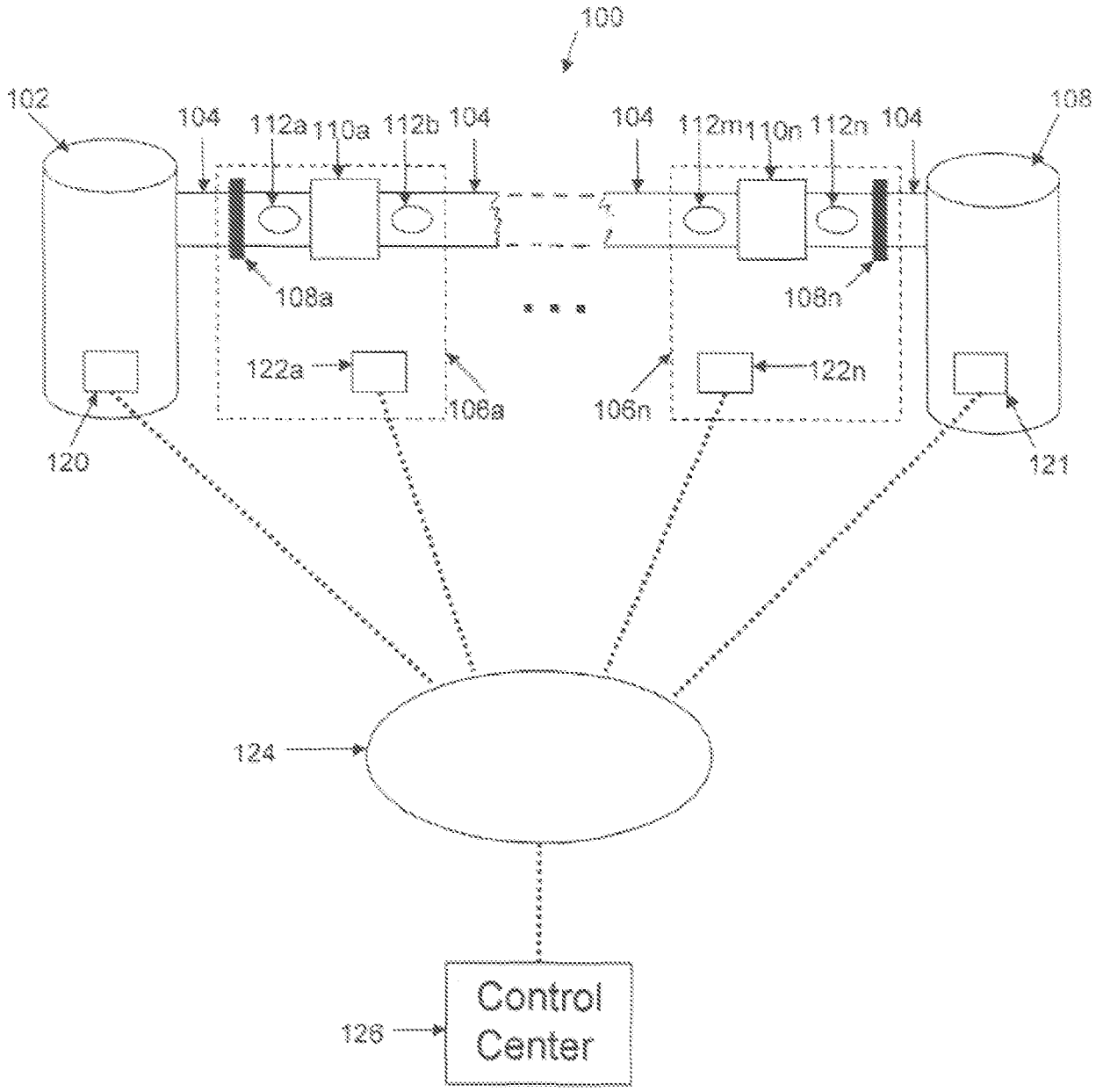

100
102
104
112a
110a
112b
104
104
112m
110n
112n
104
108
108a
108n
122a
122n
106a
106n
120
121
124
Control Center
126

FIGURE 1

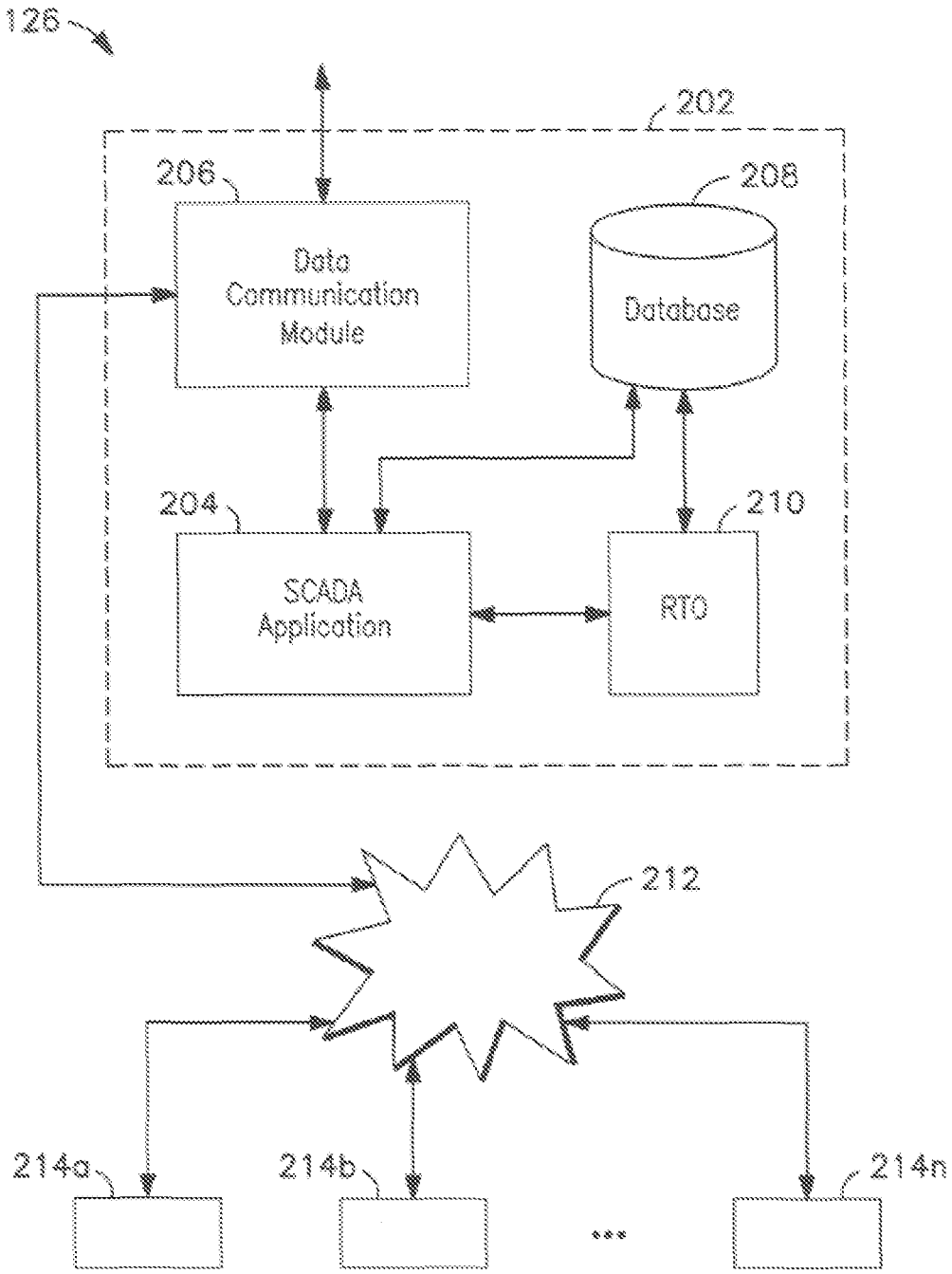

126
202
206
208
Data Communication Module
Database
204
210
SCADA Application
RTO
212
214a
214b
214n

FIG. 2

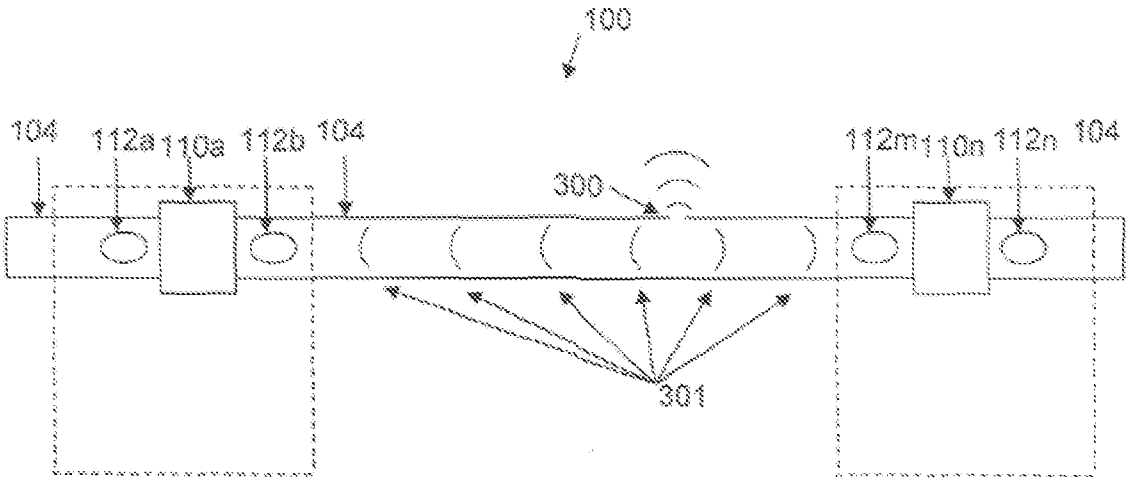


FIGURE 3

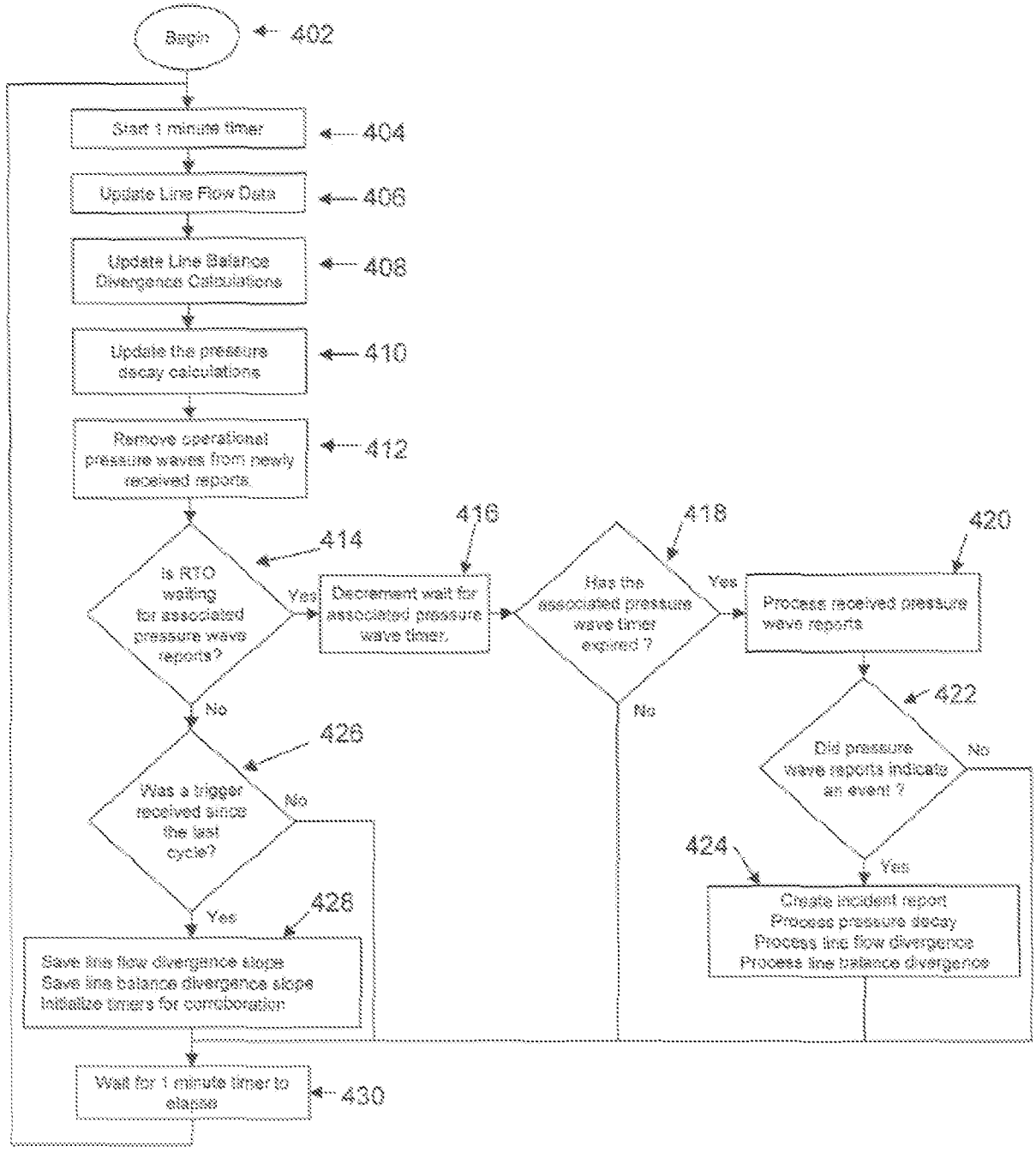

Begin
402
Start 1 minute timer
404
Update Line Flow Data
406
Update Line Balance Divergence Calculations
408
Update the pressure decay calculations
410
Remove operational pressure waves from newly received reports
412
414
Is RTO waiting for associated pressure wave reports?
Yes
No
416
Decrement wait for associated pressure wave timer
418
Has the associated pressure wave timer expired ?
Yes
No
420
Process received pressure wave reports
422
Did pressure wave reports indicate an event ?
Yes
No
424
Create incident report
Process pressure decay
Process line flow divergence
Process line balance divergence
426
Was a trigger received since the last cycle?
Yes
No
428
Save line flow divergence slope
Save line balance divergence slope
Initialize timers for corroboration
Wait for 1 minute timer to elapse
430

FIGURE 4

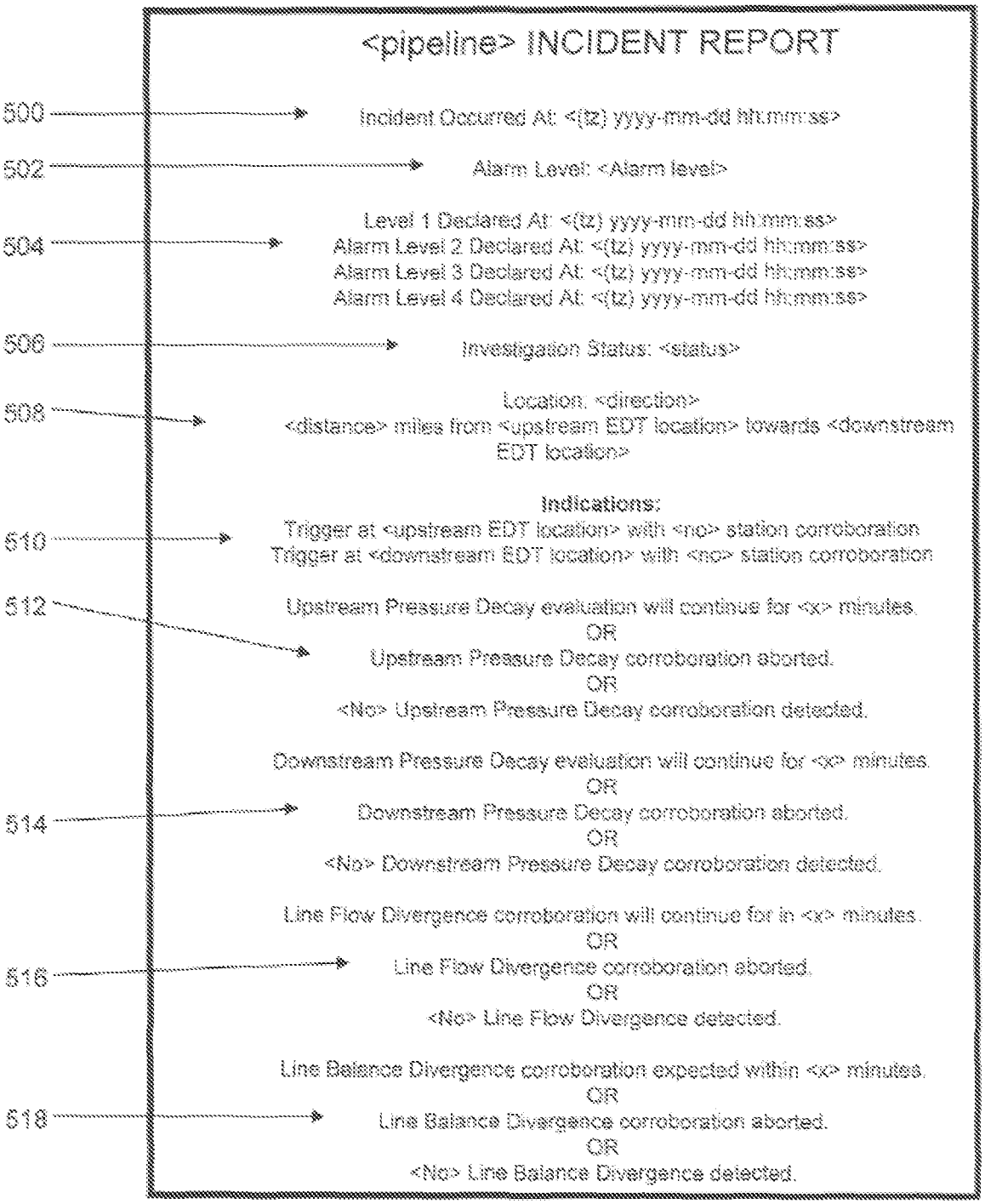

<pipeline> INCIDENT REPORT
500
Incident Occurred At: <(tz) yyyy-mm-dd hh:mm:ss>
502
Alarm Level: <Alarm level>
504
Level 1 Declared At: <(tz) yyyy-mm-dd hh:mm:ss>
Alarm Level 2 Declared At: <(tz) yyyy-mm-dd hh:mm:ss>
Alarm Level 3 Declared At: <(tz) yyyy-mm-dd hh:mm:ss>
Alarm Level 4 Declared At: <(tz) yyyy-mm-dd hh:mm:ss>
506
Investigation Status: <status>
508
Location: <direction>
<distance> miles from <upstream EDT location> towards <downstream EDT location>
Indications:
510
Trigger at <upstream EDT location> with <no> station corroboration
Trigger at <downstream EDT location> with <no> station corroboration
512
Upstream Pressure Decay evaluation will continue for <x> minutes.
OR
Upstream Pressure Decay corroboration aborted.
OR
<No> Upstream Pressure Decay corroboration detected.
Downstream Pressure Decay evaluation will continue for <x> minutes.
OR
514
Downstream Pressure Decay corroboration aborted.
OR
<No> Downstream Pressure Decay corroboration detected.
Line Flow Divergence corroboration will continue for in <x> minutes.
OR
516
Line Flow Divergence corroboration aborted.
OR
<No> Line Flow Divergence detected.
Line Balance Divergence corroboration expected within <x> minutes.
OR
518
Line Balance Divergence corroboration aborted.
OR
<No> Line Balance Divergence detected.

FIGURE 5