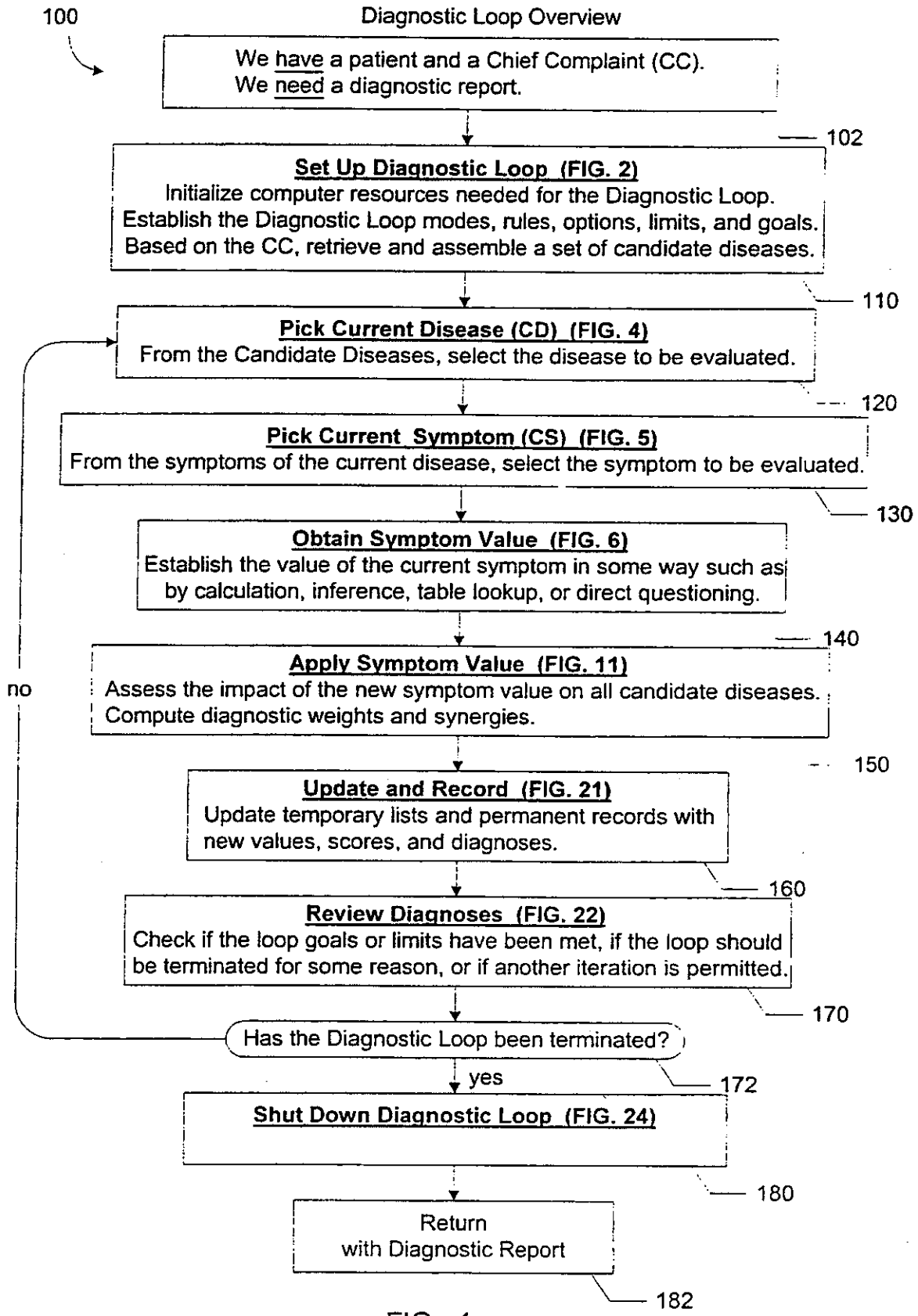

100
Diagnostic Loop Overview
We have a patient and a Chief Complaint (CC).
We need a diagnostic report.
102
Set Up Diagnostic Loop (FIG. 2)
Initialize computer resources needed for the Diagnostic Loop.
Establish the Diagnostic Loop modes, rules, options, limits, and goals.
Based on the CC, retrieve and assemble a set of candidate diseases.
110
Pick Current Disease (CD) (FIG. 4)
From the Candidate Diseases, select the disease to be evaluated.
120
Pick Current Symptom (CS) (FIG. 5)
From the symptoms of the current disease, select the symptom to be evaluated.
130
Obtain Symptom Value (FIG. 6)
Establish the value of the current symptom in some way such as by calculation, inference, table lookup, or direct questioning.
140
Apply Symptom Value (FIG. 11)
Assess the impact of the new symptom value on all candidate diseases.
Compute diagnostic weights and synergies.
150
Update and Record (FIG. 21)
Update temporary lists and permanent records with new values, scores, and diagnoses.
160
Review Diagnoses (FIG. 22)
Check if the loop goals or limits have been met, if the loop should be terminated for some reason, or if another iteration is permitted.
170
Has the Diagnostic Loop been terminated?
no
yes
172
Shut Down Diagnostic Loop (FIG. 24)
180
Return
with Diagnostic Report
182

FIG. 1

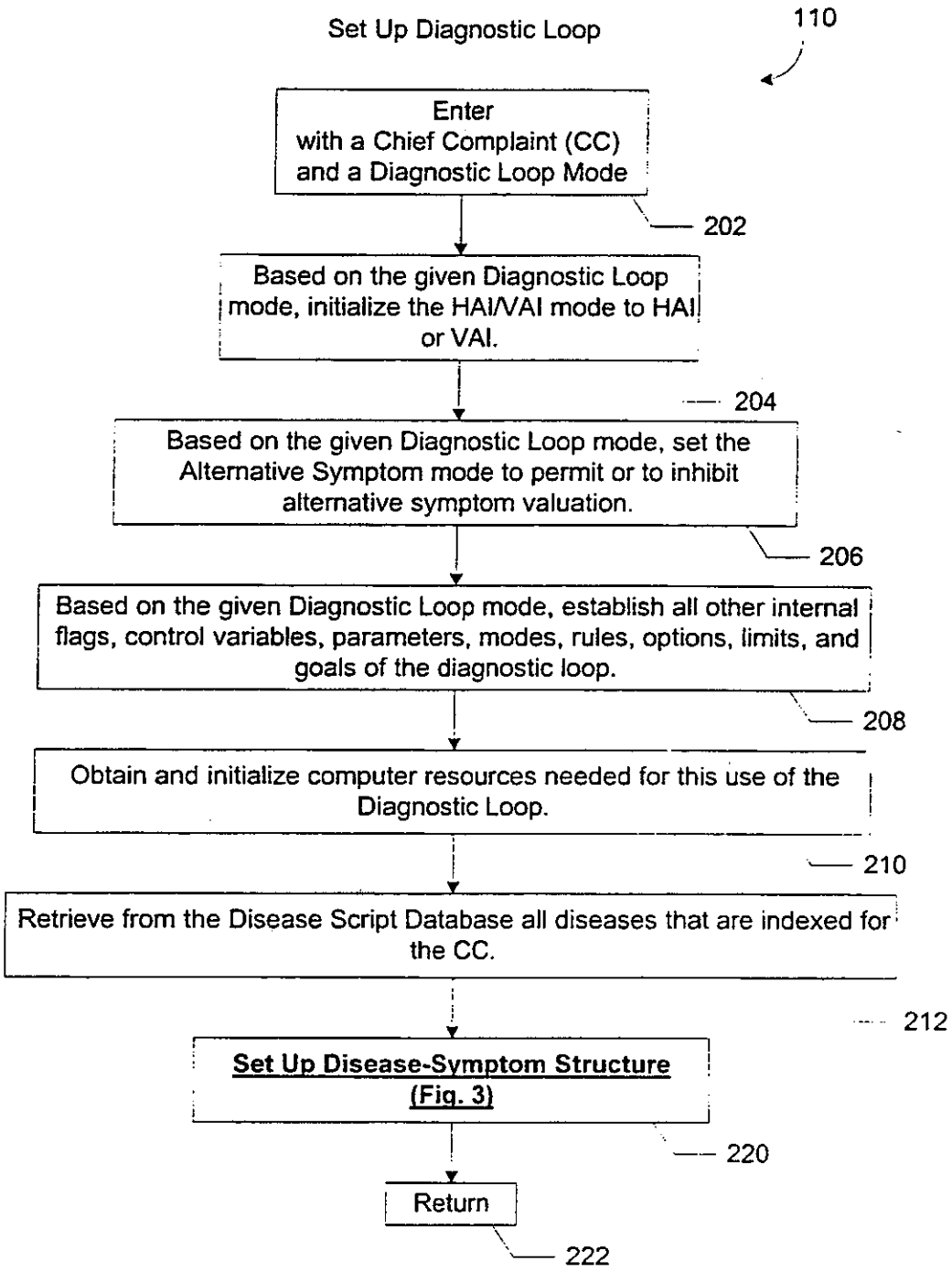

Set Up Diagnostic Loop
110
Enter
with a Chief Complaint (CC)
and a Diagnostic Loop Mode
202
Based on the given Diagnostic Loop mode, initialize the HAI/VAI mode to HAI or VAI.
204
Based on the given Diagnostic Loop mode, set the Alternative Symptom mode to permit or to inhibit alternative symptom valuation.
206
Based on the given Diagnostic Loop mode, establish all other internal flags, control variables, parameters, modes, rules, options, limits, and goals of the diagnostic loop.
208
Obtain and initialize computer resources needed for this use of the Diagnostic Loop.
210
Retrieve from the Disease Script Database all diseases that are indexed for the CC.
212
Set Up Disease-Symptom Structure (Fig. 3)
220
Return
222

FIG. 2

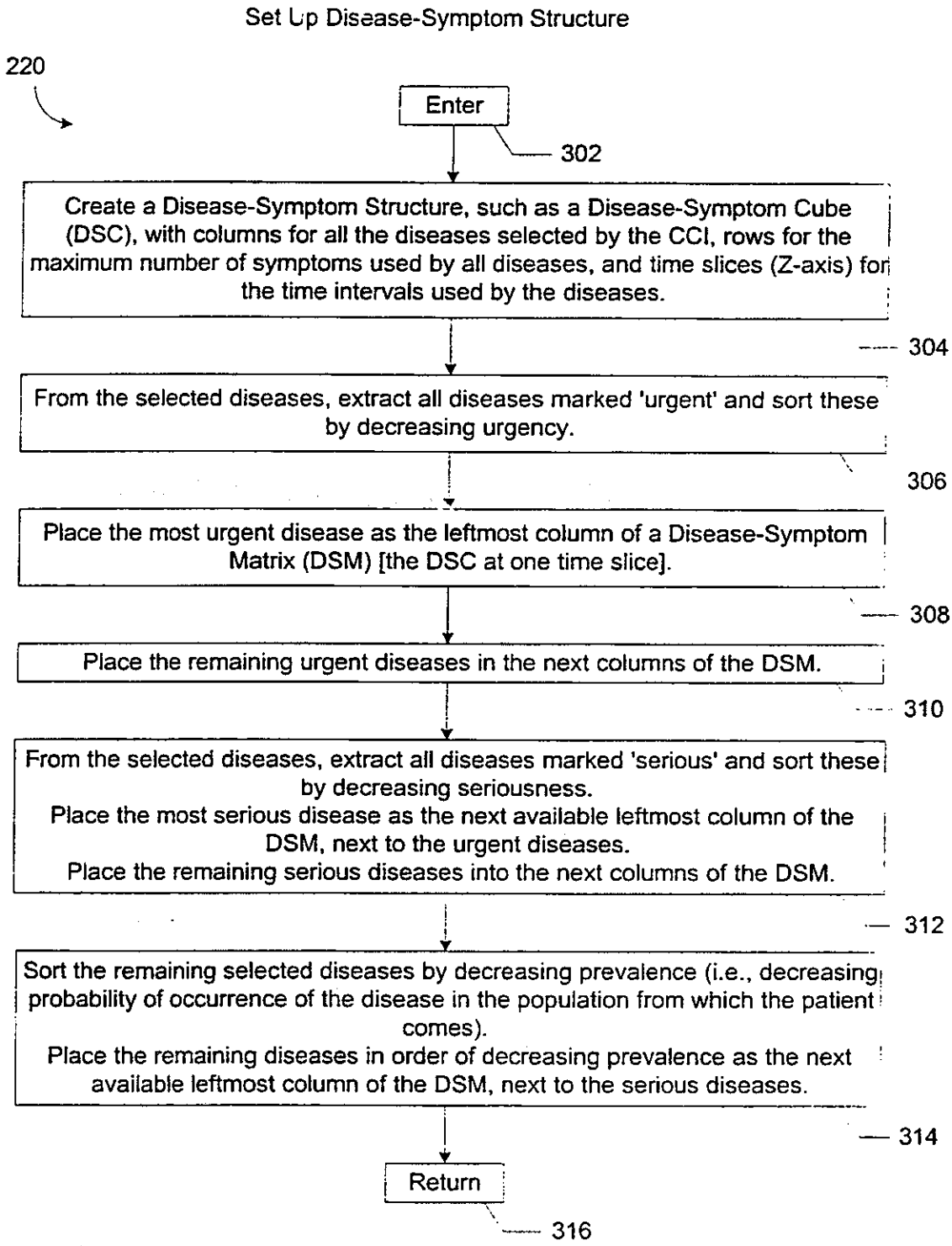

Set Up Disease-Symptom Structure
220
Enter
302
Create a Disease-Symptom Structure, such as a Disease-Symptom Cube (DSC), with columns for all the diseases selected by the CCI, rows for the maximum number of symptoms used by all diseases, and time slices (Z-axis) for the time intervals used by the diseases.
304
From the selected diseases, extract all diseases marked 'urgent' and sort these by decreasing urgency.
306
Place the most urgent disease as the leftmost column of a Disease-Symptom Matrix (DSM) [the DSC at one time slice].
308
Place the remaining urgent diseases in the next columns of the DSM.
310
From the selected diseases, extract all diseases marked 'serious' and sort these by decreasing seriousness.
Place the most serious disease as the next available leftmost column of the DSM, next to the urgent diseases.
Place the remaining serious diseases into the next columns of the DSM.
312
Sort the remaining selected diseases by decreasing prevalence (i.e., decreasing probability of occurrence of the disease in the population from which the patient comes).
Place the remaining diseases in order of decreasing prevalence as the next available leftmost column of the DSM, next to the serious diseases.
314
Return
316

FIG. 3

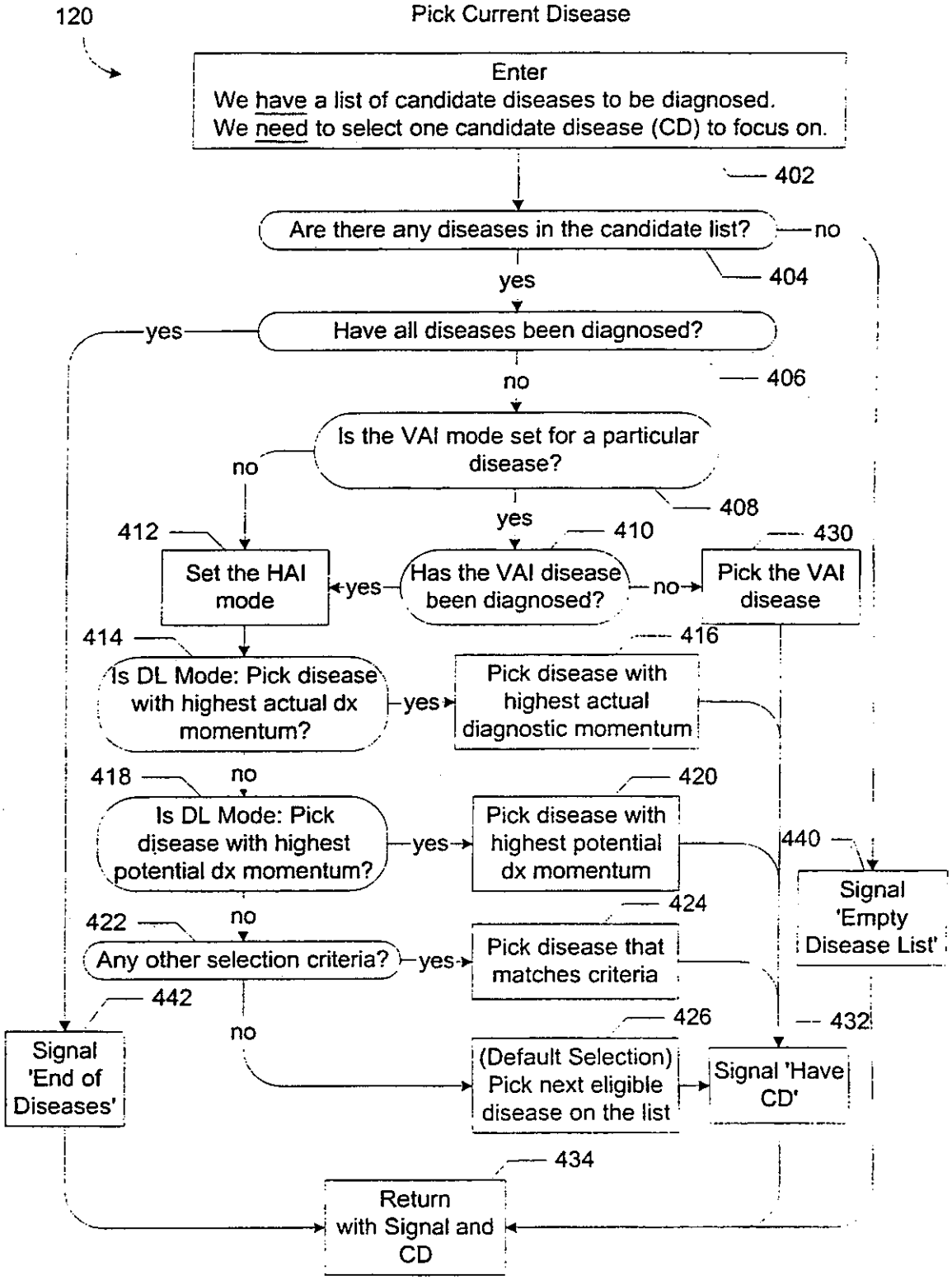

120
Pick Current Disease
Enter
We have a list of candidate diseases to be diagnosed.
We need to select one candidate disease (CD) to focus on.
402
Are there any diseases in the candidate list?
no
404
yes
Have all diseases been diagnosed?
yes
406
no
Is the VAI mode set for a particular disease?
no
408
yes
412
410
430
Set the HAI mode
yes
Has the VAI disease been diagnosed?
no
Pick the VAI disease
414
416
Is DL Mode: Pick disease with highest actual dx momentum?
yes
Pick disease with highest actual diagnostic momentum
418
no
420
Is DL Mode: Pick disease with highest potential dx momentum?
yes
Pick disease with highest potential dx momentum
440
Signal 'Empty Disease List'
424
422
no
Any other selection criteria?
yes
Pick disease that matches criteria
442
426
432
no
Signal 'End of Diseases'
(Default Selection) Pick next eligible disease on the list
Signal 'Have CD'
434
Return with Signal and CD

FIG. 4

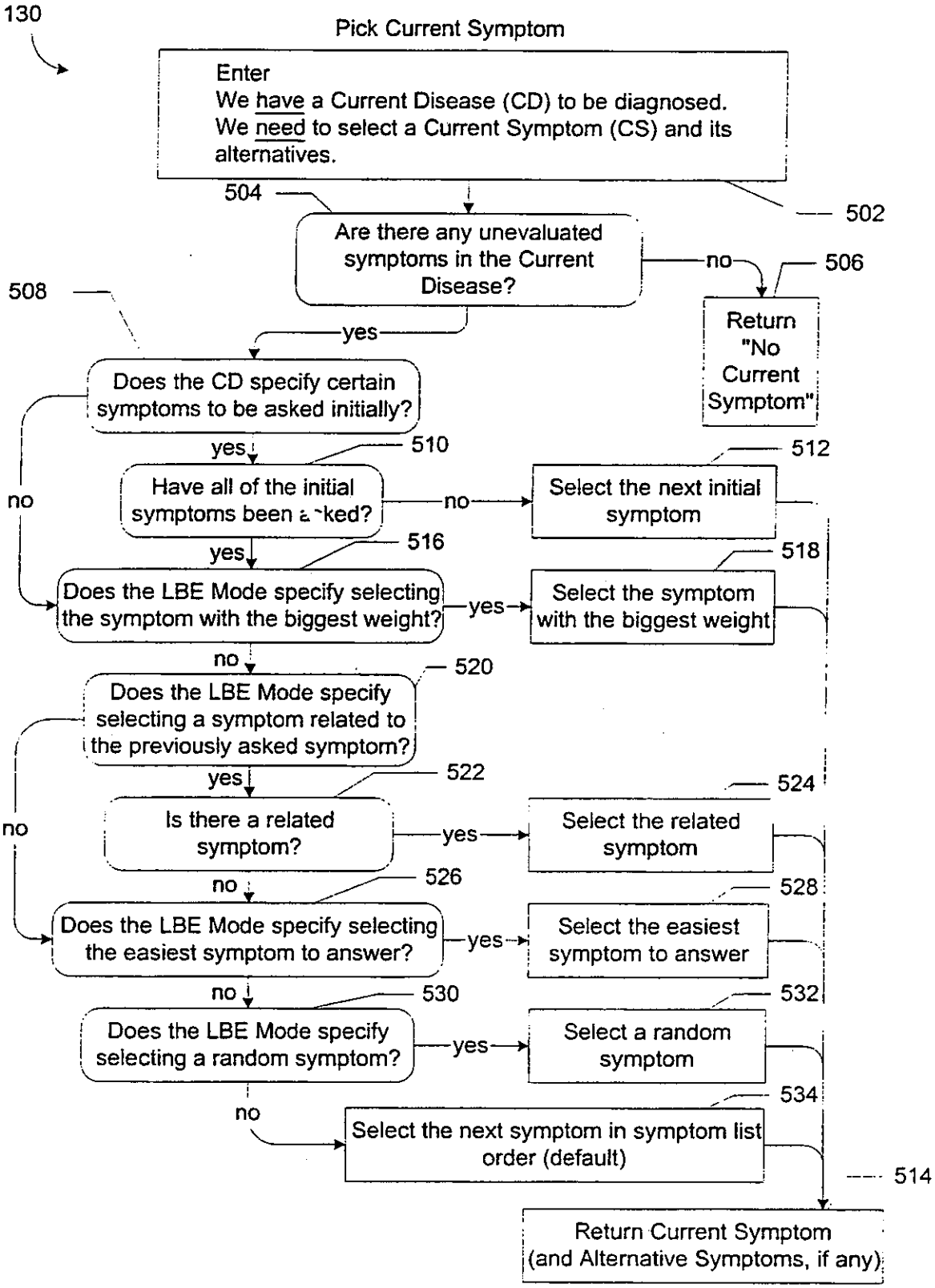

130
Pick Current Symptom
Enter
We have a Current Disease (CD) to be diagnosed.
We need to select a Current Symptom (CS) and its alternatives.
502
504
Are there any unevaluated symptoms in the Current Disease?
no
506
Return "No Current Symptom"
508
yes
Does the CD specify certain symptoms to be asked initially?
yes
510
Have all of the initial symptoms been asked?
no
512
Select the next initial symptom
no
yes
516
Does the LBE Mode specify selecting the symptom with the biggest weight?
yes
518
Select the symptom with the biggest weight
no
520
Does the LBE Mode specify selecting a symptom related to the previously asked symptom?
yes
522
Is there a related symptom?
yes
524
Select the related symptom
no
526
Does the LBE Mode specify selecting the easiest symptom to answer?
yes
528
Select the easiest symptom to answer
no
530
Does the LBE Mode specify selecting a random symptom?
yes
532
Select a random symptom
no
534
Select the next symptom in symptom list order (default)
514
Return Current Symptom (and Alternative Symptoms, if any)

FIG. 5

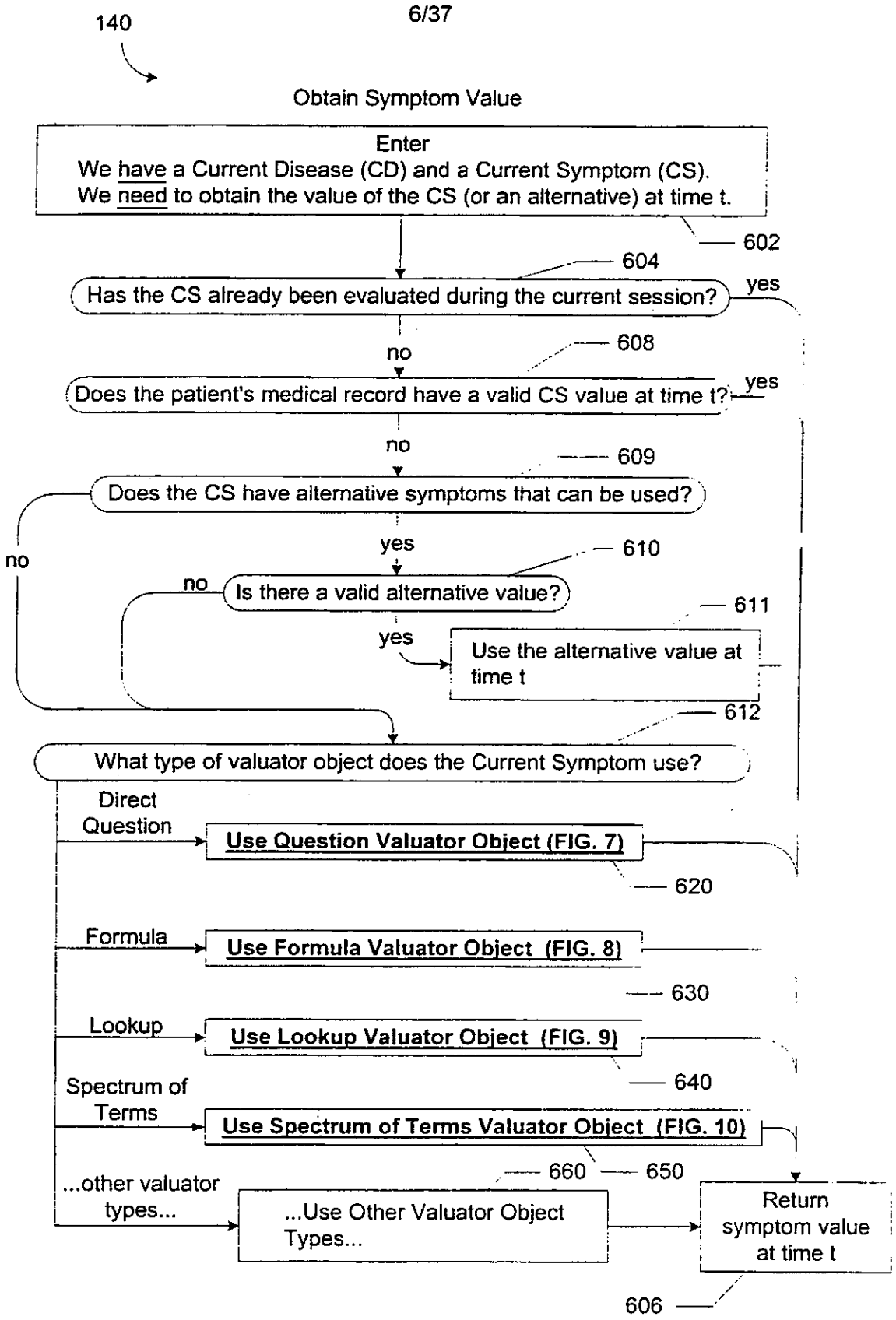

140
Obtain Symptom Value
Enter
We have a Current Disease (CD) and a Current Symptom (CS).
We need to obtain the value of the CS (or an alternative) at time t.
602
604
Has the CS already been evaluated during the current session?
yes
no
608
Does the patient's medical record have a valid CS value at time t?
yes
no
609
Does the CS have alternative symptoms that can be used?
yes
no
610
Is there a valid alternative value?
yes
611
Use the alternative value at time t
612
What type of valuator object does the Current Symptom use?
Direct Question
Use Question Valuator Object (FIG. 7)
620
Formula
Use Formula Valuator Object (FIG. 8)
630
Lookup
Use Lookup Valuator Object (FIG. 9)
640
Spectrum of Terms
Use Spectrum of Terms Valuator Object (FIG. 10)
660
650
...other valuator types...
...Use Other Valuator Object Types...
Return symptom value at time t
606

FIG. 6

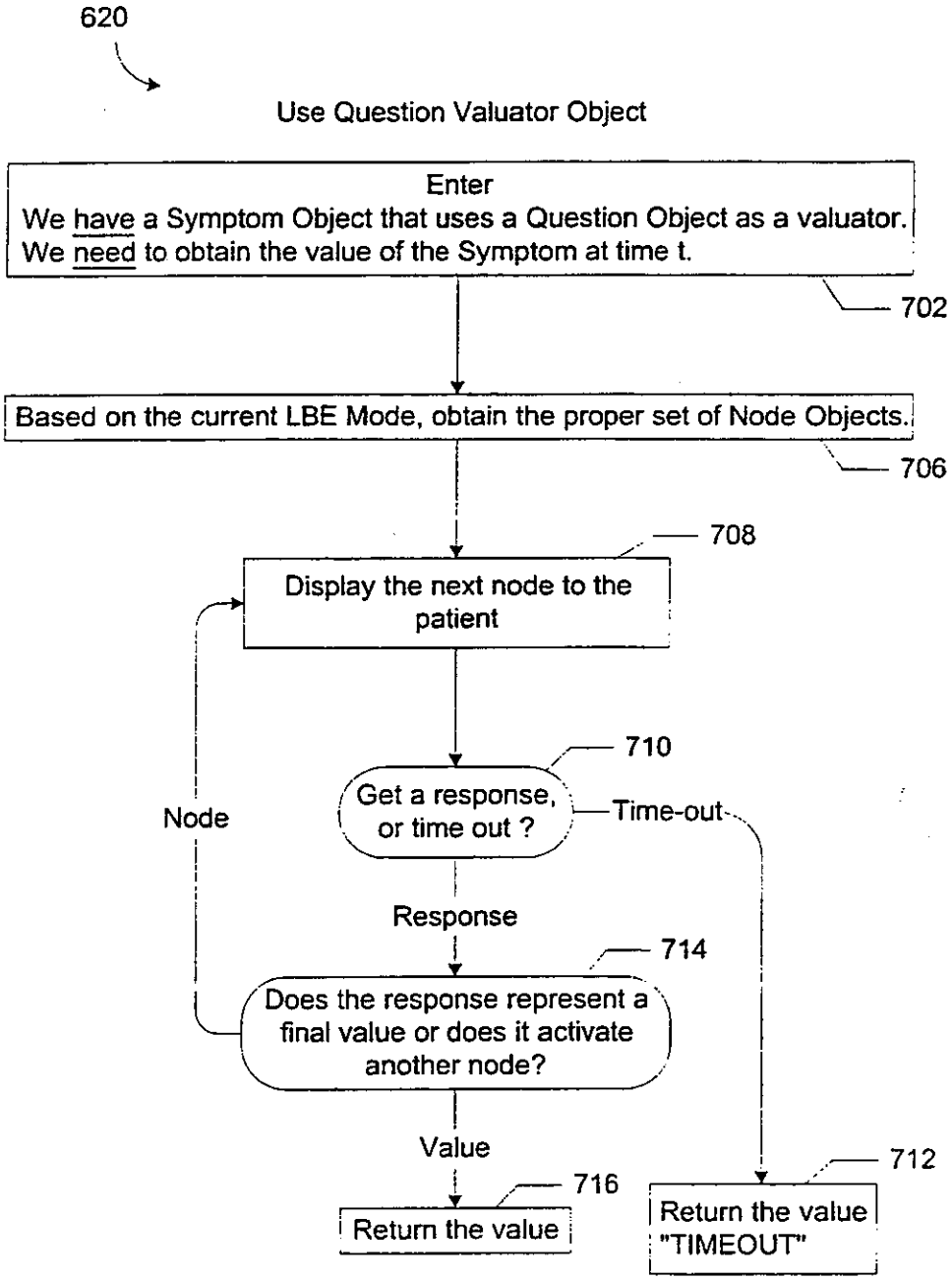

620
Use Question Valuator Object
Enter
We have a Symptom Object that uses a Question Object as a valuator.
We need to obtain the value of the Symptom at time t.
702
Based on the current LBE Mode, obtain the proper set of Node Objects.
706
708
Display the next node to the patient
710
Get a response, or time out ?
Time-out
Node
Response
714
Does the response represent a final value or does it activate another node?
Value
716
Return the value
712
Return the value "TIMEOUT"

FIG. 7

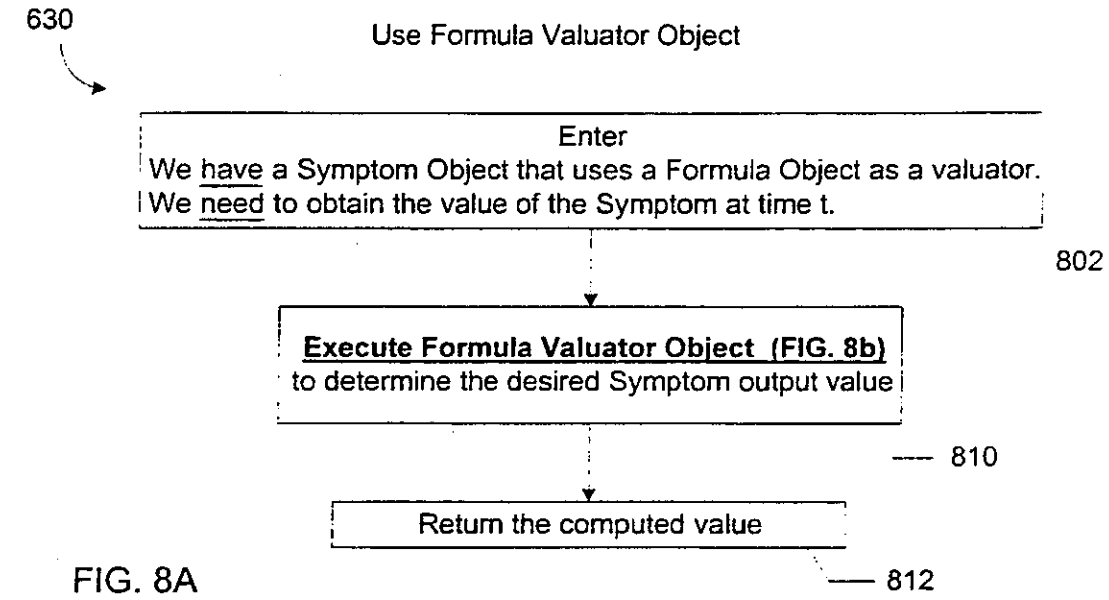

630
Use Formula Valuator Object
Enter
We have a Symptom Object that uses a Formula Object as a valuator.
We need to obtain the value of the Symptom at time t.
802
Execute Formula Valuator Object (FIG. 8b)
to determine the desired Symptom output value
810
Return the computed value
812

FIG. 8A

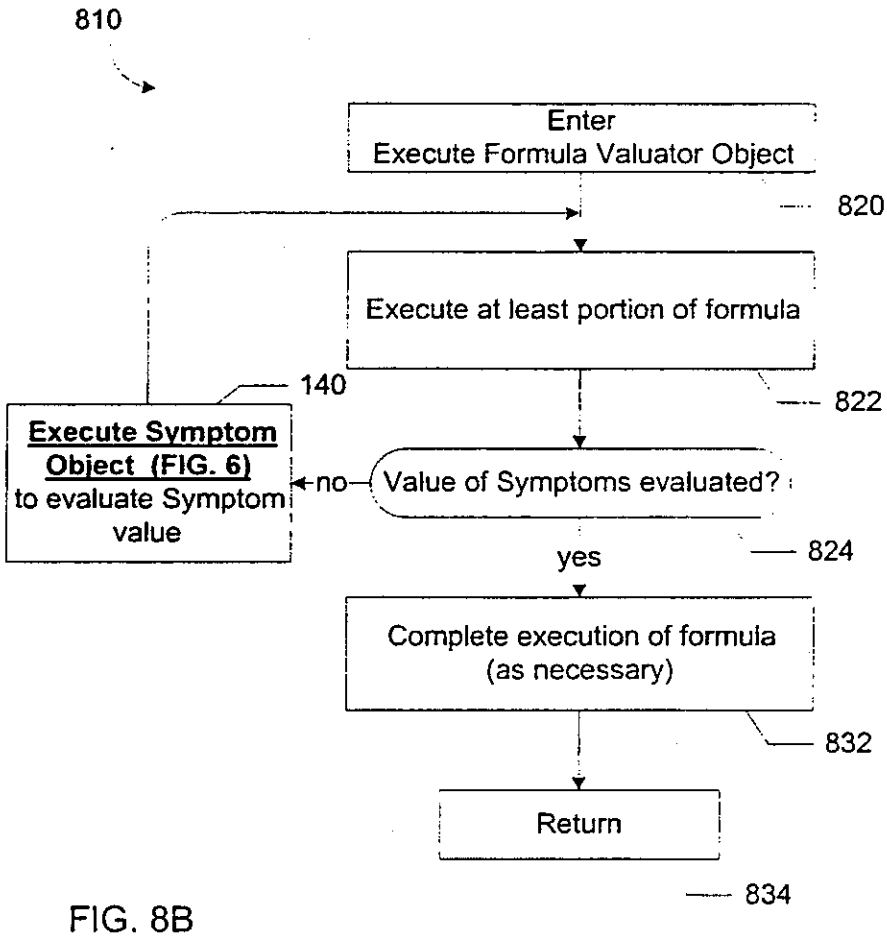

810
Enter
Execute Formula Valuator Object
820
Execute at least portion of formula
822
140
Execute Symptom Object (FIG. 6)
to evaluate Symptom value
no
Value of Symptoms evaluated?
yes
824
Complete execution of formula
(as necessary)
832
Return
834

FIG. 8B

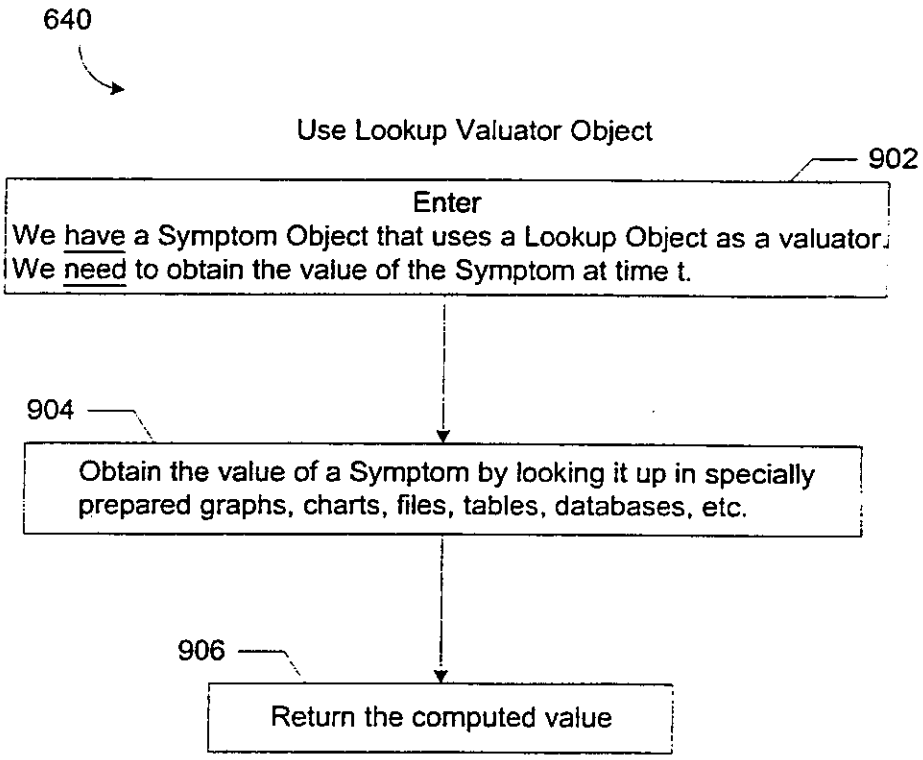

640
Use Lookup Valuator Object
902
Enter
We have a Symptom Object that uses a Lookup Object as a valuator.
We need to obtain the value of the Symptom at time t.
904
Obtain the value of a Symptom by looking it up in specially prepared graphs, charts, files, tables, databases, etc.
906
Return the computed value

FIG. 9

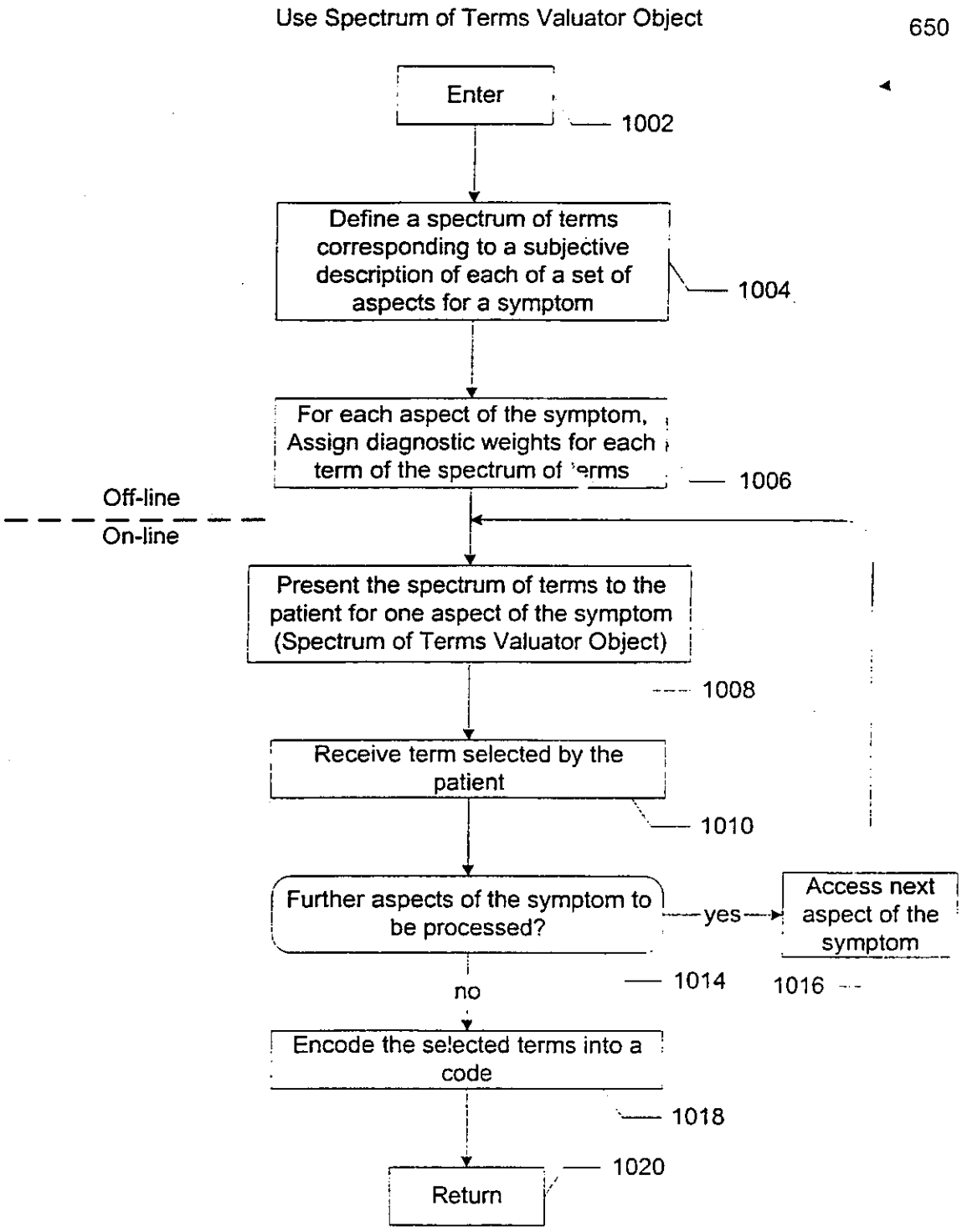

Use Spectrum of Terms Valuator Object
650
Enter
1002
Define a spectrum of terms corresponding to a subjective description of each of a set of aspects for a symptom
1004
For each aspect of the symptom, Assign diagnostic weights for each term of the spectrum of terms
1006
Off-line
On-line
Present the spectrum of terms to the patient for one aspect of the symptom (Spectrum of Terms Valuator Object)
1008
Receive term selected by the patient
1010
Further aspects of the symptom to be processed?
yes
Access next aspect of the symptom
1016
1014
no
Encode the selected terms into a code
1018
Return
1020

FIG. 10

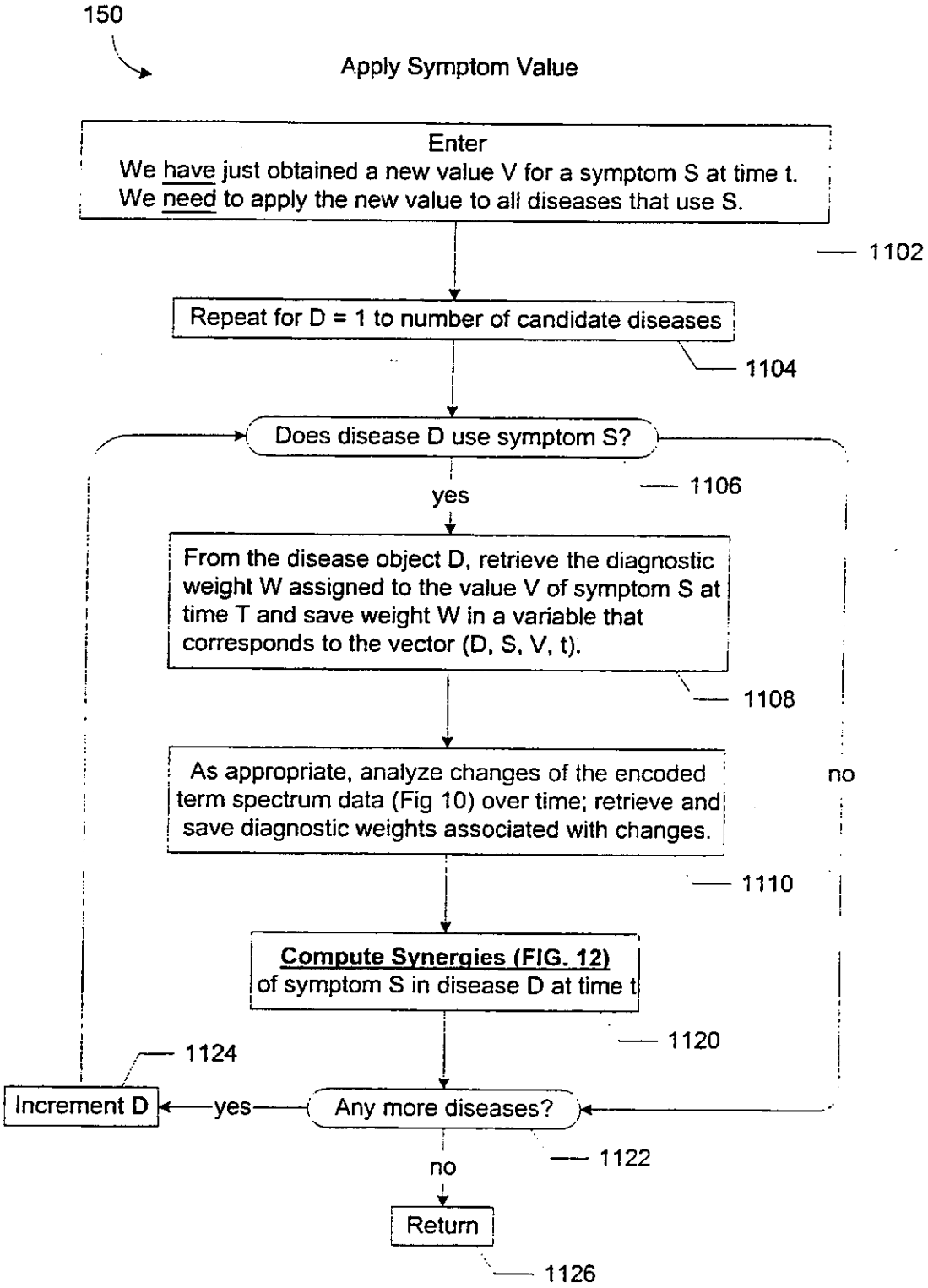

150
Apply Symptom Value
Enter
We have just obtained a new value V for a symptom S at time t.
We need to apply the new value to all diseases that use S.
1102
Repeat for D = 1 to number of candidate diseases
1104
Does disease D use symptom S?
1106
yes
no
From the disease object D, retrieve the diagnostic weight W assigned to the value V of symptom S at time T and save weight W in a variable that corresponds to the vector (D, S, V, t).
1108
As appropriate, analyze changes of the encoded term spectrum data (Fig 10) over time; retrieve and save diagnostic weights associated with changes.
1110
Compute Synergies (FIG. 12)
of symptom S in disease D at time t
1120
1124
Increment D
yes
Any more diseases?
1122
no
Return
1126

FIG. 11

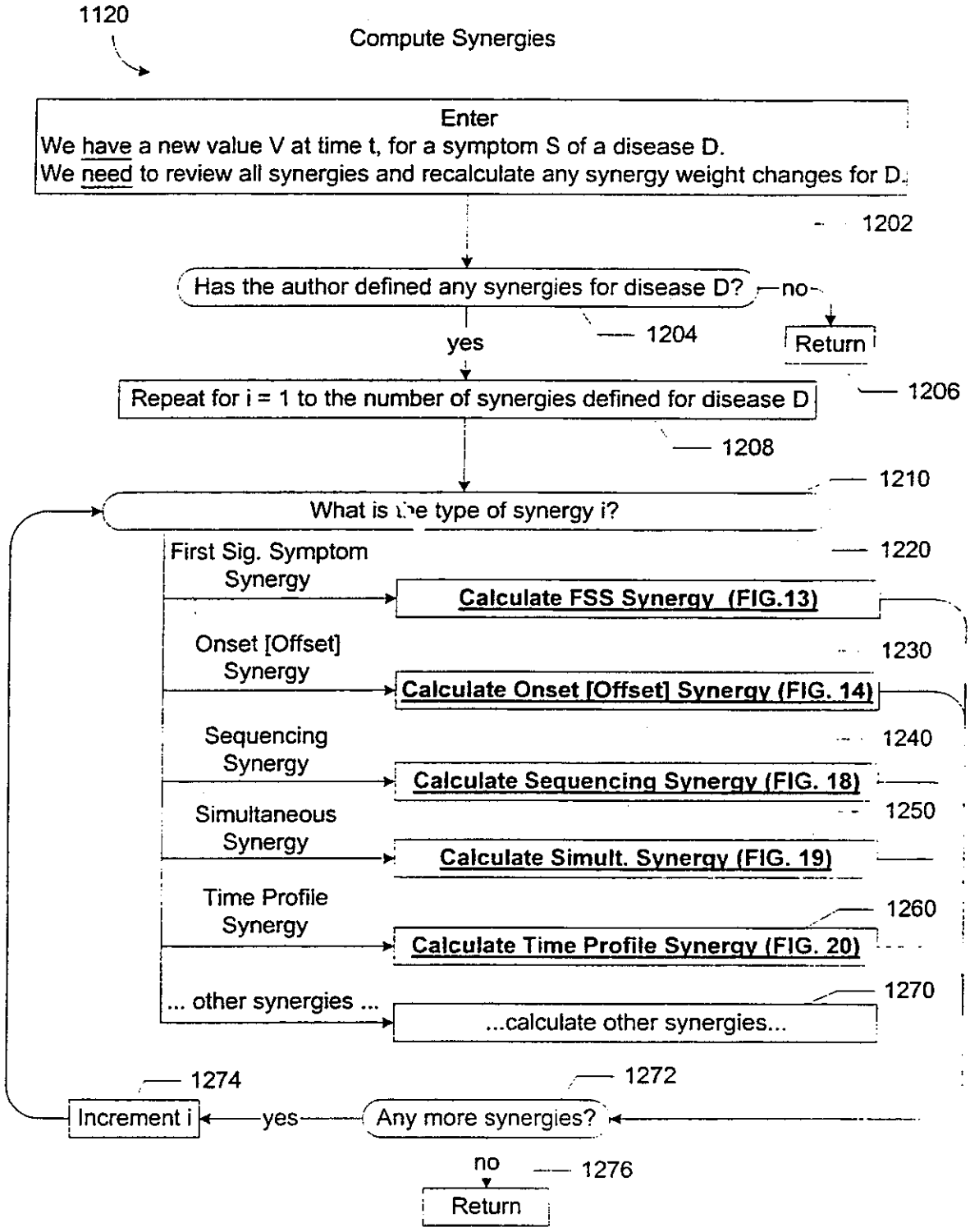

1120
Compute Synergies
Enter
We have a new value V at time t, for a symptom S of a disease D.
We need to review all synergies and recalculate any synergy weight changes for D.
1202
Has the author defined any synergies for disease D?
no
Return
1204
yes
Repeat for i = 1 to the number of synergies defined for disease D
1206
1208
1210
What is the type of synergy i?
First Sig. Symptom Synergy
1220
Calculate FSS Synergy (FIG.13)
Onset [Offset] Synergy
1230
Calculate Onset [Offset] Synergy (FIG. 14)
Sequencing Synergy
1240
Calculate Sequencing Synergy (FIG. 18)
Simultaneous Synergy
1250
Calculate Simult. Synergy (FIG. 19)
Time Profile Synergy
1260
Calculate Time Profile Synergy (FIG. 20)
... other synergies ...
1270
...calculate other synergies...
1274
1272
Increment i
yes
Any more synergies?
no
1276
Return

FIG. 12

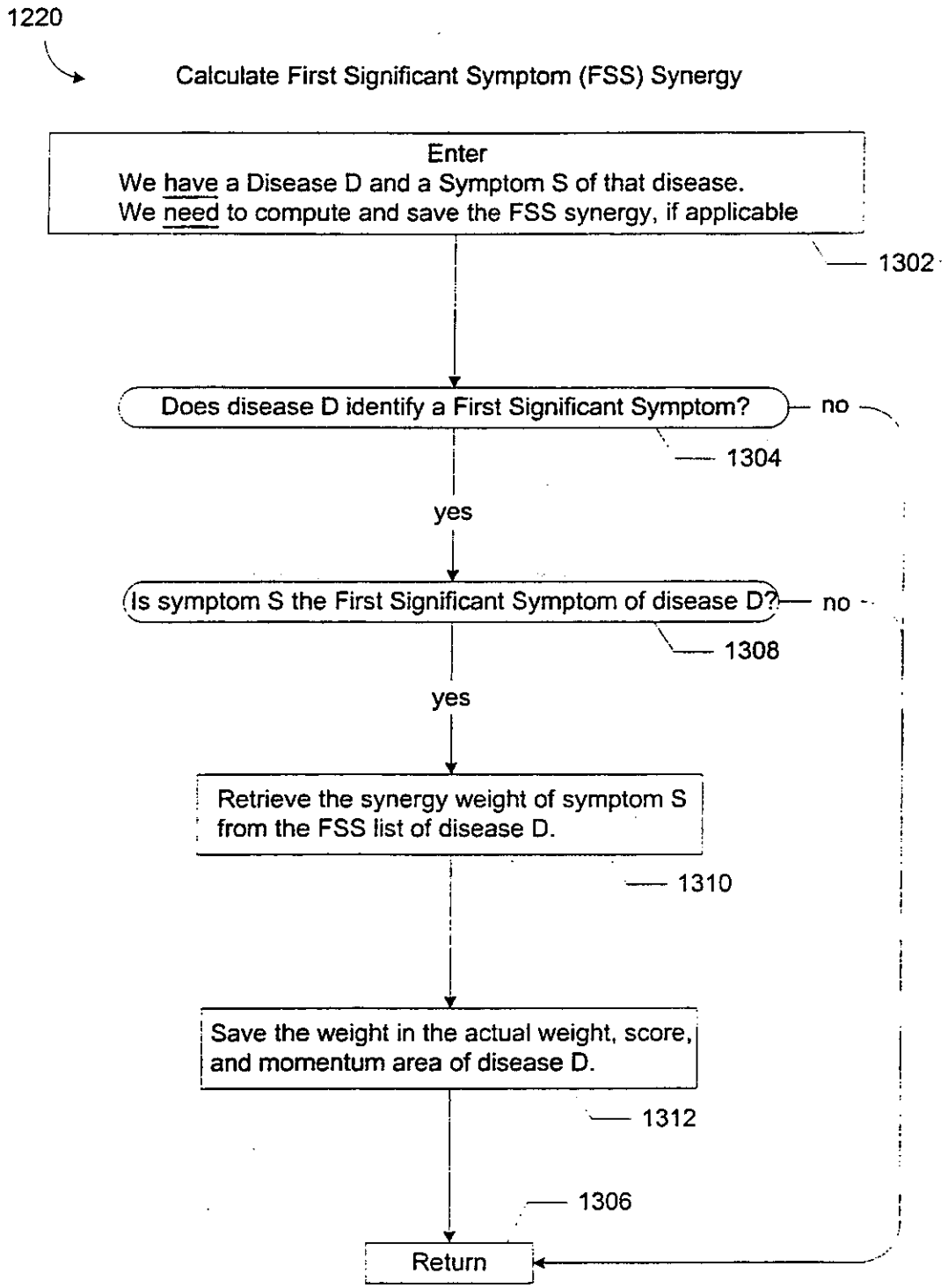

1220
Calculate First Significant Symptom (FSS) Synergy
Enter
We have a Disease D and a Symptom S of that disease.
We need to compute and save the FSS synergy, if applicable
1302
Does disease D identify a First Significant Symptom?
no
1304
yes
Is symptom S the First Significant Symptom of disease D?
no
1308
yes
Retrieve the synergy weight of symptom S from the FSS list of disease D.
1310
Save the weight in the actual weight, score, and momentum area of disease D.
1312
1306
Return

FIG. 13

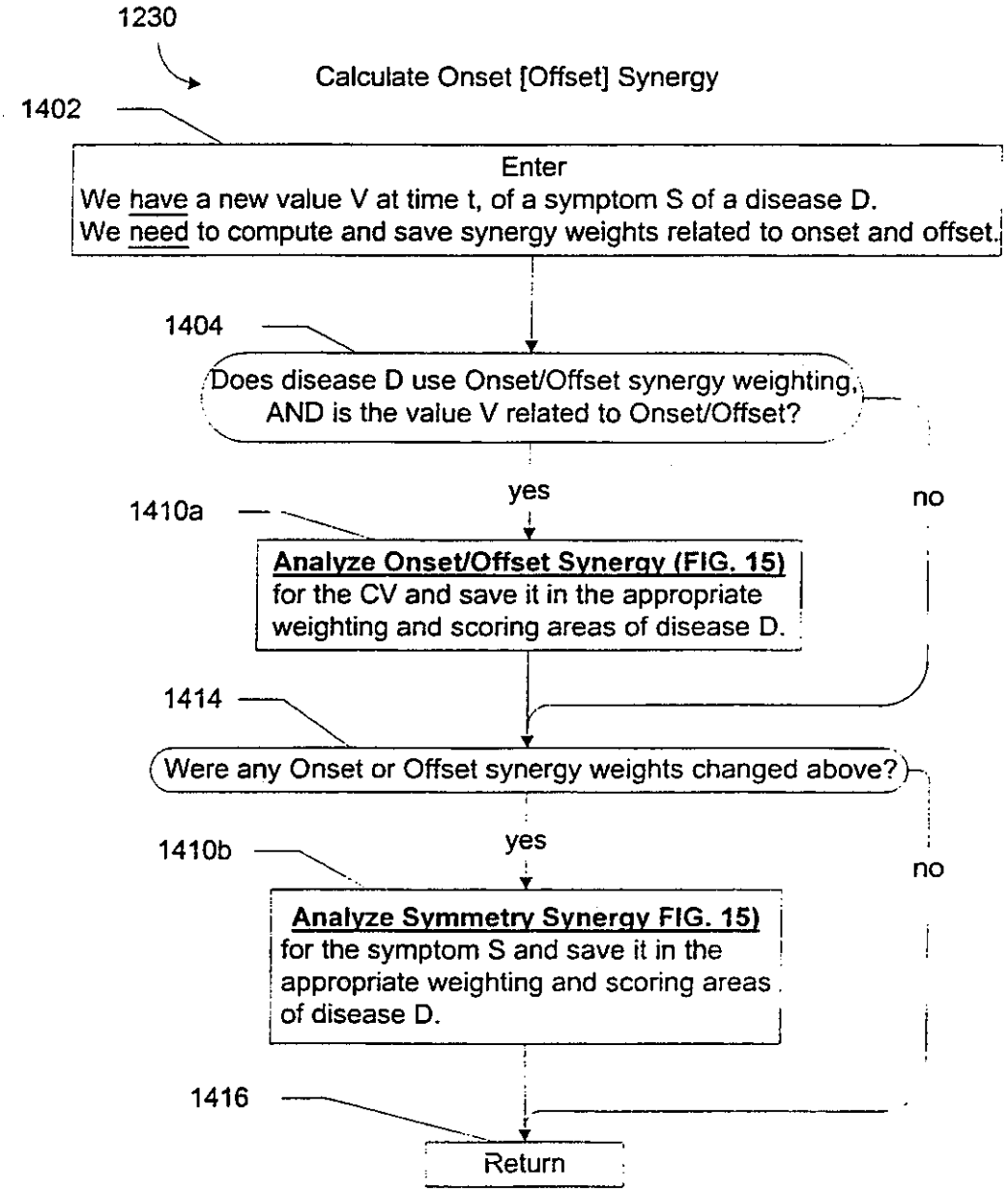

1230
Calculate Onset [Offset] Synergy
1402
Enter
We have a new value V at time t, of a symptom S of a disease D.
We need to compute and save synergy weights related to onset and offset.
1404
Does disease D use Onset/Offset synergy weighting, AND is the value V related to Onset/Offset?
yes
no
1410a
Analyze Onset/Offset Synergy (FIG. 15)
for the CV and save it in the appropriate weighting and scoring areas of disease D.
1414
Were any Onset or Offset synergy weights changed above?
yes
no
1410b
Analyze Symmetry Synergy FIG. 15)
for the symptom S and save it in the appropriate weighting and scoring areas of disease D.
1416
Return

FIG. 14

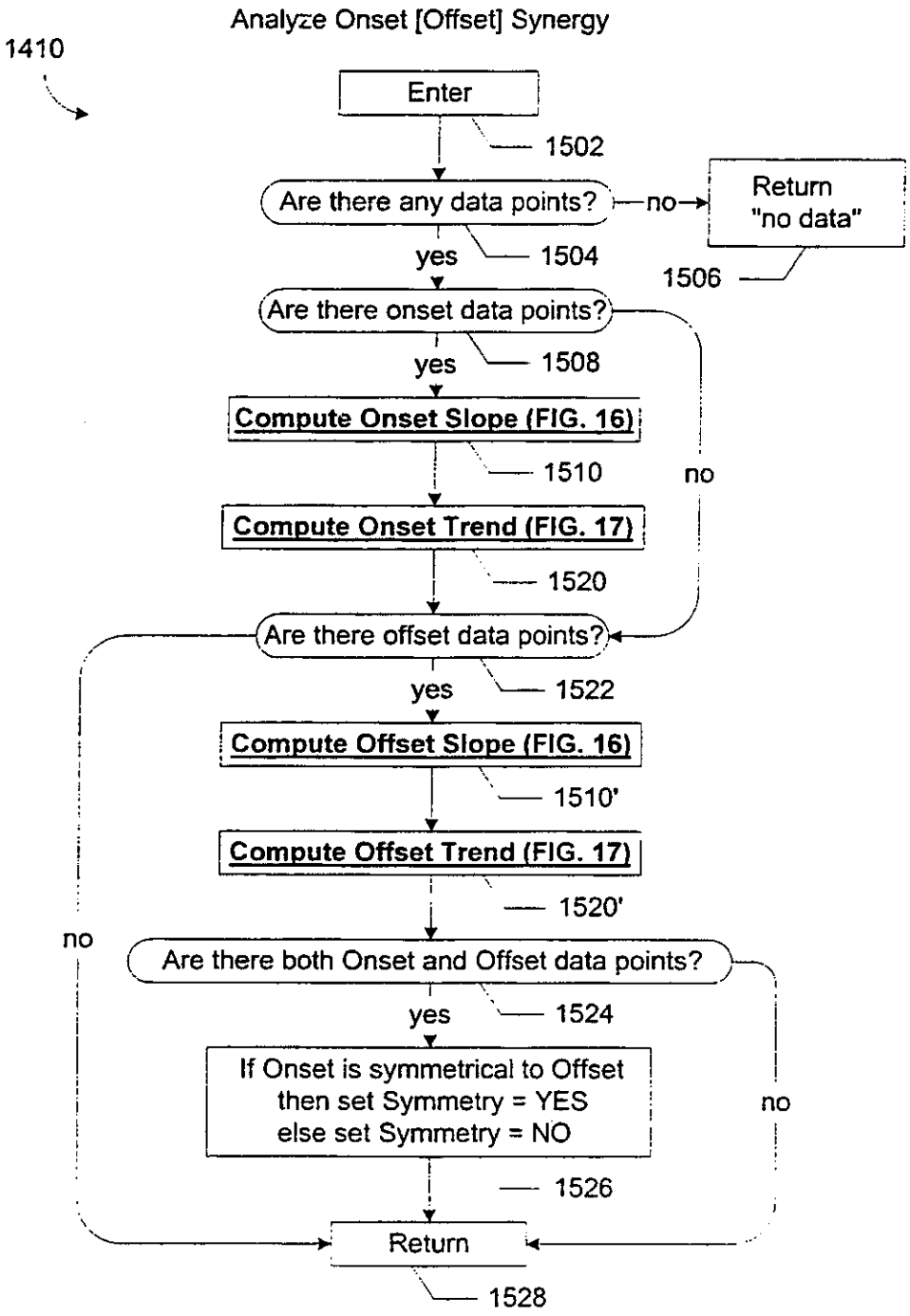

Analyze Onset [Offset] Synergy
1410
Enter
1502
Are there any data points?
no
Return "no data"
1506
yes
1504
Are there onset data points?
yes
1508
Compute Onset Slope (FIG. 16)
1510
Compute Onset Trend (FIG. 17)
1520
no
Are there offset data points?
yes
1522
Compute Offset Slope (FIG. 16)
1510'
Compute Offset Trend (FIG. 17)
1520'
no
Are there both Onset and Offset data points?
yes
1524
If Onset is symmetrical to Offset
then set Symmetry = YES
else set Symmetry = NO
no
1526
Return
1528

FIG. 15

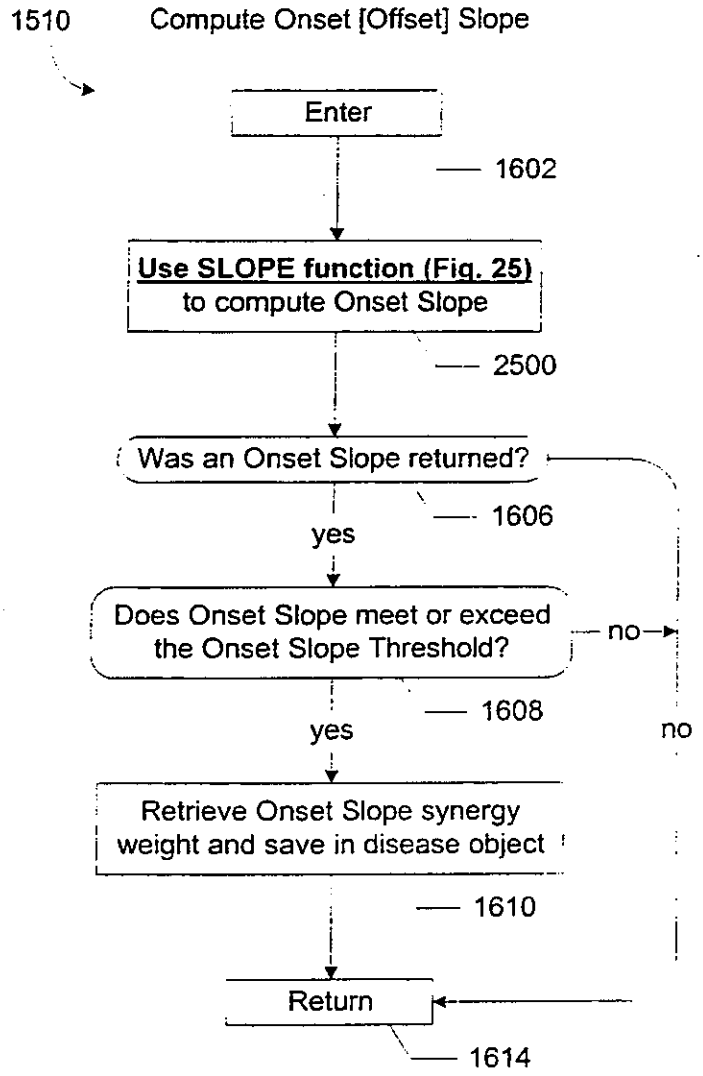

1510
Compute Onset [Offset] Slope
Enter
1602
Use SLOPE function (Fig. 25)
to compute Onset Slope
2500
Was an Onset Slope returned?
1606
yes
Does Onset Slope meet or exceed
the Onset Slope Threshold?
no
1608
yes
no
Retrieve Onset Slope synergy
weight and save in disease object
1610
Return
1614

FIG. 16

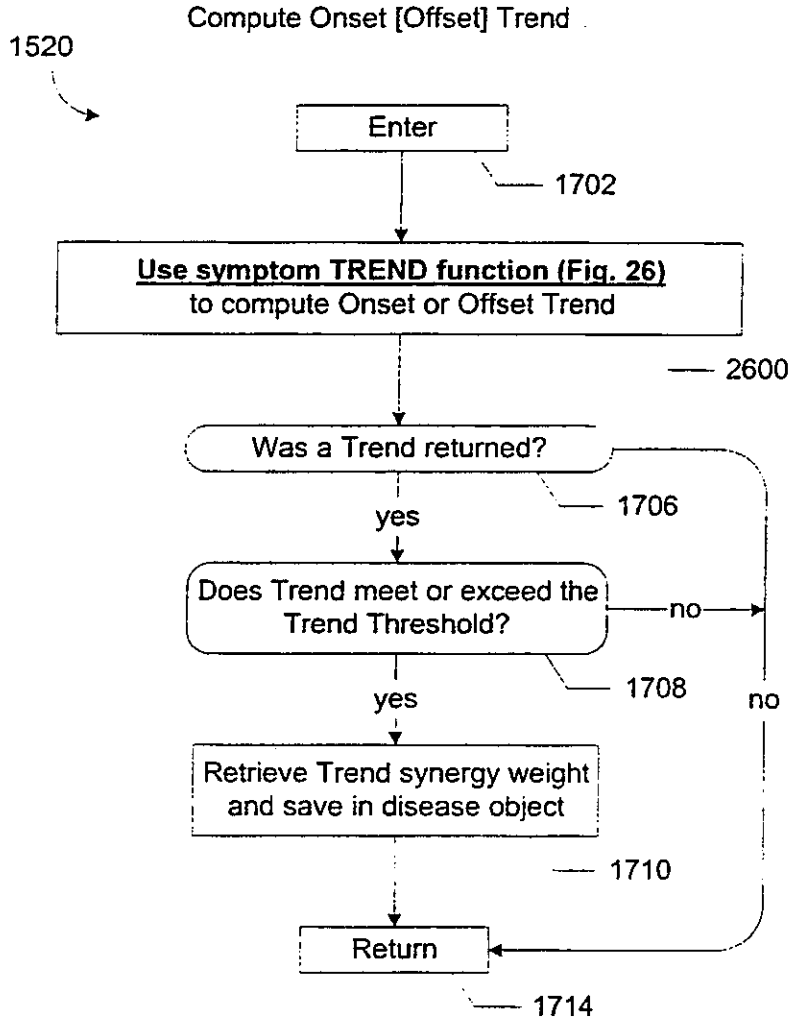

Compute Onset [Offset] Trend
1520
Enter
1702
Use symptom TREND function (Fig. 26)
to compute Onset or Offset Trend
2600
Was a Trend returned?
1706
yes
Does Trend meet or exceed the Trend Threshold?
no
1708
yes
no
Retrieve Trend synergy weight and save in disease object
1710
Return
1714

FIG. 17

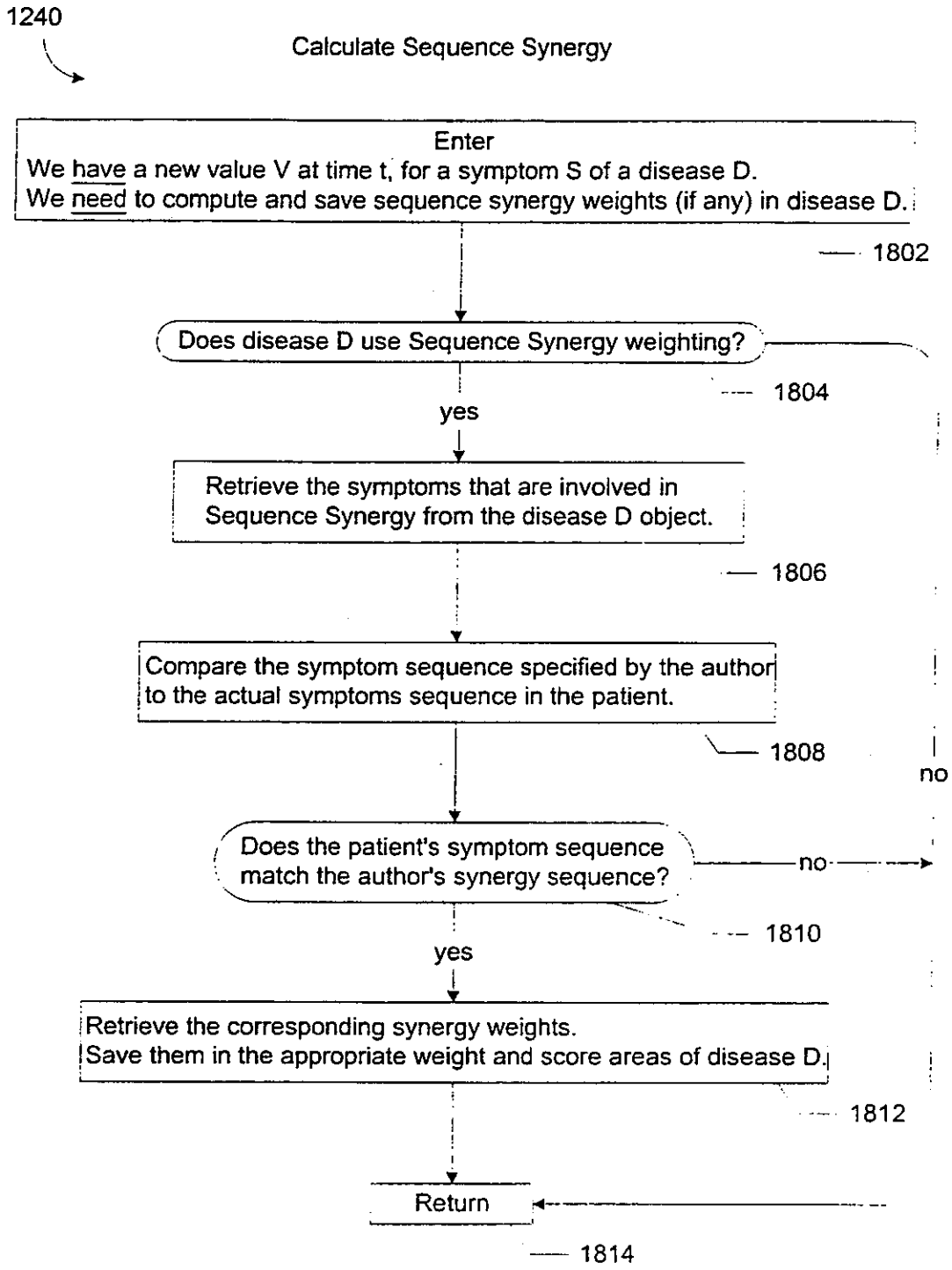

1240
Calculate Sequence Synergy
Enter
We have a new value V at time t, for a symptom S of a disease D.
We need to compute and save sequence synergy weights (if any) in disease D.
1802
Does disease D use Sequence Synergy weighting?
1804
yes
Retrieve the symptoms that are involved in Sequence Synergy from the disease D object.
1806
Compare the symptom sequence specified by the author to the actual symptoms sequence in the patient.
1808
no
Does the patient's symptom sequence match the author's synergy sequence?
no
1810
yes
Retrieve the corresponding synergy weights.
Save them in the appropriate weight and score areas of disease D.
1812
Return
1814

FIG. 18

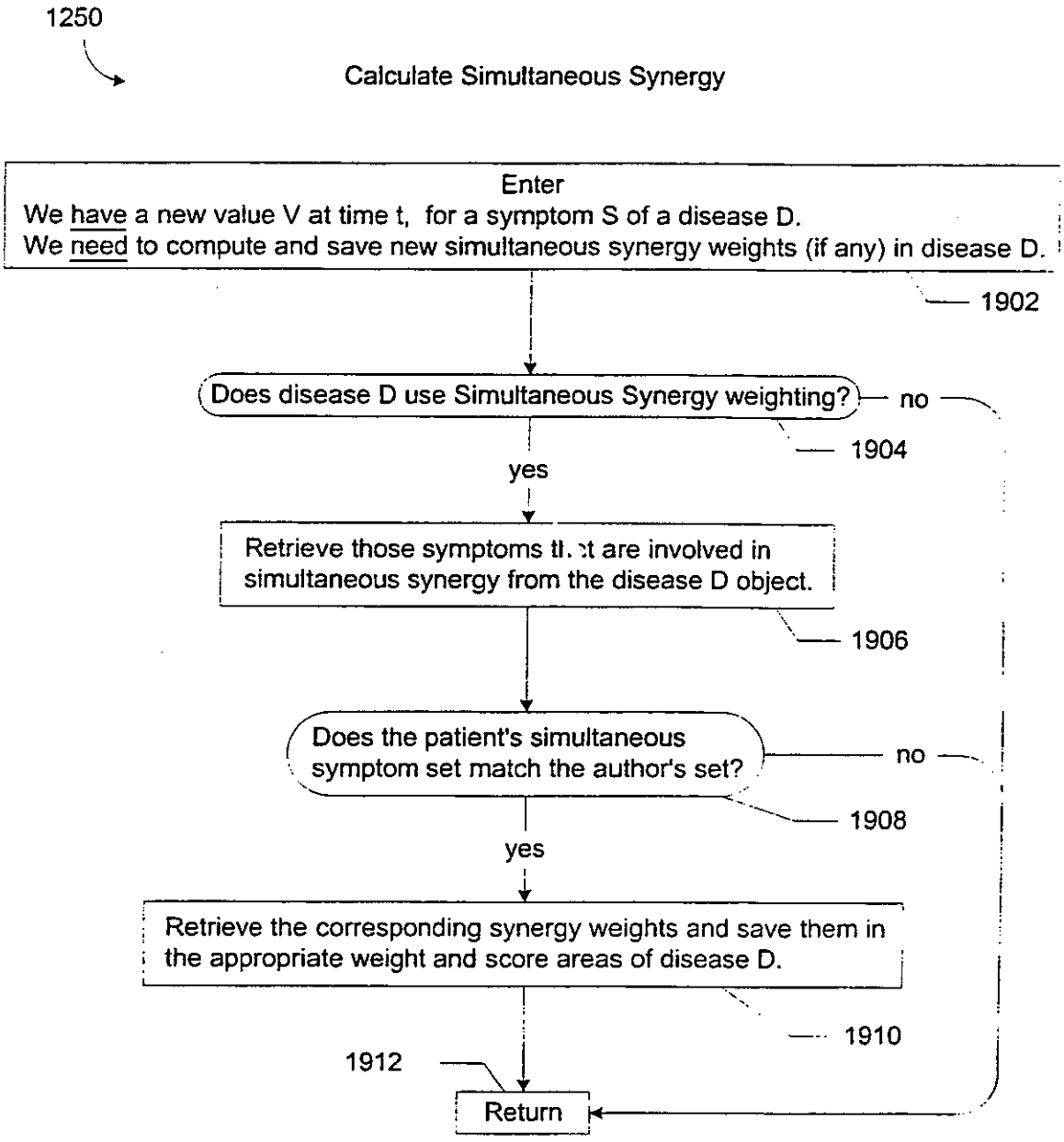

1250
Calculate Simultaneous Synergy
Enter
We have a new value V at time t, for a symptom S of a disease D.
We need to compute and save new simultaneous synergy weights (if any) in disease D.
1902
Does disease D use Simultaneous Synergy weighting?
no
1904
yes
Retrieve those symptoms that are involved in simultaneous synergy from the disease D object.
1906
Does the patient's simultaneous symptom set match the author's set?
no
1908
yes
Retrieve the corresponding synergy weights and save them in the appropriate weight and score areas of disease D.
1910
1912
Return

FIG. 19

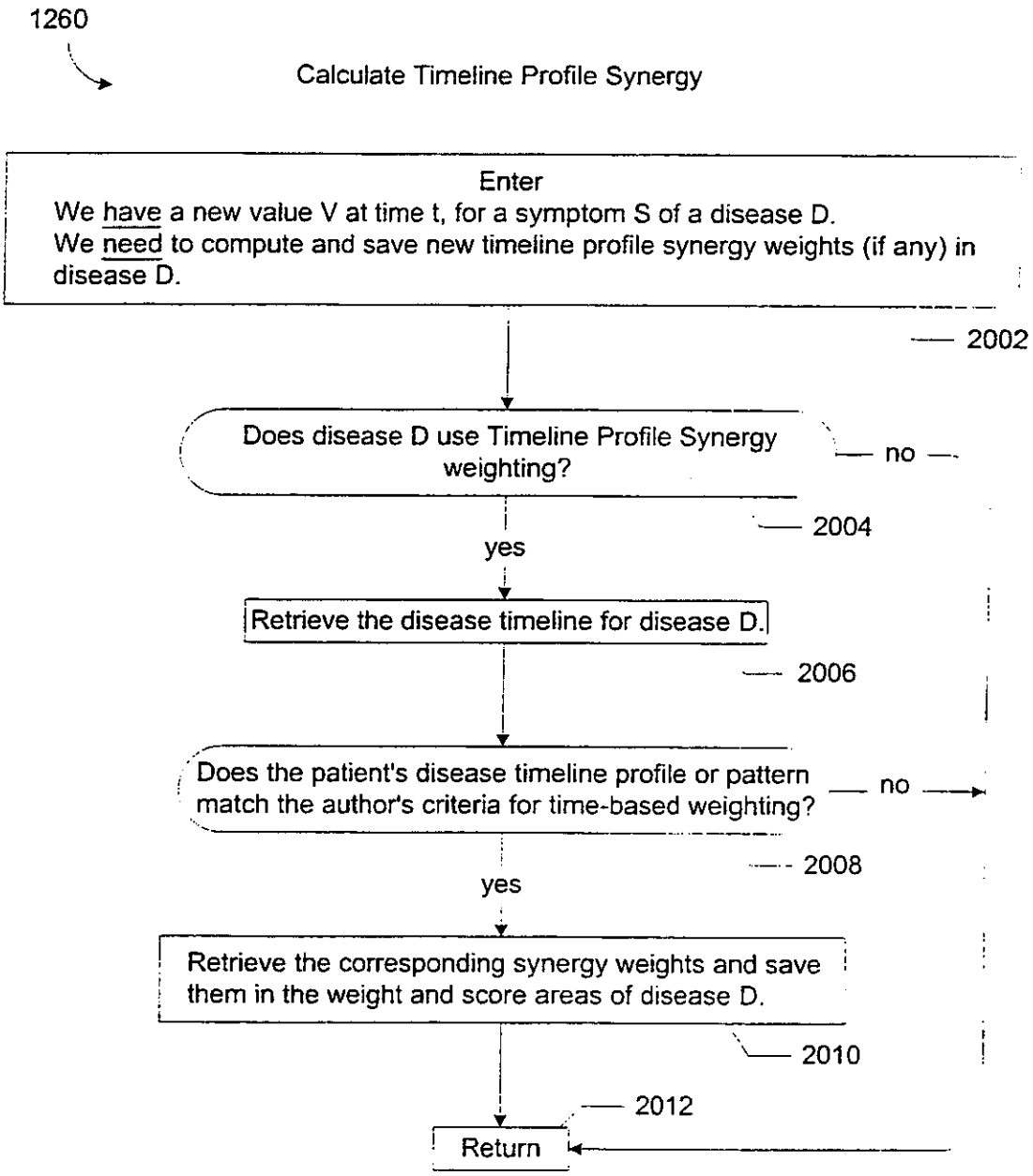

1260
Calculate Timeline Profile Synergy
Enter
We have a new value V at time t, for a symptom S of a disease D.
We need to compute and save new timeline profile synergy weights (if any) in disease D.
2002
Does disease D use Timeline Profile Synergy weighting?
no
2004
yes
Retrieve the disease timeline for disease D.
2006
Does the patient's disease timeline profile or pattern match the author's criteria for time-based weighting?
no
2008
yes
Retrieve the corresponding synergy weights and save them in the weight and score areas of disease D.
2010
2012
Return

FIG. 20

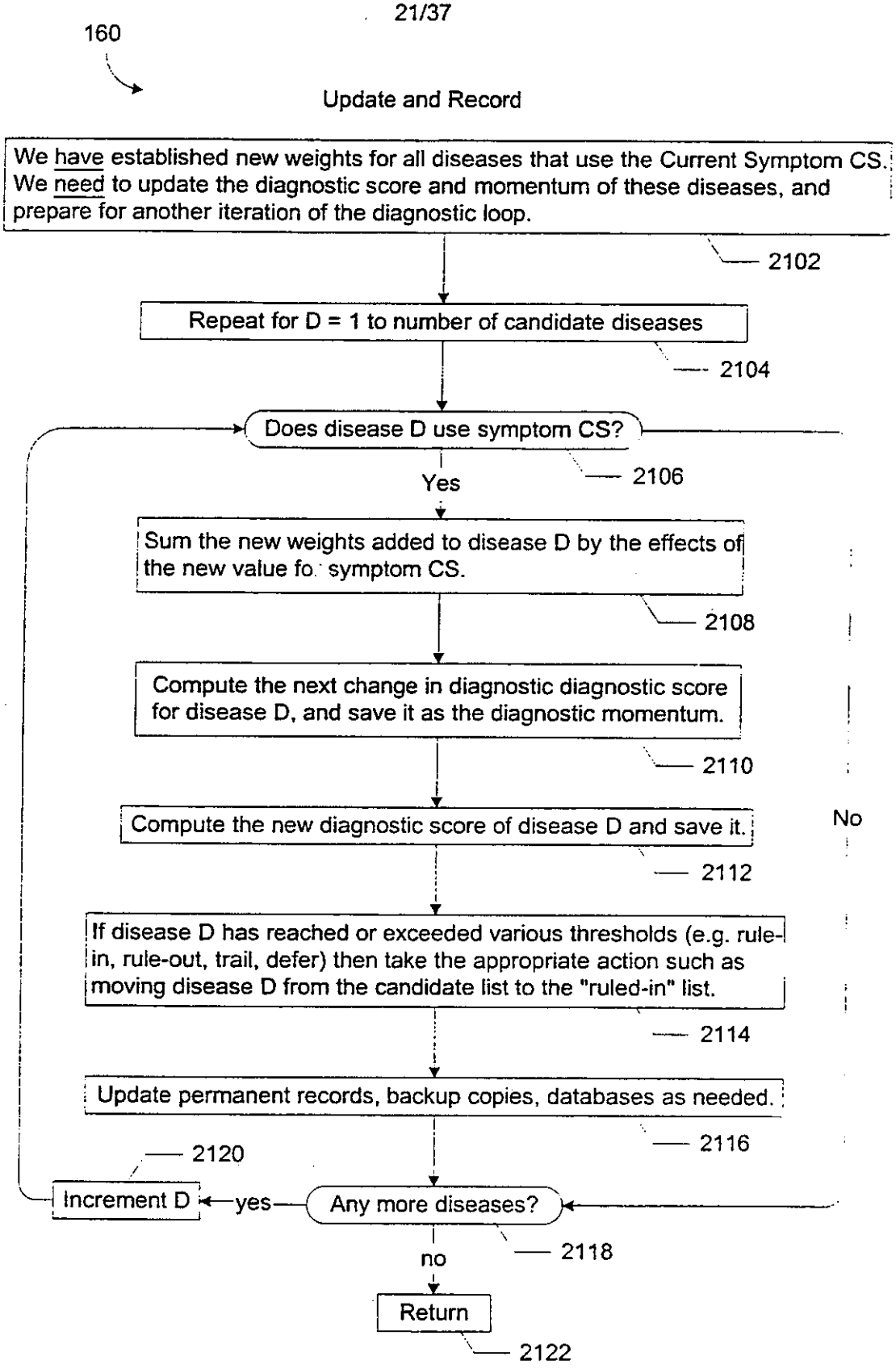

160
Update and Record
We have established new weights for all diseases that use the Current Symptom CS. We need to update the diagnostic score and momentum of these diseases, and prepare for another iteration of the diagnostic loop.
2102
Repeat for D = 1 to number of candidate diseases
2104
Does disease D use symptom CS?
2106
Yes
No
Sum the new weights added to disease D by the effects of the new value for symptom CS.
2108
Compute the next change in diagnostic diagnostic score for disease D, and save it as the diagnostic momentum.
2110
Compute the new diagnostic score of disease D and save it.
2112
If disease D has reached or exceeded various thresholds (e.g. rule-in, rule-out, trail, defer) then take the appropriate action such as moving disease D from the candidate list to the "ruled-in" list.
2114
Update permanent records, backup copies, databases as needed.
2116
2120
Increment D
yes
Any more diseases?
2118
no
Return
2122

FIG. 21

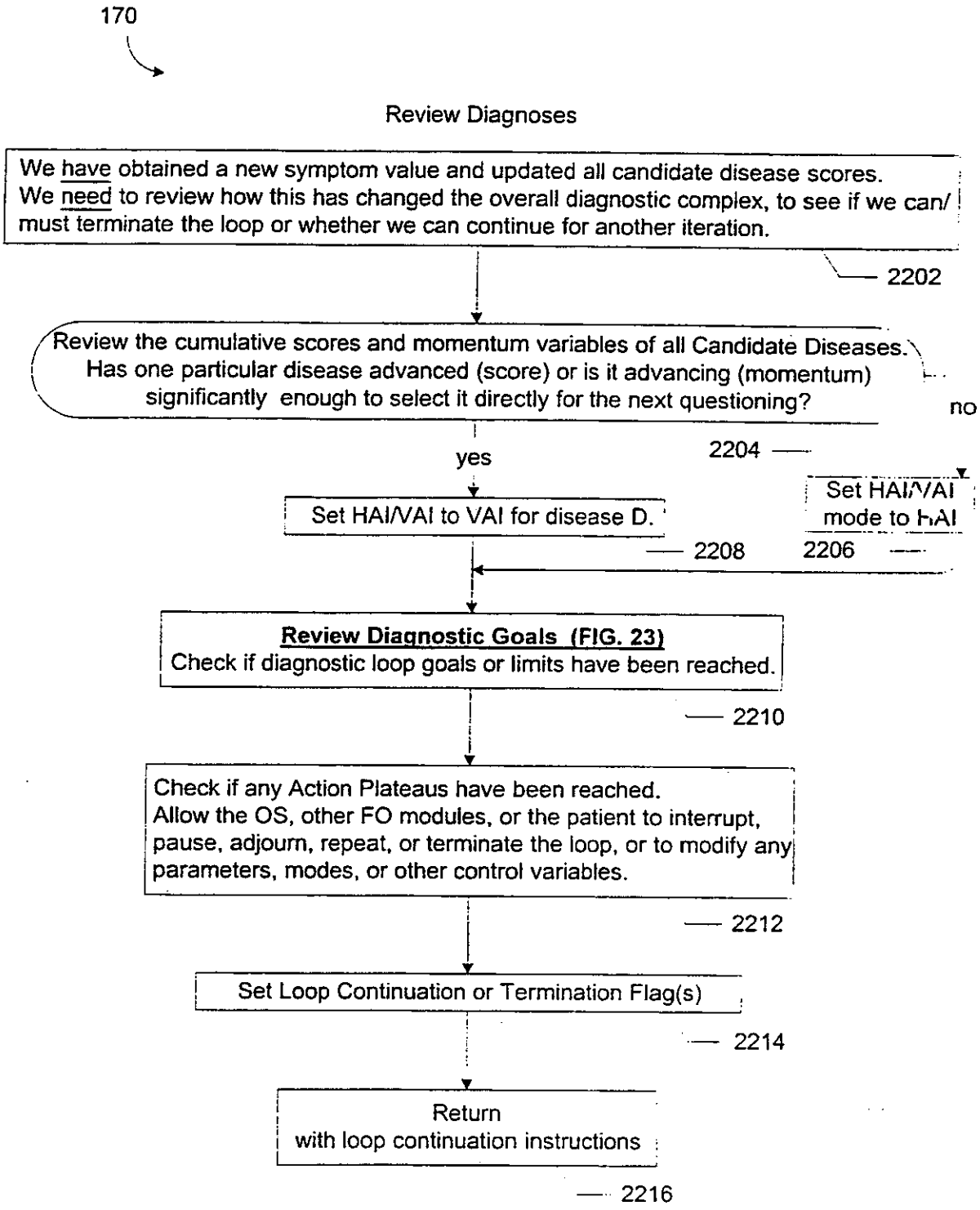

170
Review Diagnoses
We have obtained a new symptom value and updated all candidate disease scores. We need to review how this has changed the overall diagnostic complex, to see if we can/ must terminate the loop or whether we can continue for another iteration.
2202
Review the cumulative scores and momentum variables of all Candidate Diseases. Has one particular disease advanced (score) or is it advancing (momentum) significantly enough to select it directly for the next questioning?
no
2204
yes
Set HAI/VAI to VAI for disease D.
2208
Set HAI/VAI mode to HAI
2206
Review Diagnostic Goals (FIG. 23)
Check if diagnostic loop goals or limits have been reached.
2210
Check if any Action Plateaus have been reached. Allow the OS, other FO modules, or the patient to interrupt, pause, adjourn, repeat, or terminate the loop, or to modify any parameters, modes, or other control variables.
2212
Set Loop Continuation or Termination Flag(s)
2214
Return with loop continuation instructions
2216

FIG. 22

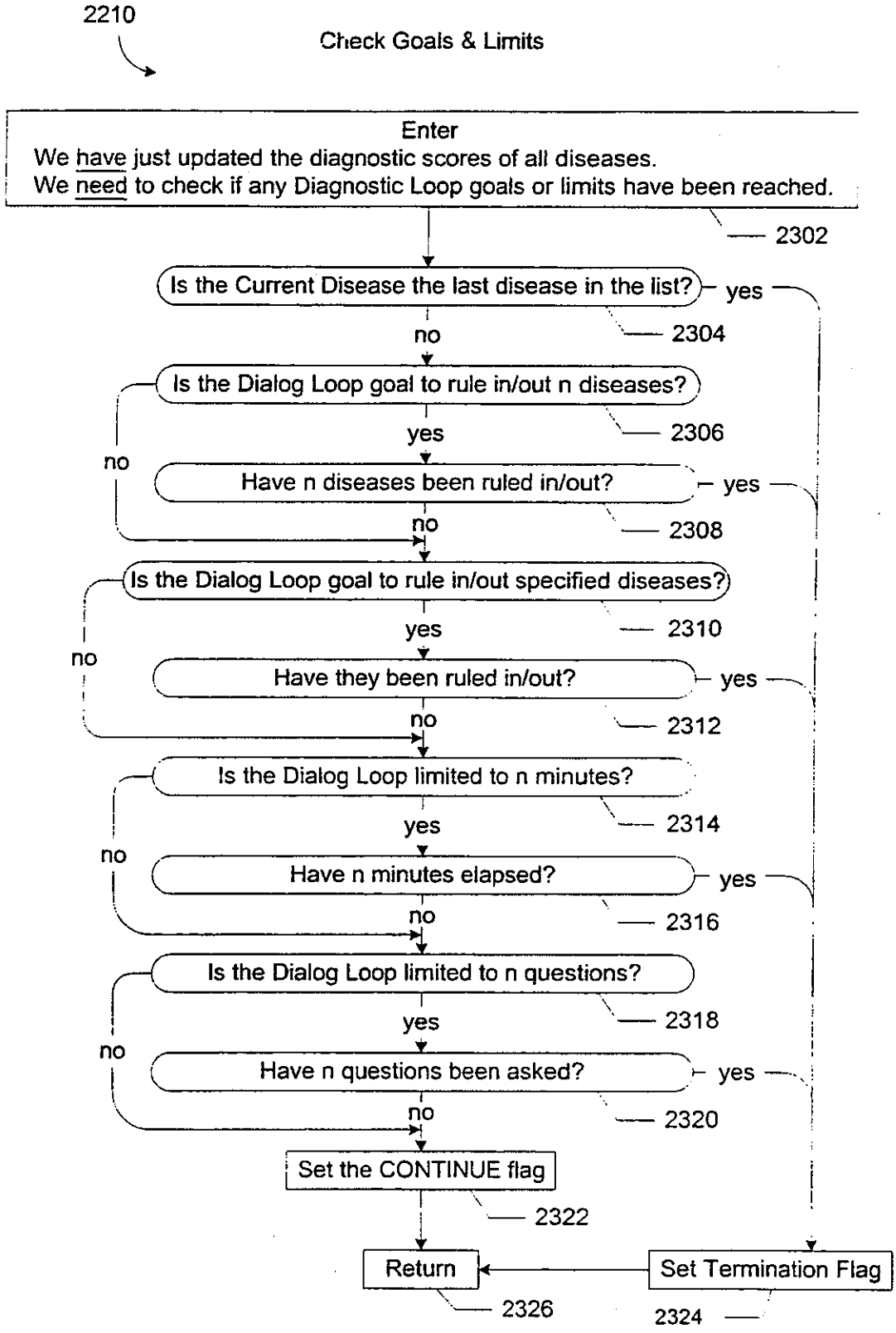

2210
Check Goals & Limits
Enter
We have just updated the diagnostic scores of all diseases.
We need to check if any Diagnostic Loop goals or limits have been reached.
2302
Is the Current Disease the last disease in the list?
yes
2304
no
Is the Dialog Loop goal to rule in/out n diseases?
2306
yes
no
Have n diseases been ruled in/out?
yes
2308
no
Is the Dialog Loop goal to rule in/out specified diseases?
2310
yes
no
Have they been ruled in/out?
yes
2312
no
Is the Dialog Loop limited to n minutes?
2314
yes
no
Have n minutes elapsed?
yes
2316
no
Is the Dialog Loop limited to n questions?
2318
yes
no
Have n questions been asked?
yes
2320
no
Set the CONTINUE flag
2322
Return
Set Termination Flag
2326
2324

FIG. 23

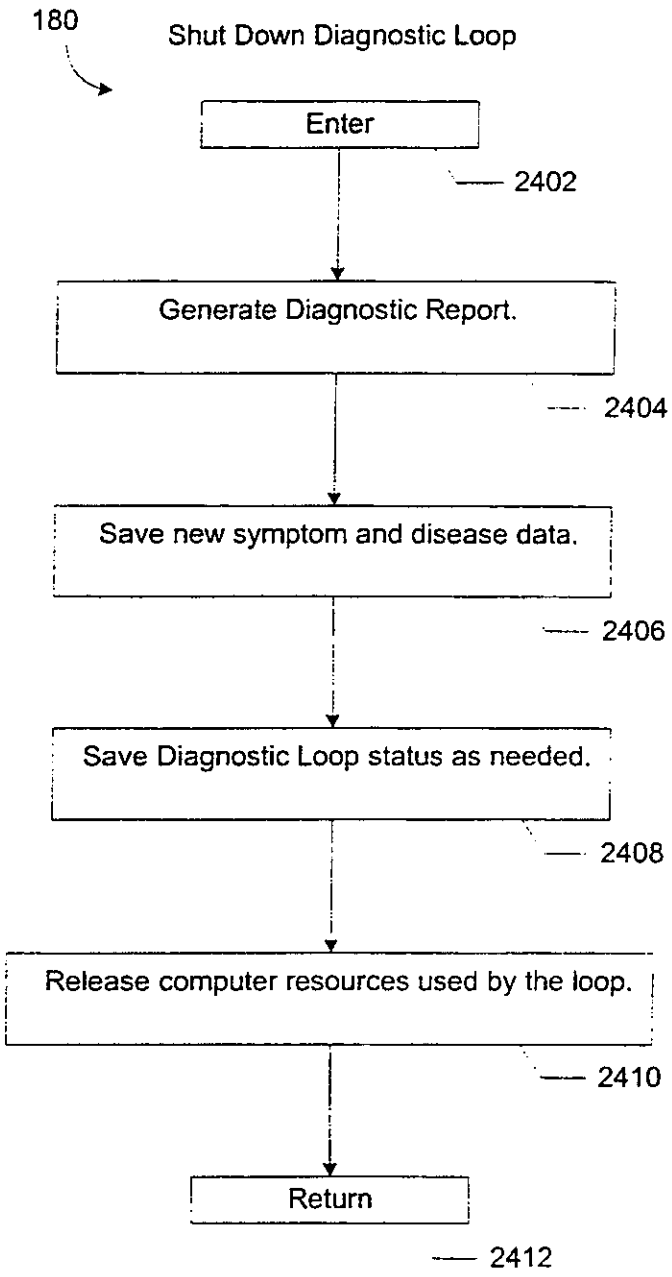

180
Shut Down Diagnostic Loop
Enter
2402
Generate Diagnostic Report.
2404
Save new symptom and disease data.
2406
Save Diagnostic Loop status as needed.
2408
Release computer resources used by the loop.
2410
Return
2412

FIG. 24

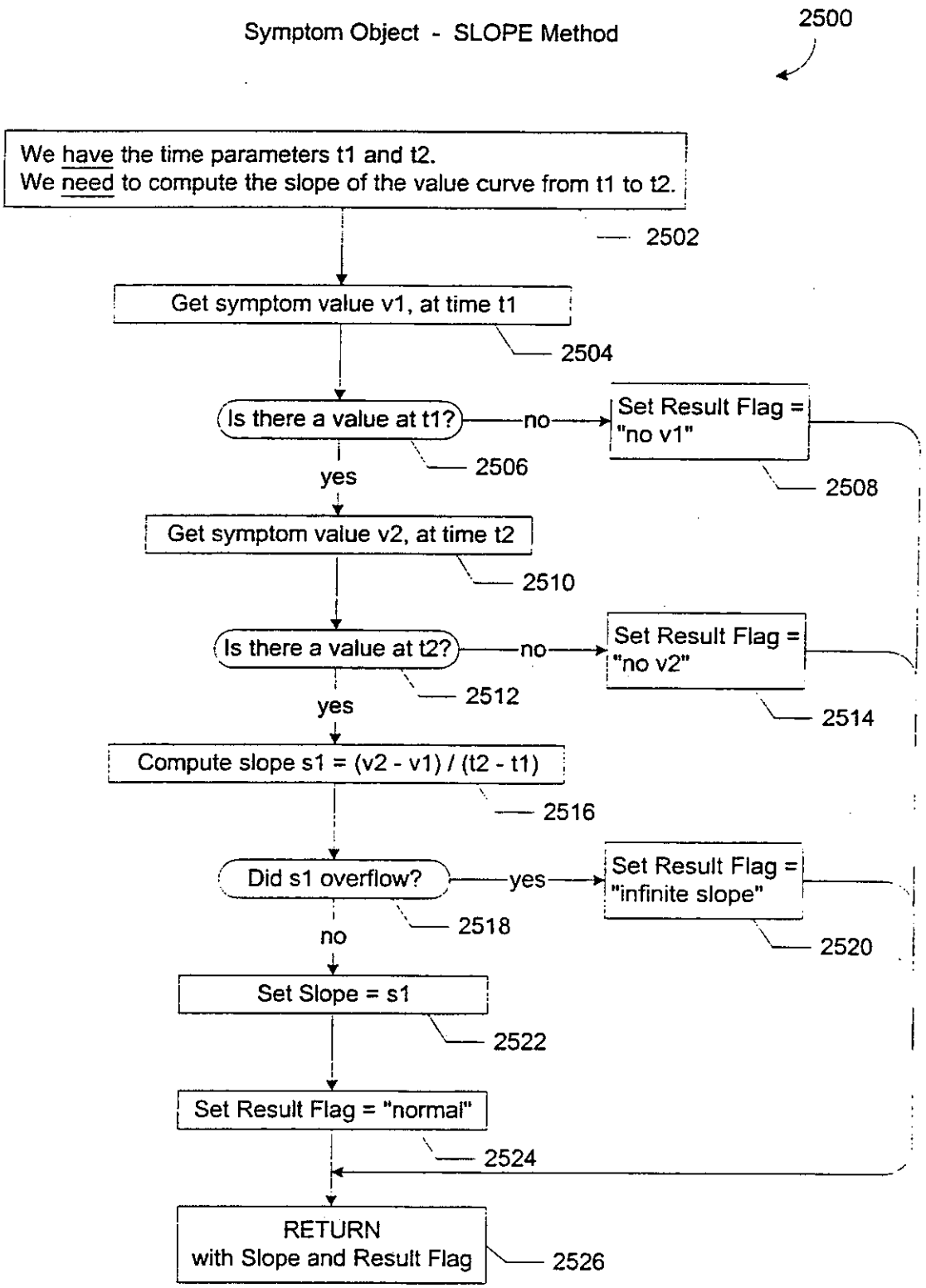

Symptom Object - SLOPE Method
2500
We have the time parameters t1 and t2.
We need to compute the slope of the value curve from t1 to t2.
2502
Get symptom value v1, at time t1
2504
Is there a value at t1?
no
Set Result Flag = "no v1"
2506
2508
yes
Get symptom value v2, at time t2
2510
Is there a value at t2?
no
Set Result Flag = "no v2"
2512
2514
yes
Compute slope s1 = (v2 - v1) / (t2 - t1)
2516
Did s1 overflow?
yes
Set Result Flag = "infinite slope"
2518
2520
no
Set Slope = s1
2522
Set Result Flag = "normal"
2524
RETURN with Slope and Result Flag
2526

FIG. 25

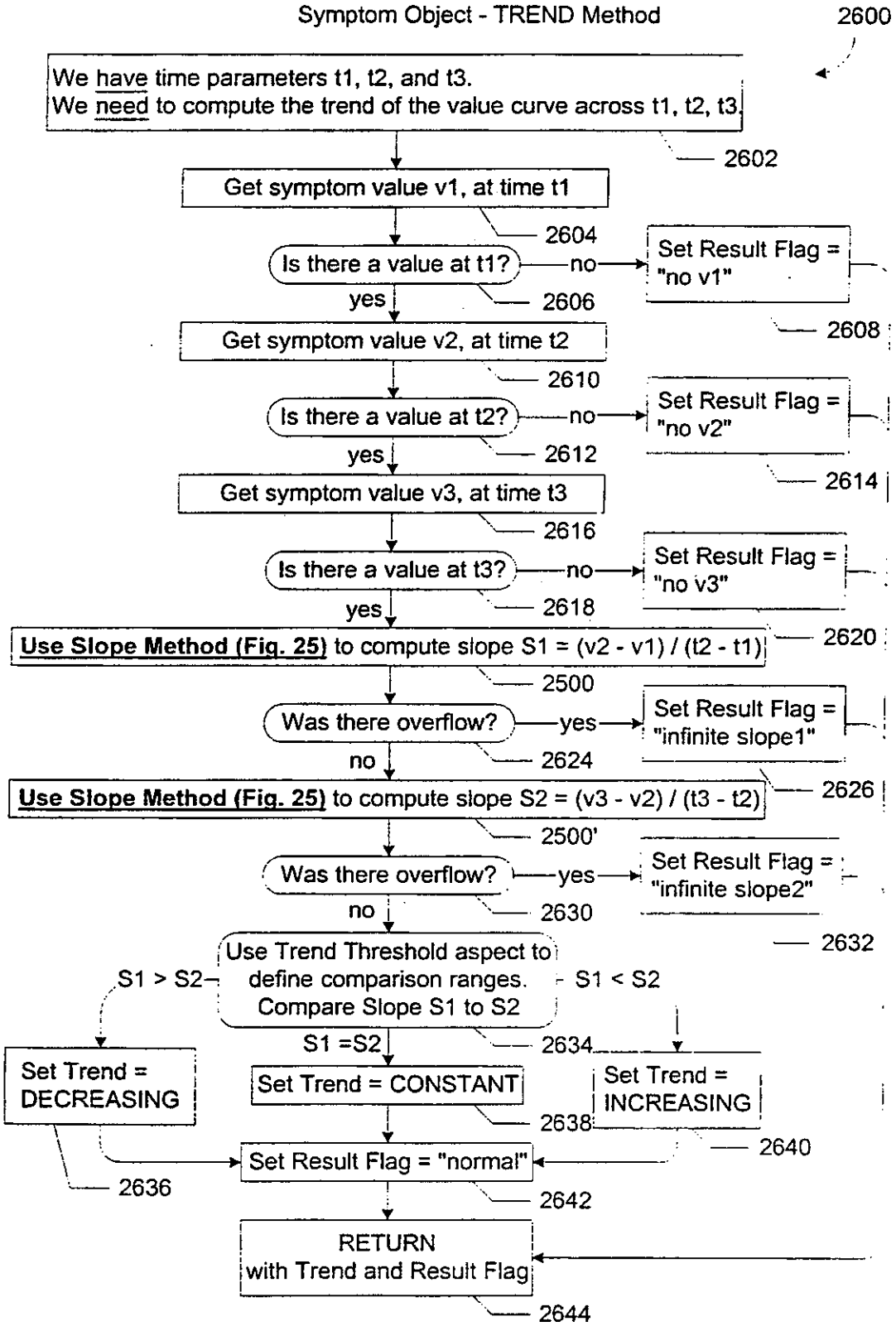
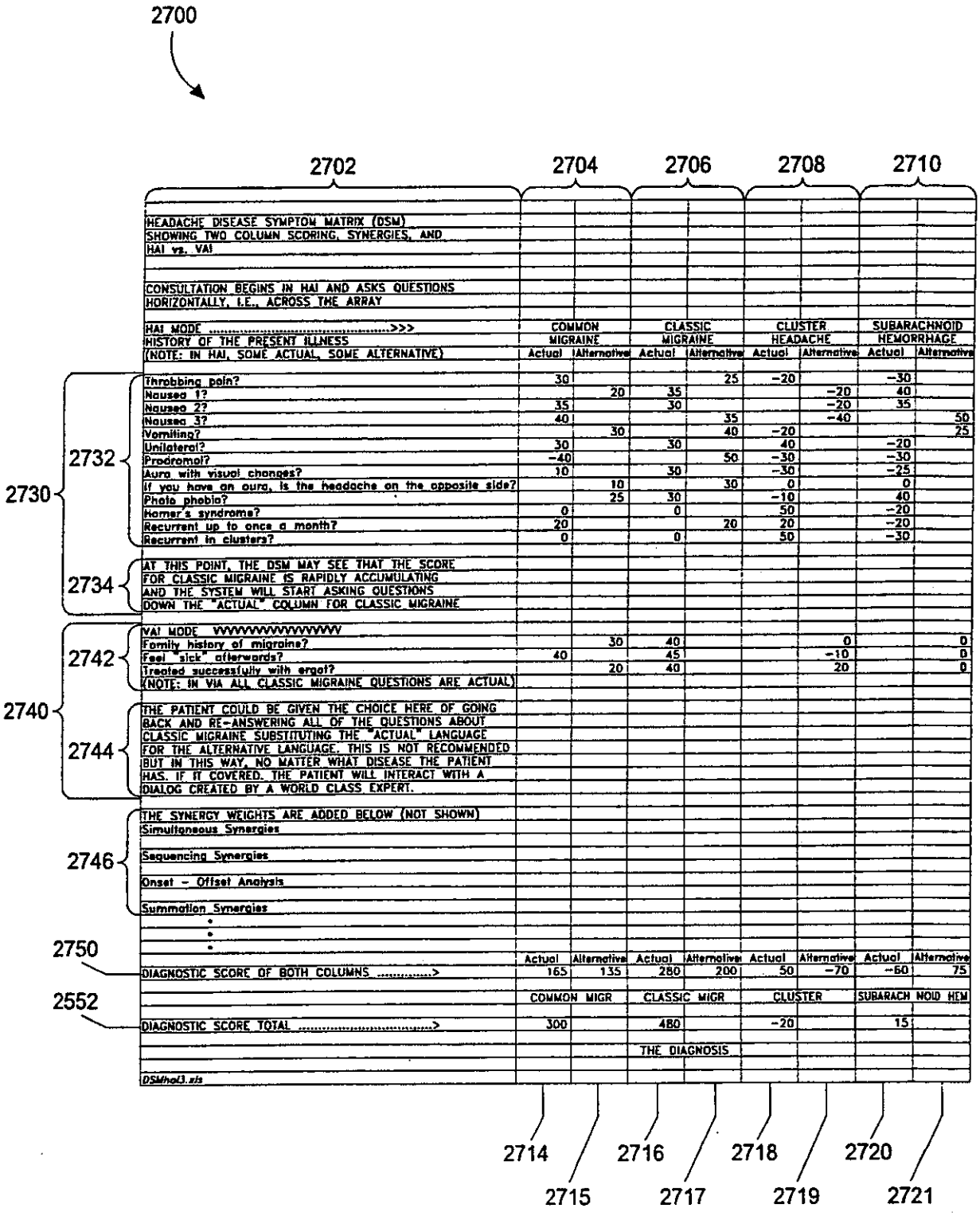

Symptom Object - TREND Method
2600
We have time parameters t1, t2, and t3.
We need to compute the trend of the value curve across t1, t2, t3.
2602
Get symptom value v1, at time t1
2604
Is there a value at t1?
no
Set Result Flag = "no v1"
2606
yes
2608
Get symptom value v2, at time t2
2610
Is there a value at t2?
no
Set Result Flag = "no v2"
2612
yes
2614
Get symptom value v3, at time t3
2616
Is there a value at t3?
no
Set Result Flag = "no v3"
2618
yes
Use Slope Method (Fig. 25) to compute slope S1 = (v2 - v1) / (t2 - t1)
2620
2500
Was there overflow?
yes
Set Result Flag = "infinite slope1"
2624
no
2626
Use Slope Method (Fig. 25) to compute slope S2 = (v3 - v2) / (t3 - t2)
2500'
Was there overflow?
yes
Set Result Flag = "infinite slope2"
2630
no
2632
Use Trend Threshold aspect to define comparison ranges. Compare Slope S1 to S2
S1 > S2
S1 < S2
S1 =S2
2634
Set Trend = DECREASING
Set Trend = CONSTANT
Set Trend = INCREASING
2636
2638
2640
Set Result Flag = "normal"
2642
RETURN with Trend and Result Flag
2644

FIG. 26



HEADACHE DISEASE SYMPTOM MATRIX (DSM) SHOWING TWO COLUMN SCORING, SYNERGIES, AND HAI vs. VAI								
CONSULTATION BEGINS IN HAI AND ASKS QUESTIONS HORIZONTALLY, I.E., ACROSS THE ARRAY								
HAI MODE >>>	COMMON MIGRAINE		CLASSIC MIGRAINE		CLUSTER HEADACHE		SUBARACHNOID HEMORRHAGE	
HISTORY OF THE PRESENT ILLNESS (NOTE: IN HAI, SOME ACTUAL, SOME ALTERNATIVE)	Actual	Alternative	Actual	Alternative	Actual	Alternative	Actual	Alternative
Throbbing pain?	30			25	-20		-30	
Nausea 1?		20	35			-20	40	
Nausea 2?	35		30			-20	35	
Nausea 3?	40			35		-40		50
Vomiting?		30		40	-20			25
Unilateral?	30		30		40		-20	
Prodromal?	-40			50	-30		-30	
Aura with visual changes?	10		30		-30		-25	
If you have an aura, is the headache on the opposite side?		10		30	0		0	
Photo phobia?		25	30		-10		40	
Horner's syndrome?	0		0		50		-20	
Recurrent up to once a month?	20			20	20		-20	
Recurrent in clusters?	0		0		50		-30	
AT THIS POINT, THE DSM MAY SEE THAT THE SCORE FOR CLASSIC MIGRAINE IS RAPIDLY ACCUMULATING AND THE SYSTEM WILL START ASKING QUESTIONS DOWN THE "ACTUAL" COLUMN FOR CLASSIC MIGRAINE								
VAI MODE VVVVVVVVVVVVVVV								
Family history of migraine?		30	40			0		0
Feel "sick" afterwards?	40		45			-10		0
Treated successfully with ergot?		20	40			20		0
(NOTE: IN VIA ALL CLASSIC MIGRAINE QUESTIONS ARE ACTUAL)								
THE PATIENT COULD BE GIVEN THE CHOICE HERE OF GOING BACK AND RE-ANSWERING ALL OF THE QUESTIONS ABOUT CLASSIC MIGRAINE SUBSTITUTING THE "ACTUAL" LANGUAGE FOR THE ALTERNATIVE LANGUAGE. THIS IS NOT RECOMMENDED BUT IN THIS WAY, NO MATTER WHAT DISEASE THE PATIENT HAS, IF IT COVERED, THE PATIENT WILL INTERACT WITH A DIALOG CREATED BY A WORLD CLASS EXPERT.								
THE SYNERGY WEIGHTS ARE ADDED BELOW (NOT SHOWN)								
Simultaneous Synergies								
Sequencing Synergies								
Onset - Offset Analysis								
Summation Synergies								
•								
•								
•								
	Actual	Alternative	Actual	Alternative	Actual	Alternative	Actual	Alternative
DIAGNOSTIC SCORE OF BOTH COLUMNS >	165	135	280	200	50	-70	-60	75
	COMMON MIGR		CLASSIC MIGR		CLUSTER		SUBARACH MOID HEM	
DIAGNOSTIC SCORE TOTAL >	300		480		-20		15	
			THE DIAGNOSIS					
DSMhai3.xls								

FIG. 27

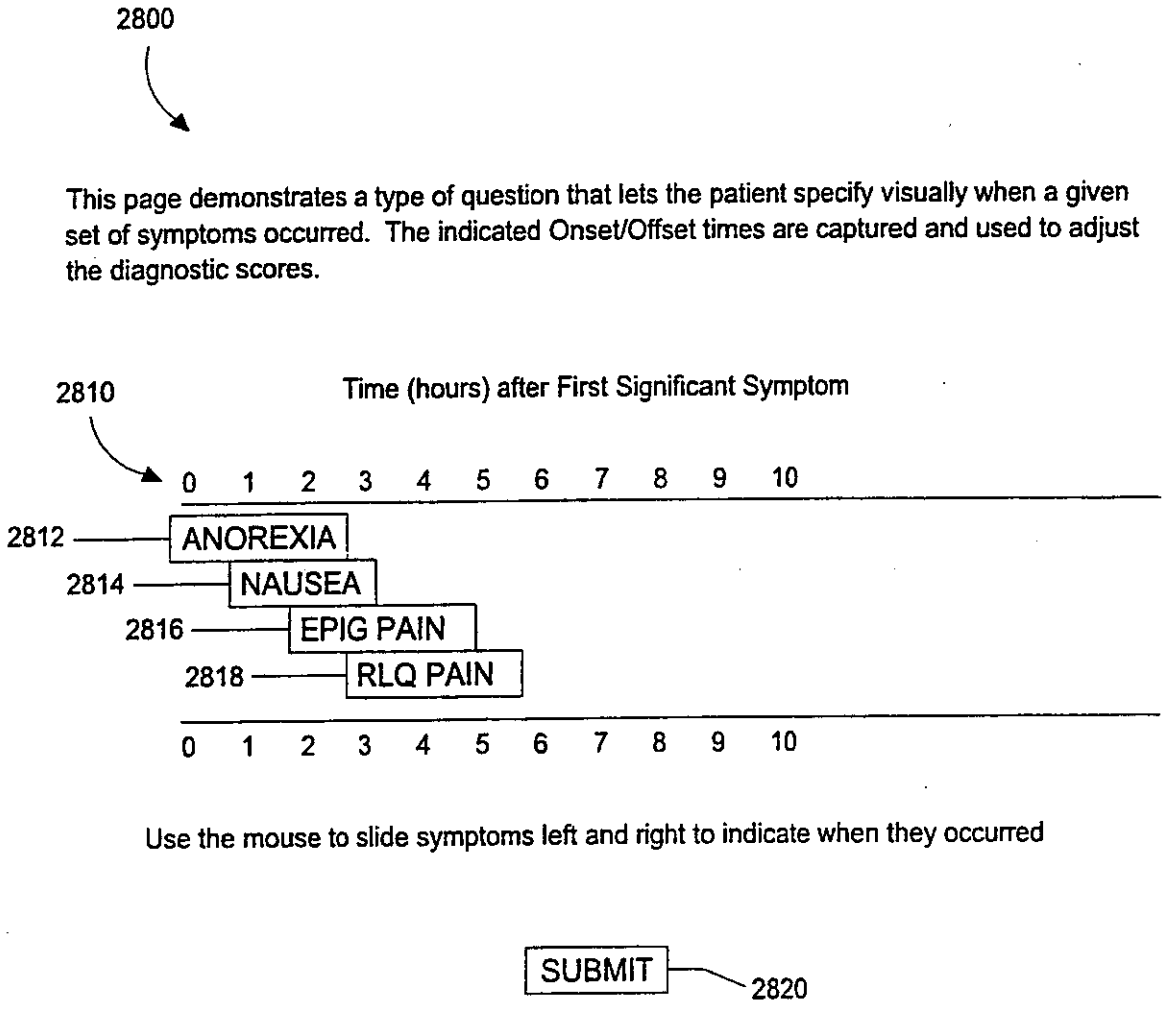

2800
This page demonstrates a type of question that lets the patient specify visually when a given set of symptoms occurred. The indicated Onset/Offset times are captured and used to adjust the diagnostic scores.
2810
Time (hours) after First Significant Symptom
0 1 2 3 4 5 6 7 8 9 10
2812
ANOREXIA
2814
NAUSEA
2816
EPIG PAIN
2818
RLQ PAIN
0 1 2 3 4 5 6 7 8 9 10
Use the mouse to slide symptoms left and right to indicate when they occurred
SUBMIT
2820

FIG. 28

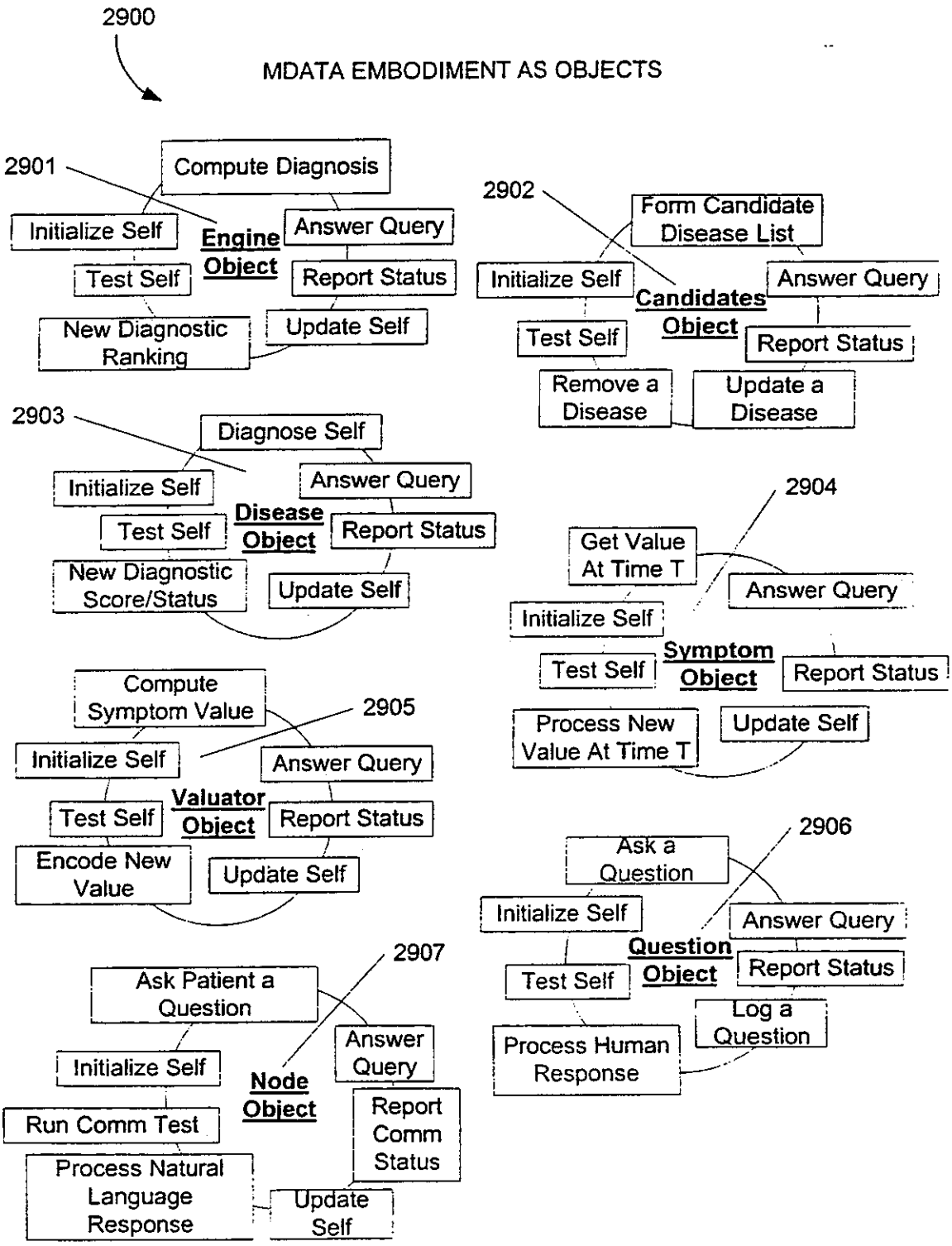

2900
MDATA EMBODIMENT AS OBJECTS
2901
Compute Diagnosis
Initialize Self
Engine Object
Answer Query
Test Self
Report Status
New Diagnostic Ranking
Update Self
2902
Form Candidate Disease List
Initialize Self
Candidates Object
Answer Query
Test Self
Report Status
Remove a Disease
Update a Disease
2903
Diagnose Self
Initialize Self
Answer Query
Test Self
Disease Object
Report Status
New Diagnostic Score/Status
Update Self
2904
Get Value At Time T
Answer Query
Initialize Self
Test Self
Symptom Object
Report Status
Process New Value At Time T
Update Self
Compute Symptom Value
2905
Initialize Self
Answer Query
Test Self
Valuator Object
Report Status
Encode New Value
Update Self
2906
Ask a Question
Initialize Self
Answer Query
Question Object
Test Self
Report Status
Log a Question
Process Human Response
2907
Ask Patient a Question
Answer Query
Initialize Self
Node Object
Report Comm Status
Run Comm Test
Process Natural Language Response
Update Self

FIG. 29A

USING OBJECTS FOR DIAGNOSIS

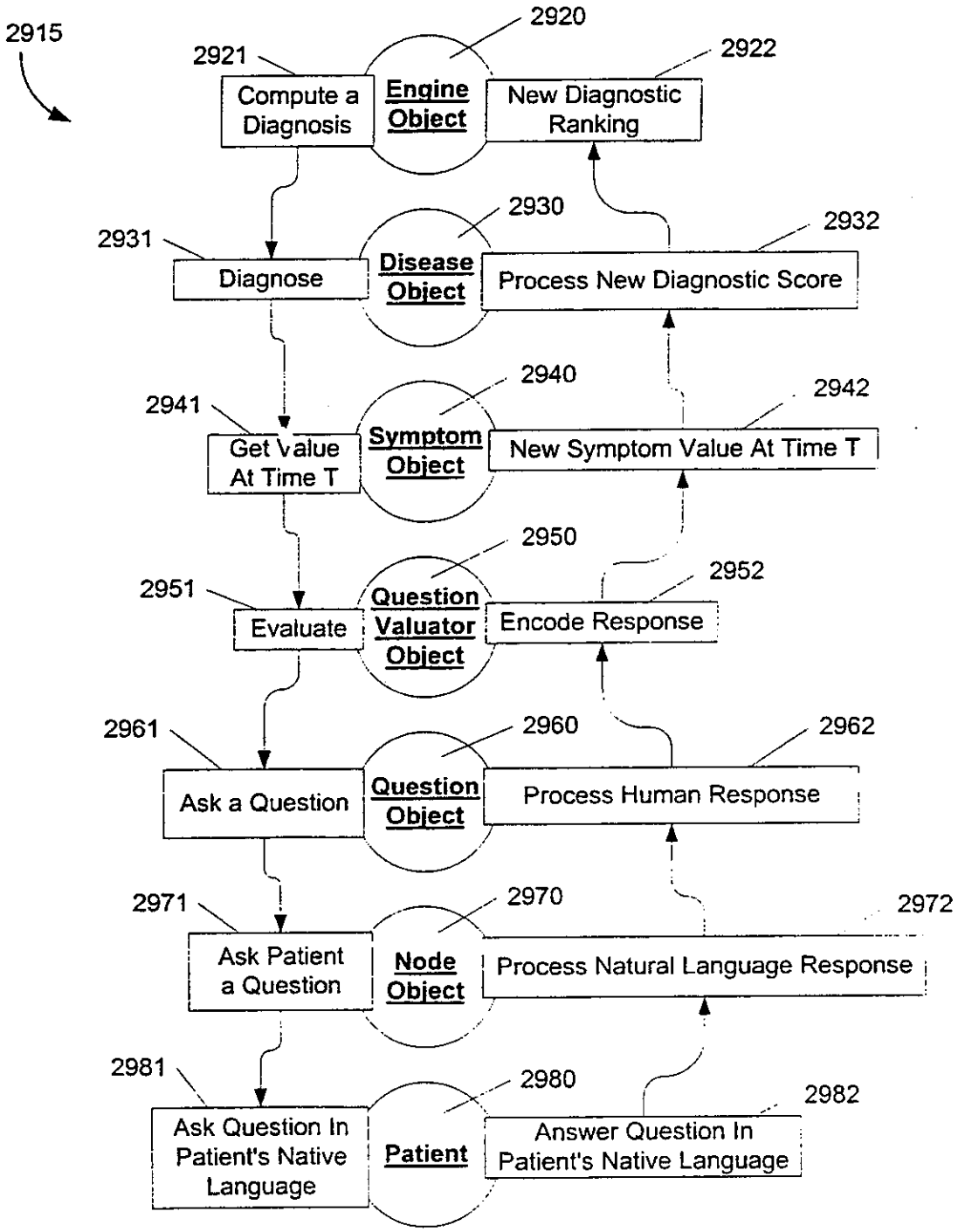


FIG. 29B

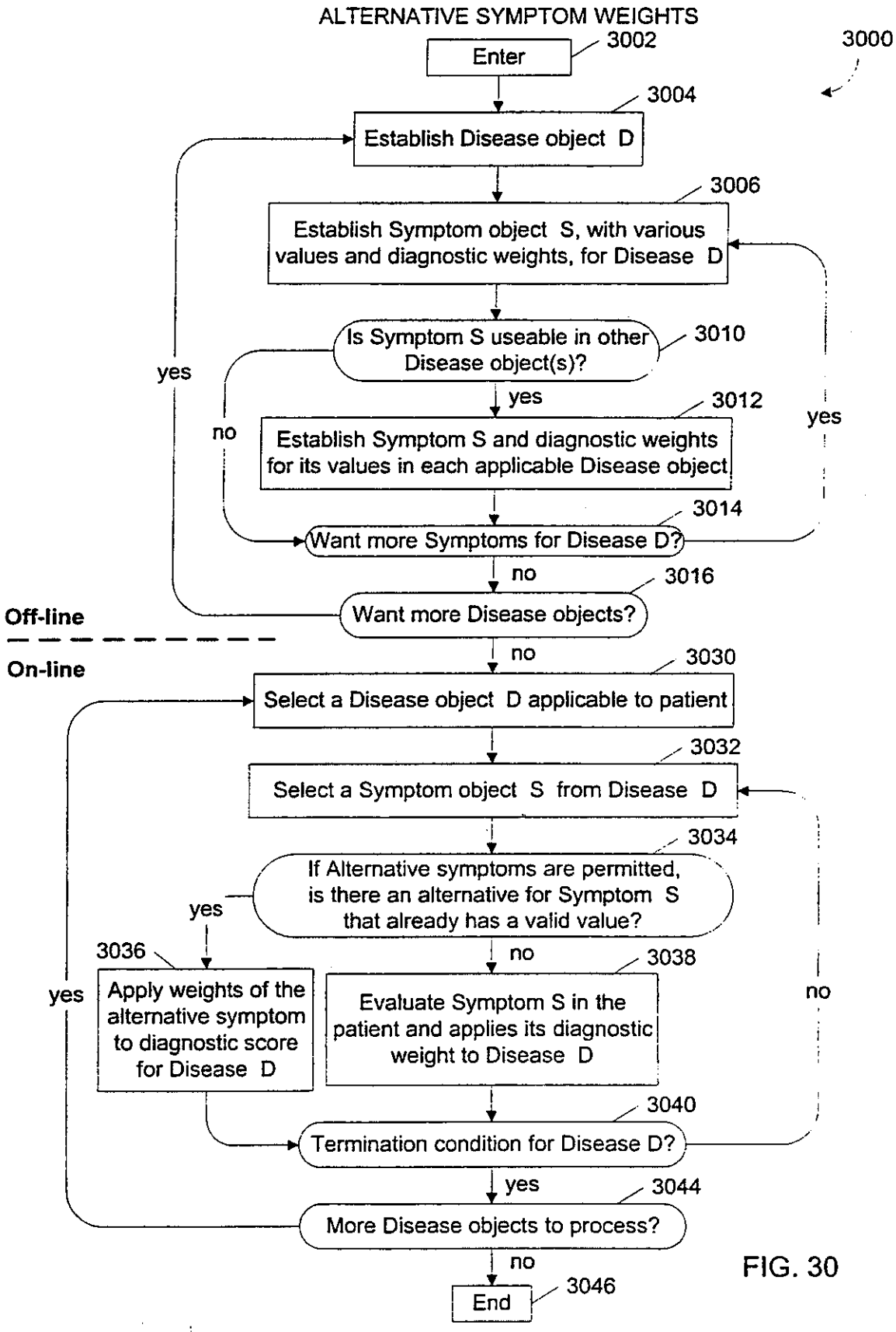

ALTERNATIVE SYMPTOM WEIGHTS
3000
Enter
3002
Establish Disease object D
3004
Establish Symptom object S, with various values and diagnostic weights, for Disease D
3006
Is Symptom S useable in other Disease object(s)?
3010
yes
no
Establish Symptom S and diagnostic weights for its values in each applicable Disease object
3012
yes
Want more Symptoms for Disease D?
3014
no
Want more Disease objects?
3016
yes
Off-line
On-line
no
Select a Disease object D applicable to patient
3030
Select a Symptom object S from Disease D
3032
If Alternative symptoms are permitted, is there an alternative for Symptom S that already has a valid value?
3034
yes
no
Apply weights of the alternative symptom to diagnostic score for Disease D
3036
Evaluate Symptom S in the patient and applies its diagnostic weight to Disease D
3038
yes
no
Termination condition for Disease D?
3040
yes
More Disease objects to process?
3044
no
End
3046

FIG. 30

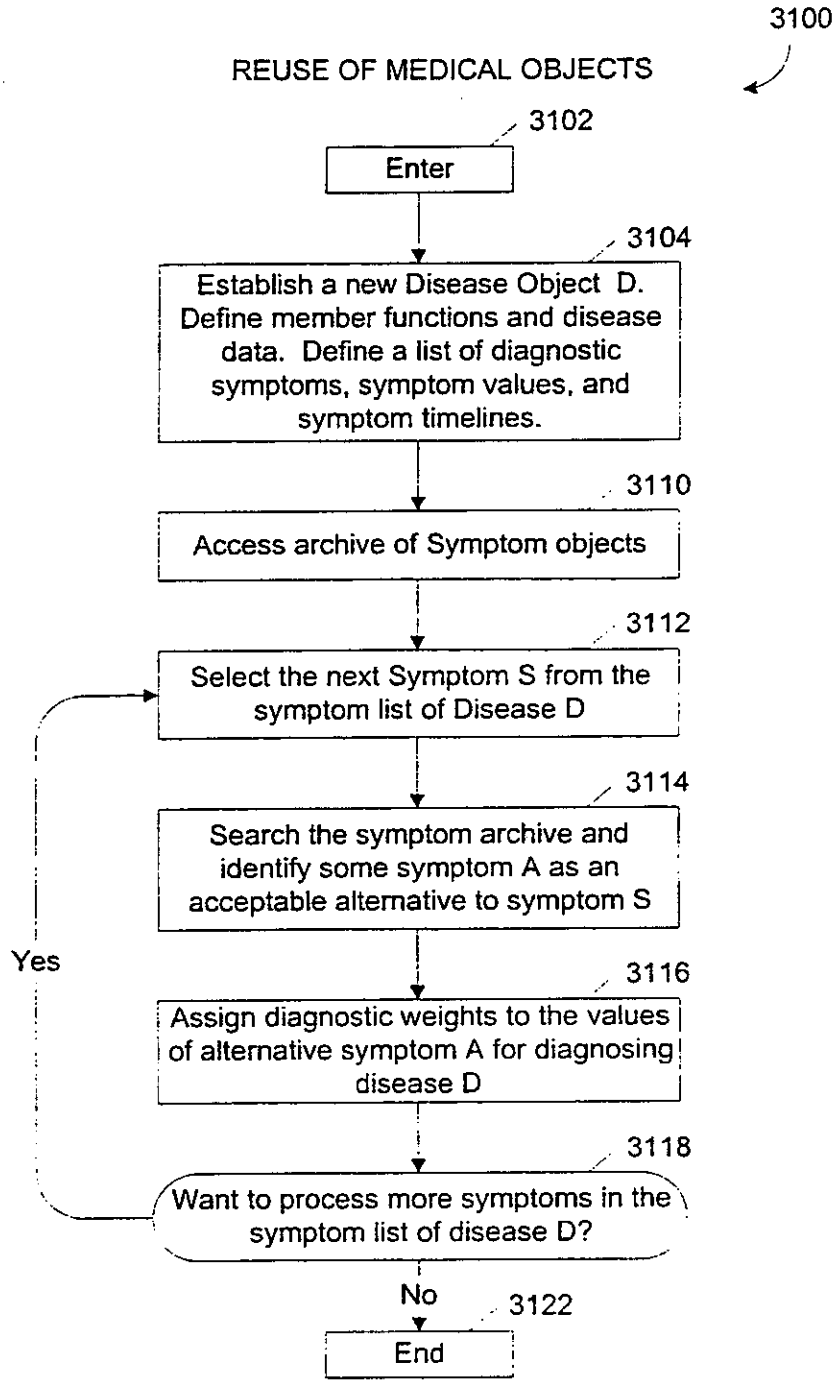

3100
REUSE OF MEDICAL OBJECTS
3102
Enter
3104
Establish a new Disease Object D. Define member functions and disease data. Define a list of diagnostic symptoms, symptom values, and symptom timelines.
3110
Access archive of Symptom objects
3112
Select the next Symptom S from the symptom list of Disease D
3114
Search the symptom archive and identify some symptom A as an acceptable alternative to symptom S
3116
Assign diagnostic weights to the values of alternative symptom A for diagnosing disease D
3118
Want to process more symptoms in the symptom list of disease D?
Yes
No
3122
End

FIG. 31

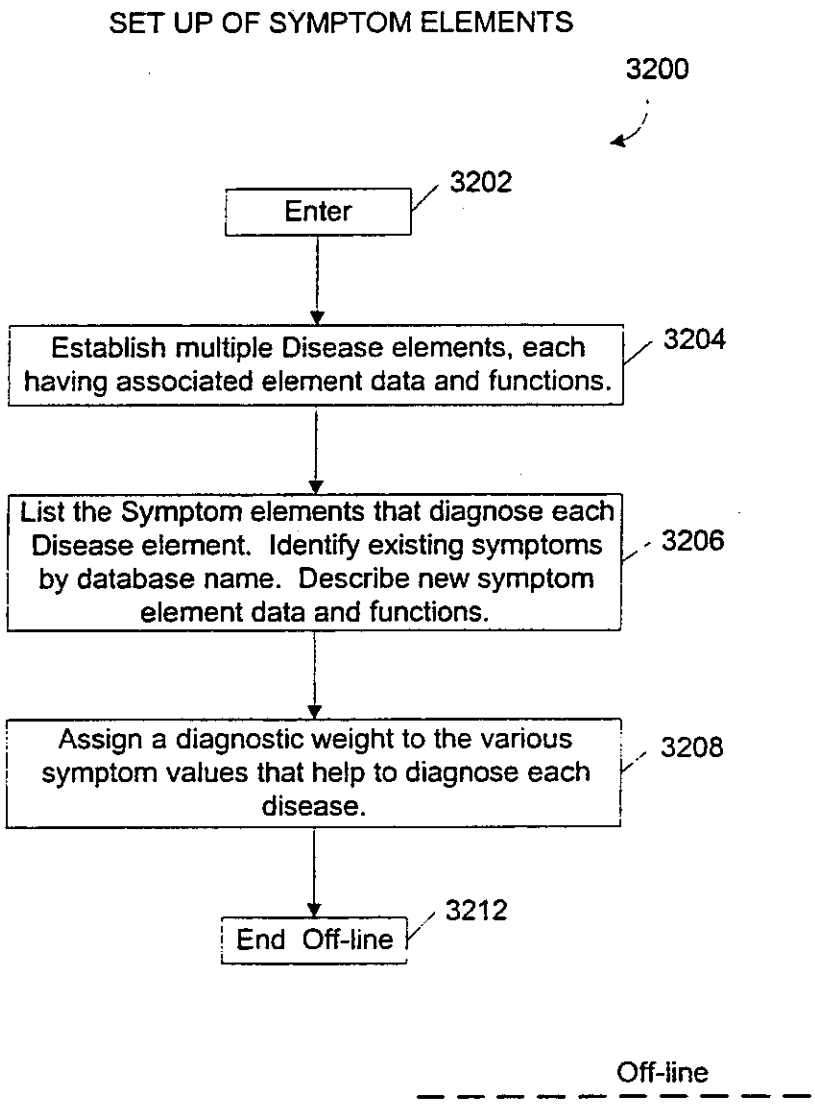

SET UP OF SYMPTOM ELEMENTS
3200
Enter
3202
Establish multiple Disease elements, each having associated element data and functions.
3204
List the Symptom elements that diagnose each Disease element. Identify existing symptoms by database name. Describe new symptom element data and functions.
3206
Assign a diagnostic weight to the various symptom values that help to diagnose each disease.
3208
End Off-line
3212
Off-line

FIG. 32A

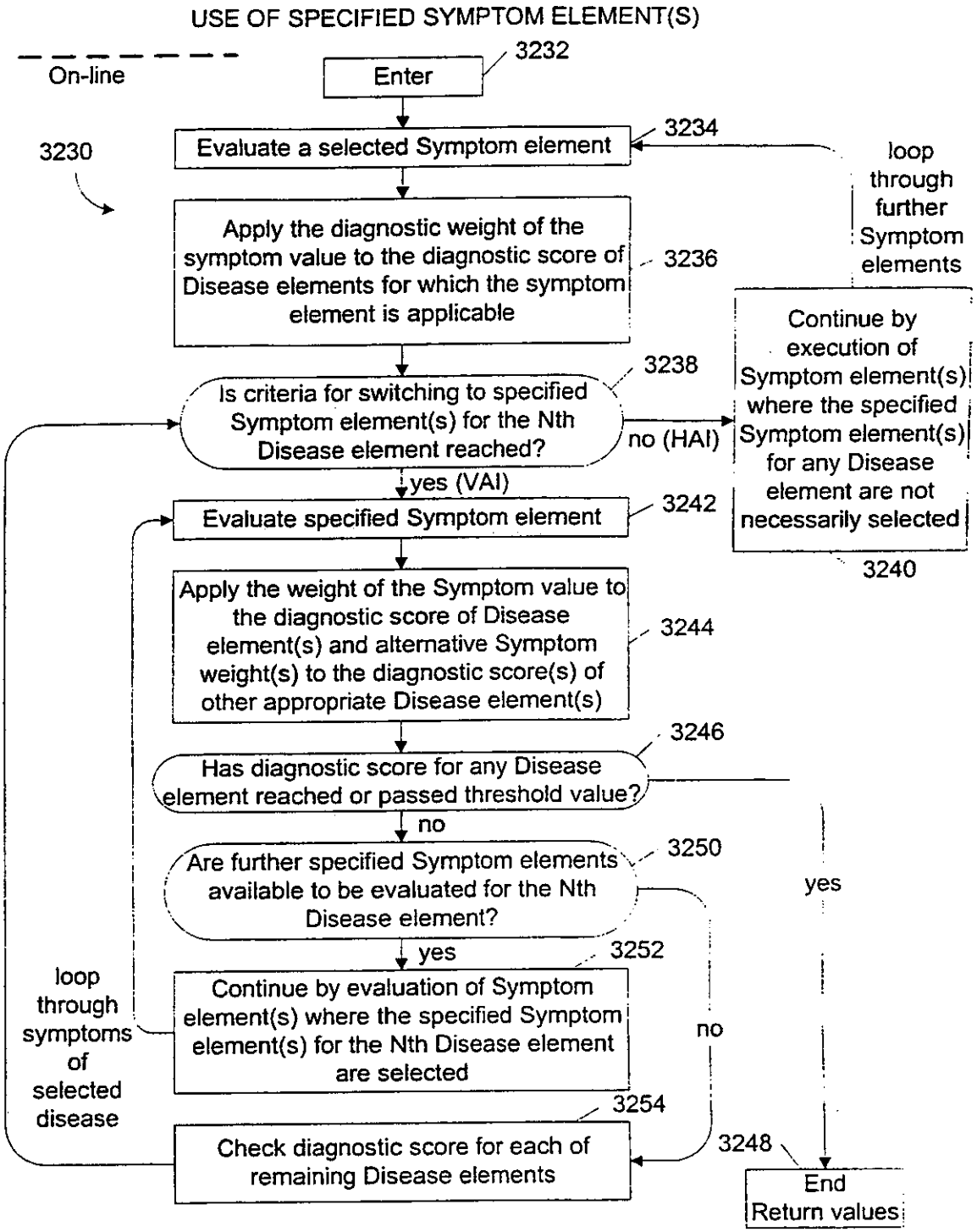

USE OF SPECIFIED SYMPTOM ELEMENT(S)
On-line
Enter
3232
3230
Evaluate a selected Symptom element
3234
loop through further Symptom elements
Apply the diagnostic weight of the symptom value to the diagnostic score of Disease elements for which the symptom element is applicable
3236
Continue by execution of Symptom element(s) where the specified Symptom element(s) for any Disease element are not necessarily selected
3240
Is criteria for switching to specified Symptom element(s) for the Nth Disease element reached?
3238
no (HAI)
yes (VAI)
Evaluate specified Symptom element
3242
Apply the weight of the Symptom value to the diagnostic score of Disease element(s) and alternative Symptom weight(s) to the diagnostic score(s) of other appropriate Disease element(s)
3244
Has diagnostic score for any Disease element reached or passed threshold value?
3246
yes
no
Are further specified Symptom elements available to be evaluated for the Nth Disease element?
3250
yes
no
loop through symptoms of selected disease
Continue by evaluation of Symptom element(s) where the specified Symptom element(s) for the Nth Disease element are selected
3252
Check diagnostic score for each of remaining Disease elements
3254
3248
End
Return values

FIG. 32B

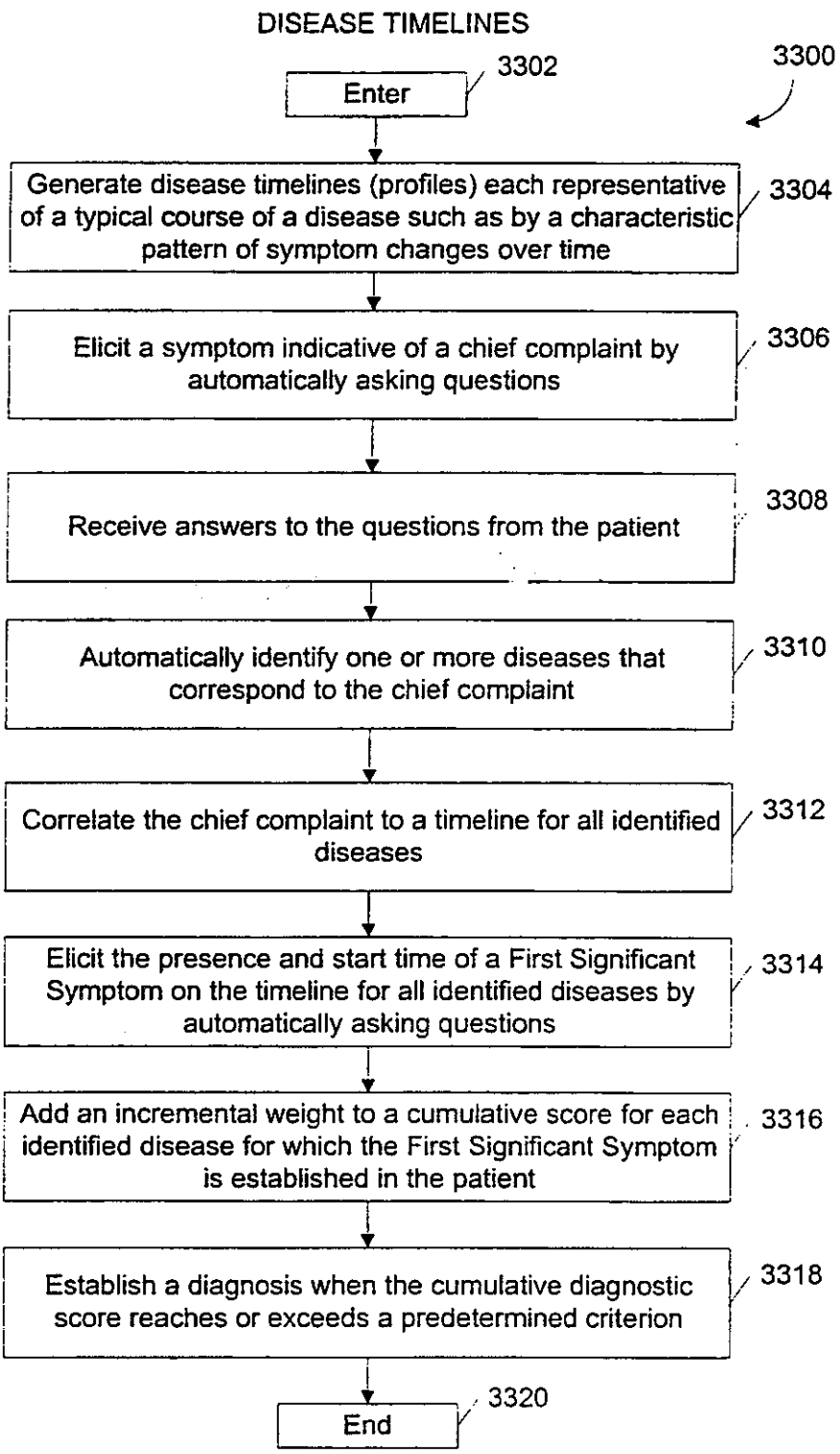

DISEASE TIMELINES
3300
Enter
3302
Generate disease timelines (profiles) each representative of a typical course of a disease such as by a characteristic pattern of symptom changes over time
3304
Elicit a symptom indicative of a chief complaint by automatically asking questions
3306
Receive answers to the questions from the patient
3308
Automatically identify one or more diseases that correspond to the chief complaint
3310
Correlate the chief complaint to a timeline for all identified diseases
3312
Elicit the presence and start time of a First Significant Symptom on the timeline for all identified diseases by automatically asking questions
3314
Add an incremental weight to a cumulative score for each identified disease for which the First Significant Symptom is established in the patient
3316
Establish a diagnosis when the cumulative diagnostic score reaches or exceeds a predetermined criterion
3318
End
3320

FIG. 33

5 AUG 2004

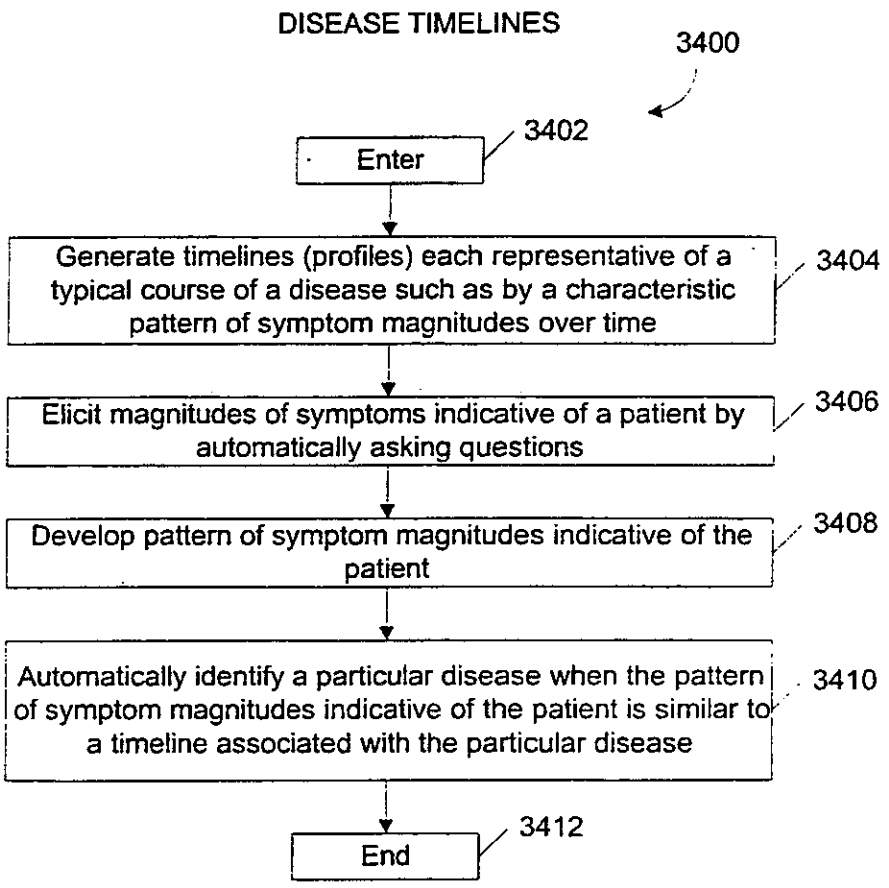


FIG. 34

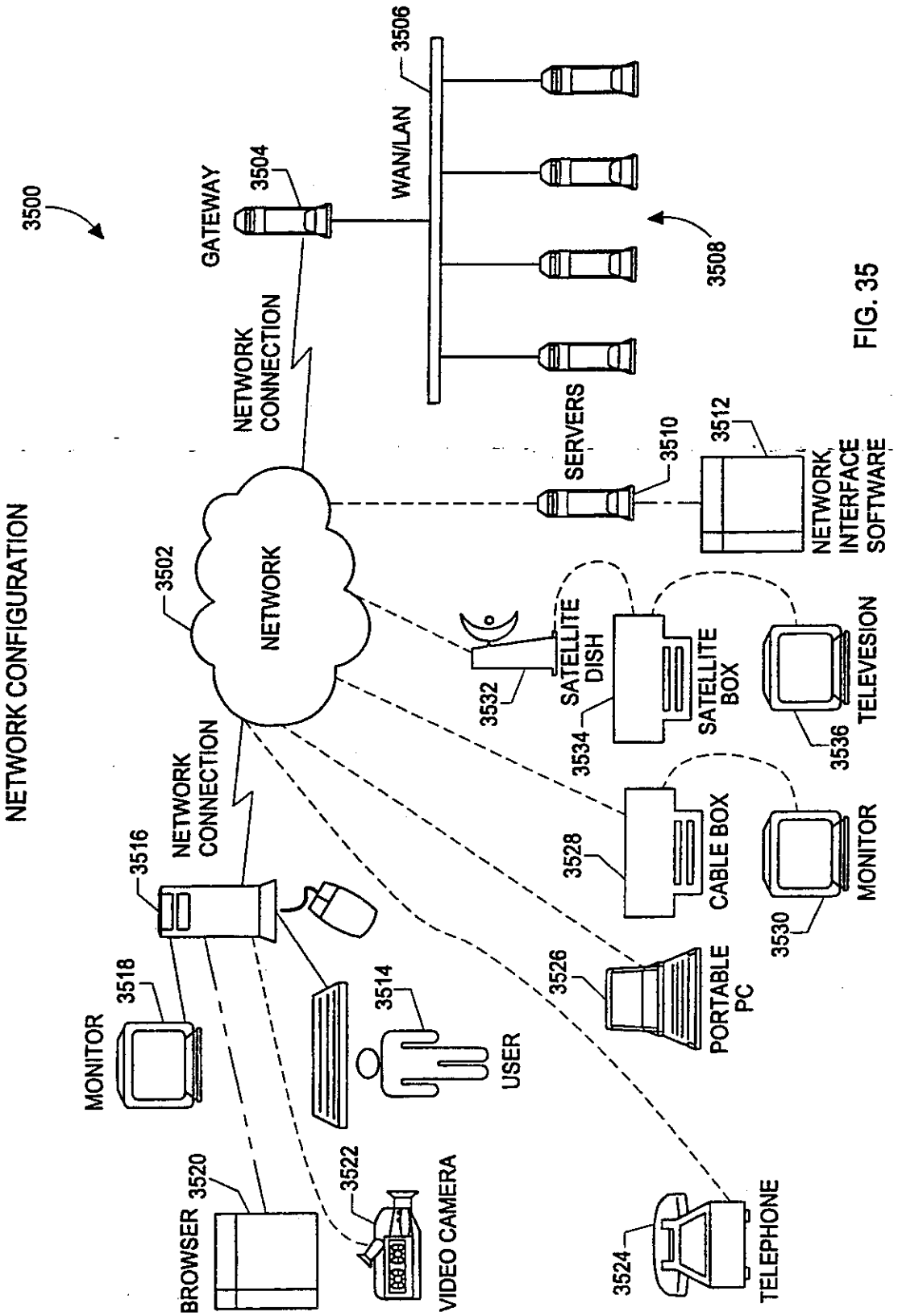

NETWORK CONFIGURATION
3500
GATEWAY
3504
WAN/LAN
3506
3508
NETWORK CONNECTION
SERVERS
3510
3512
NETWORK INTERFACE SOFTWARE
3502
NETWORK
3532
SATELLITE DISH
3534
SATELLITE BOX
TELEVISION
3536
NETWORK CONNECTION
3516
3528
CABLE BOX
MONITOR
3530
3518
3514
3526
PORTABLE PC
MONITOR
USER
BROWSER
3520
3522
VIDEO CAMERA
3524
TELEPHONE

FIG. 35