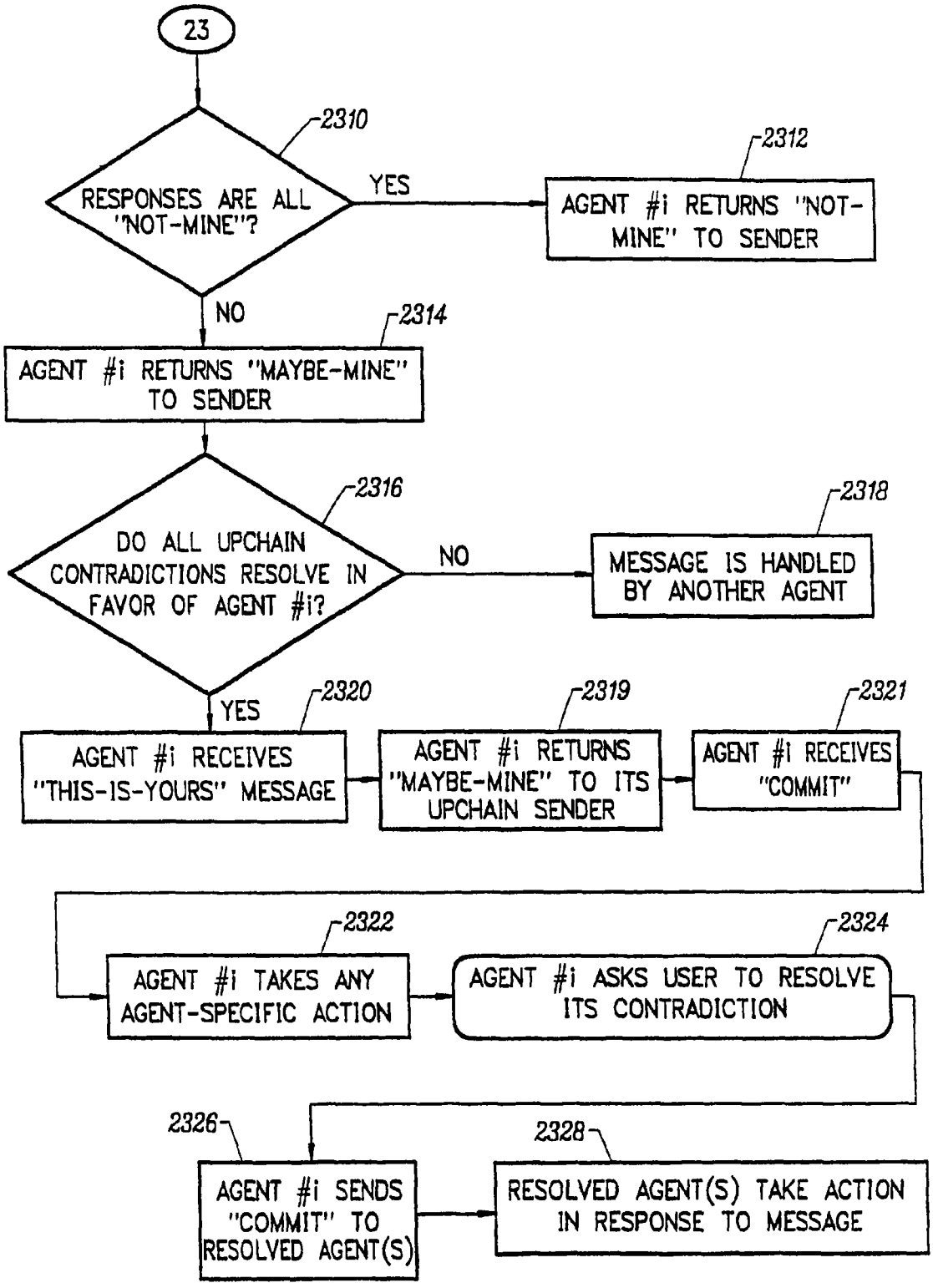

23
2310
RESPONSES ARE ALL "NOT-MINE"?
YES
2312
AGENT #i RETURNS "NOT-MINE" TO SENDER
NO
2314
AGENT #i RETURNS "MAYBE-MINE" TO SENDER
2316
DO ALL UPCHAIN CONTRADICTIONS RESOLVE IN FAVOR OF AGENT #i?
NO
2318
MESSAGE IS HANDLED BY ANOTHER AGENT
YES
2320
AGENT #i RECEIVES "THIS-IS-YOURS" MESSAGE
2319
AGENT #i RETURNS "MAYBE-MINE" TO ITS UPCHAIN SENDER
2321
AGENT #i RECEIVES "COMMIT"
2322
AGENT #i TAKES ANY AGENT-SPECIFIC ACTION
2324
AGENT #i ASKS USER TO RESOLVE ITS CONTRADICTION
2326
AGENT #i SENDS "COMMIT" TO RESOLVED AGENT(S)
2328
RESOLVED AGENT(S) TAKE ACTION IN RESPONSE TO MESSAGE

FIG. 23

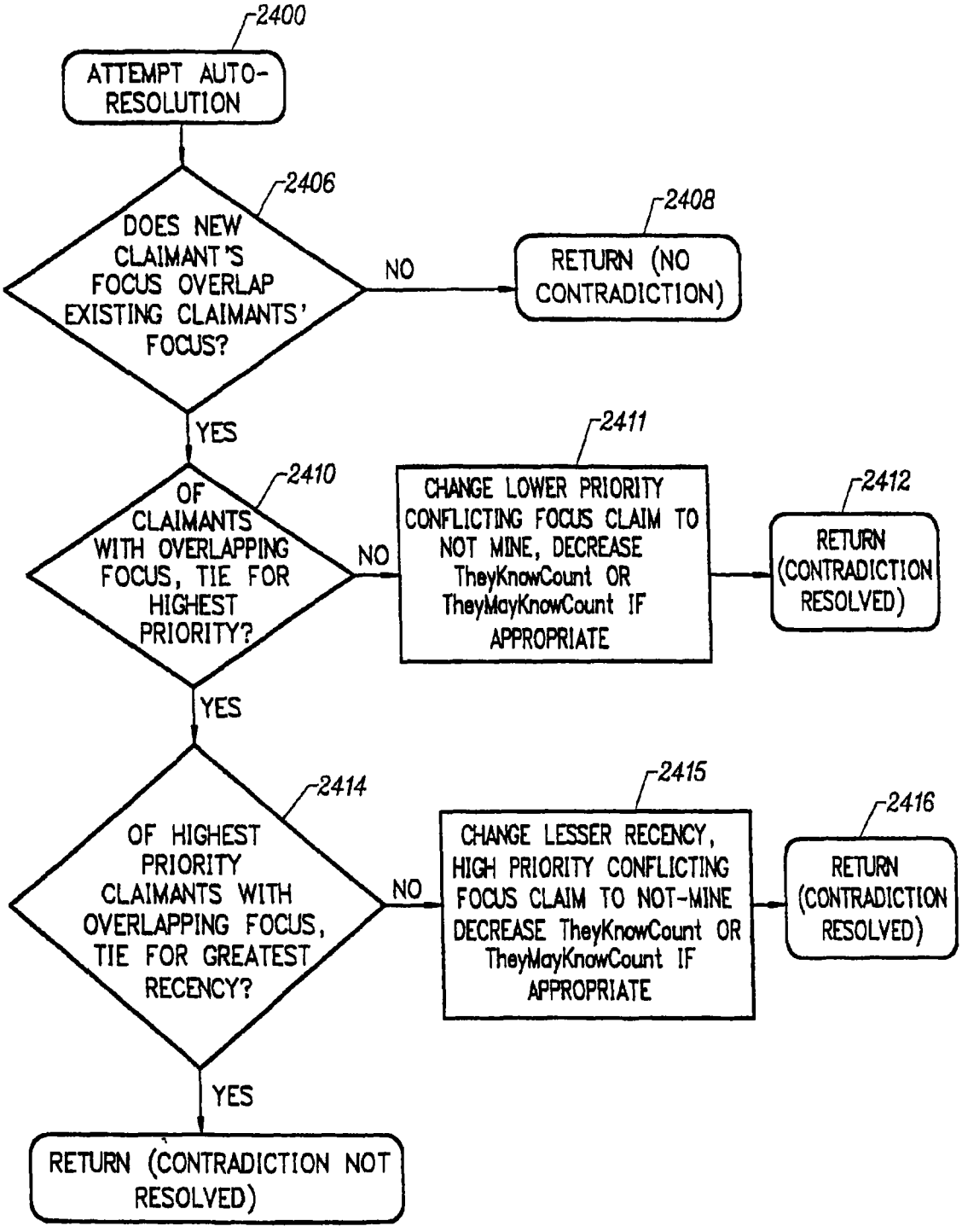
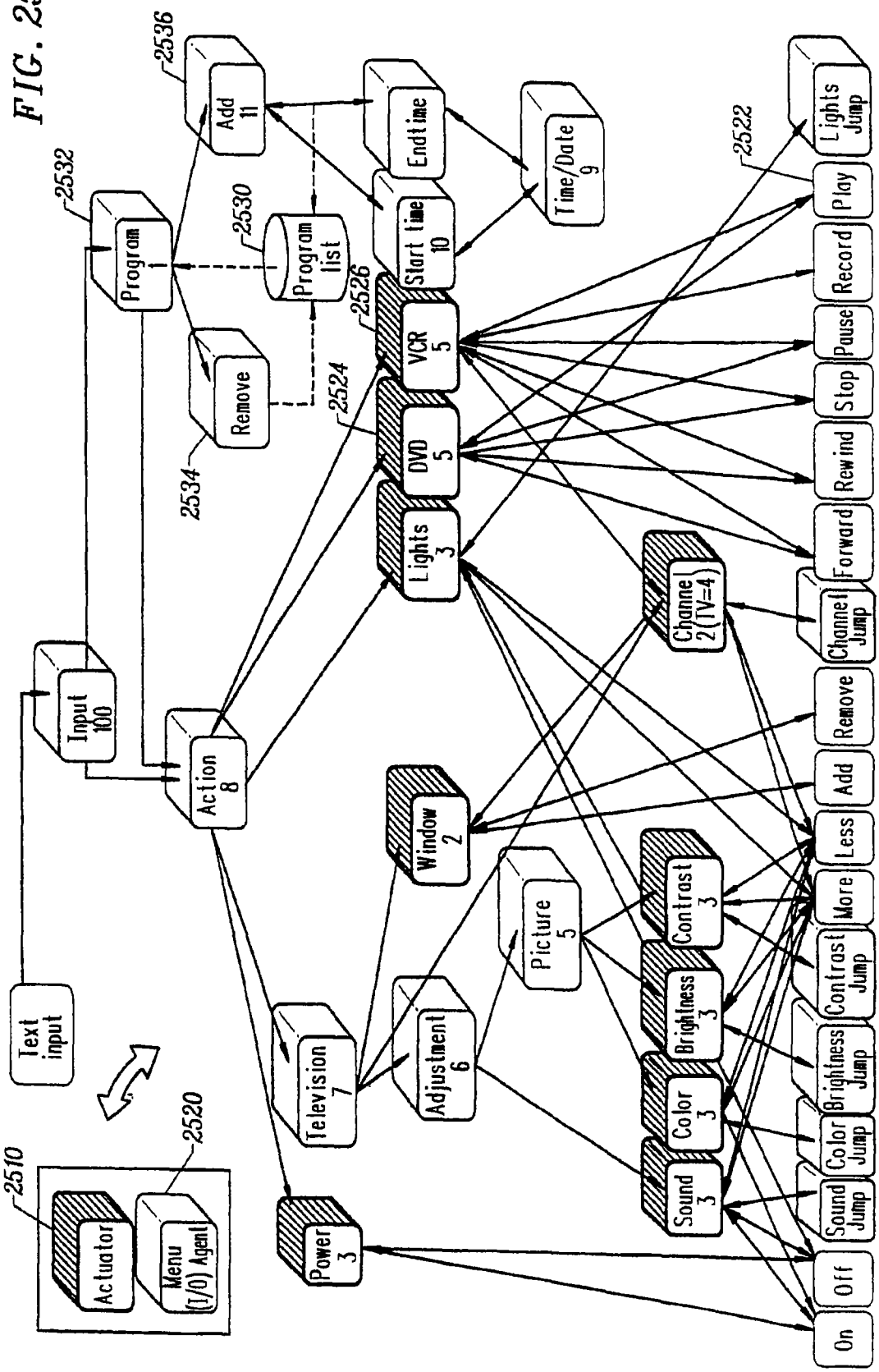

2400
ATTEMPT AUTO-RESOLUTION
2406
DOES NEW CLAIMANT'S FOCUS OVERLAP EXISTING CLAIMANTS' FOCUS?
NO
2408
RETURN (NO CONTRADICTION)
YES
2410
OF CLAIMANTS WITH OVERLAPPING FOCUS, TIE FOR HIGHEST PRIORITY?
NO
2411
CHANGE LOWER PRIORITY CONFLICTING FOCUS CLAIM TO NOT MINE, DECREASE TheyKnowCount OR TheyMayKnowCount IF APPROPRIATE
2412
RETURN (CONTRADICTION RESOLVED)
YES
2414
OF HIGHEST PRIORITY CLAIMANTS WITH OVERLAPPING FOCUS, TIE FOR GREATEST RECENCY?
NO
2415
CHANGE LESSER RECENCY, HIGH PRIORITY CONFLICTING FOCUS CLAIM TO NOT-MINE DECREASE TheyKnowCount OR TheyMayKnowCount IF APPROPRIATE
2416
RETURN (CONTRADICTION RESOLVED)
YES
RETURN (CONTRADICTION NOT RESOLVED)

FIG. 24

FIG. 25


2510
2520
2522
2524
2526
2530
2532
2534
2536
Actuator
Menu (I/O) Agent
Text input
Input 100
Action 8
Program 1
Add 11
Remove
Program list
Start time 10
Endtime
Time/Date 9
VCR 5
DVD 5
Lights 3
Window 2
Television 7
Adjustment 6
Picture 5
Power 3
Sound 3
Color 3
Brightness 3
Contrast 3
Channe 2(TV=4)
Lights Jump
Play
Record
Pause
Stop
Rewind
Forward
Channel Jump
Remove
Add
Less
More
Contrast Jump
Brightness Jump
Color Jump
Sound Jump
Off
On