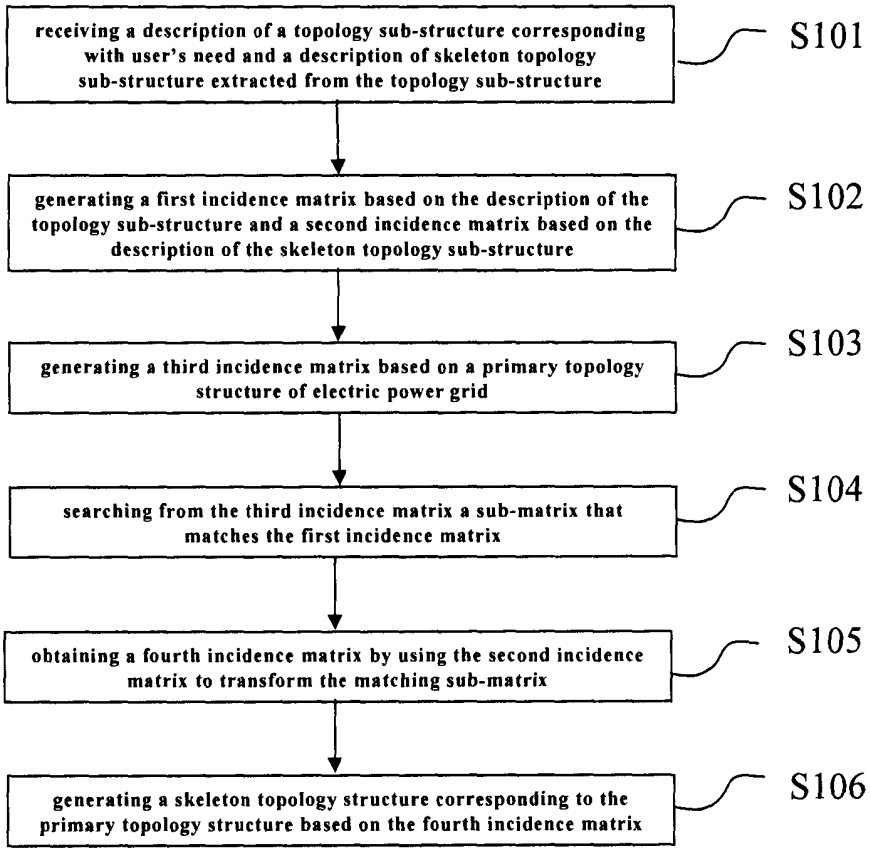

receiving a description of a topology sub-structure corresponding with user's need and a description of skeleton topology sub-structure extracted from the topology sub-structure
S101
generating a first incidence matrix based on the description of the topology sub-structure and a second incidence matrix based on the description of the skeleton topology sub-structure
S102
generating a third incidence matrix based on a primary topology structure of electric power grid
S103
searching from the third incidence matrix a sub-matrix that matches the first incidence matrix
S104
obtaining a fourth incidence matrix by using the second incidence matrix to transform the matching sub-matrix
S105
generating a skeleton topology structure corresponding to the primary topology structure based on the fourth incidence matrix
S106

FIG. 1

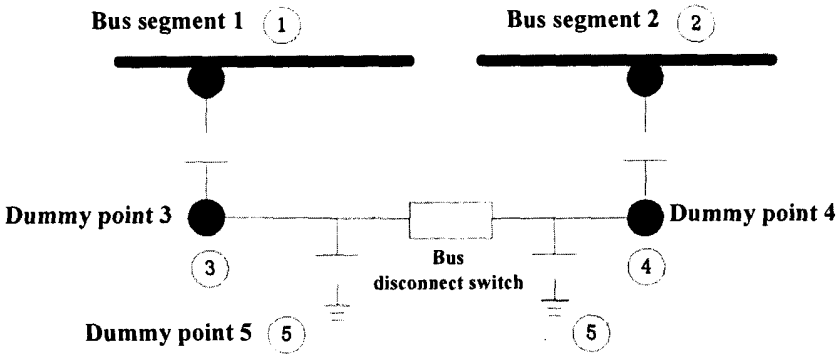

Bus segment 1
1
Bus segment 2
2
Dummy point 3
Dummy point 4
3
Bus
disconnect switch
4
Dummy point 5
5
5

FIG. 2

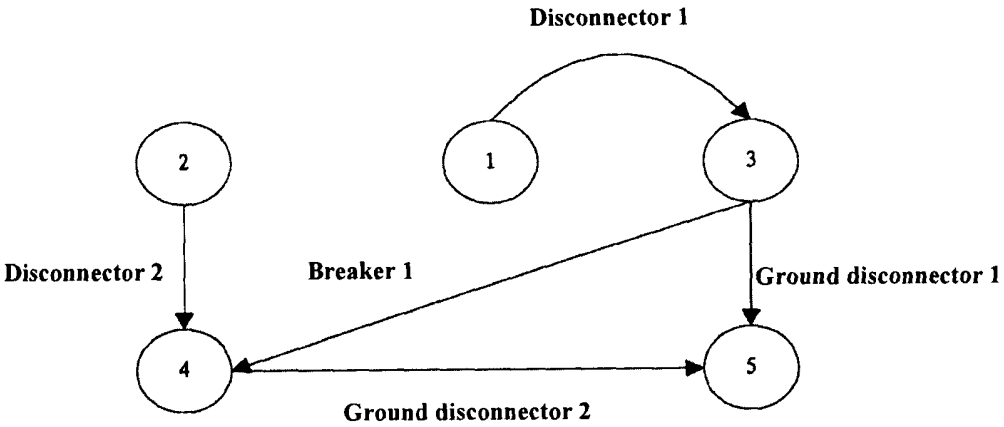

Disconnector 1
2
1
3
Disconnector 2
Breaker 1
Ground disconnector 1
4
5
Ground disconnector 2

FIG. 3

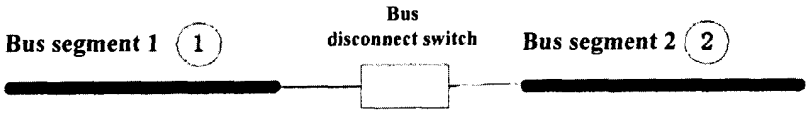

Bus segment 1
1
Bus
disconnect switch
Bus segment 2
2

FIG. 4

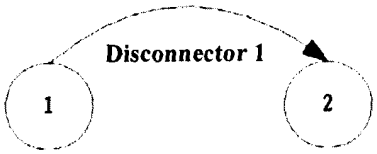

Disconnector 1
1
2

FIG. 5

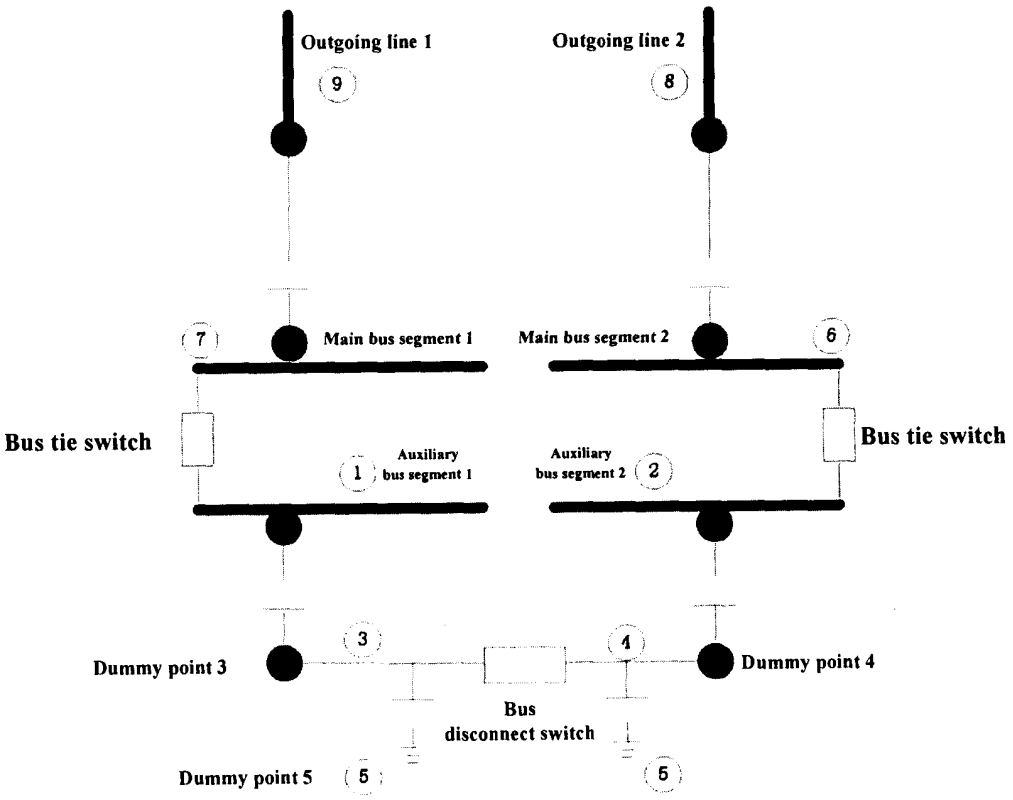

Outgoing line 1
9
Outgoing line 2
8
7
Main bus segment 1
Main bus segment 2
6
Bus tie switch
Bus tie switch
Auxiliary
1 bus segment 1
Auxiliary
bus segment 2 2
3
4
Dummy point 3
Dummy point 4
Bus
disconnect switch
Dummy point 5
5
5

FIG. 6

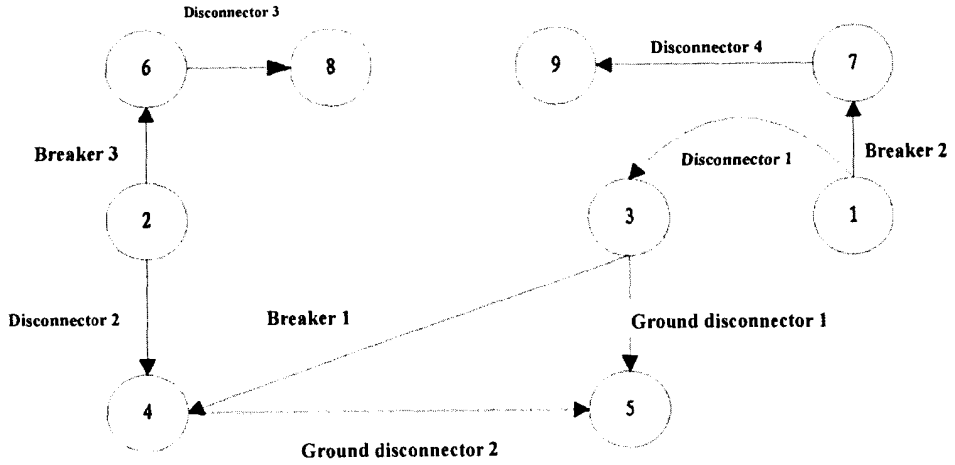

Disconnector 3
6
8
9
Disconnector 4
7
Breaker 3
Disconnector 1
Breaker 2
2
3
1
Disconnector 2
Breaker 1
Ground disconnector 1
4
5
Ground disconnector 2

FIG. 7

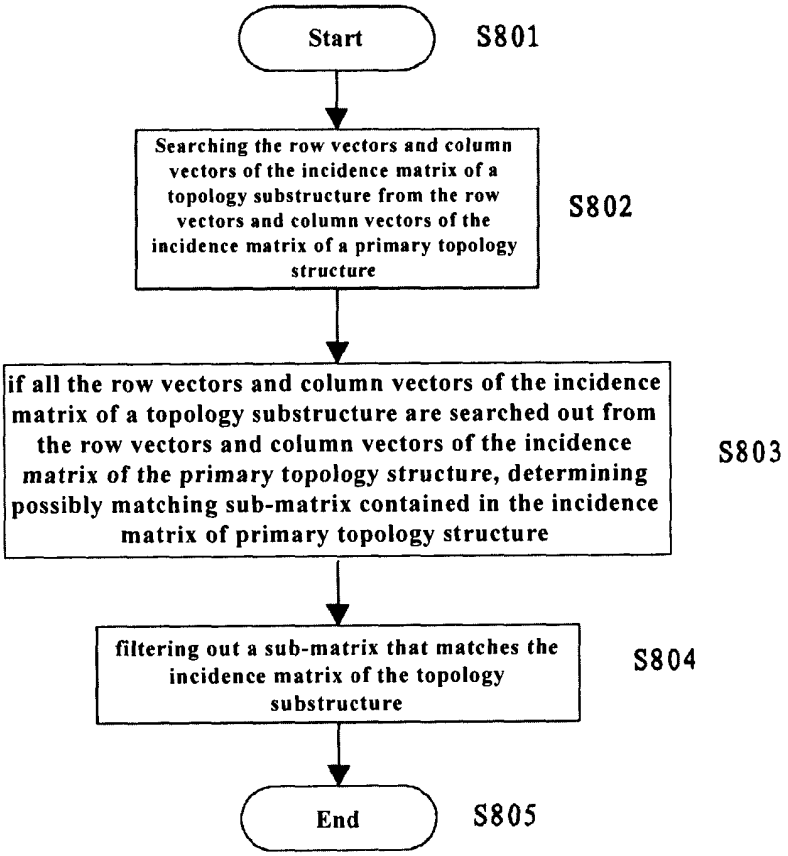

Start
S801
Searching the row vectors and column vectors of the incidence matrix of a topology substructure from the row vectors and column vectors of the incidence matrix of a primary topology structure
S802
if all the row vectors and column vectors of the incidence matrix of a topology substructure are searched out from the row vectors and column vectors of the incidence matrix of the primary topology structure, determining possibly matching sub-matrix contained in the incidence matrix of primary topology structure
S803
filtering out a sub-matrix that matches the incidence matrix of the topology substructure
S804
End
S805

FIG. 8

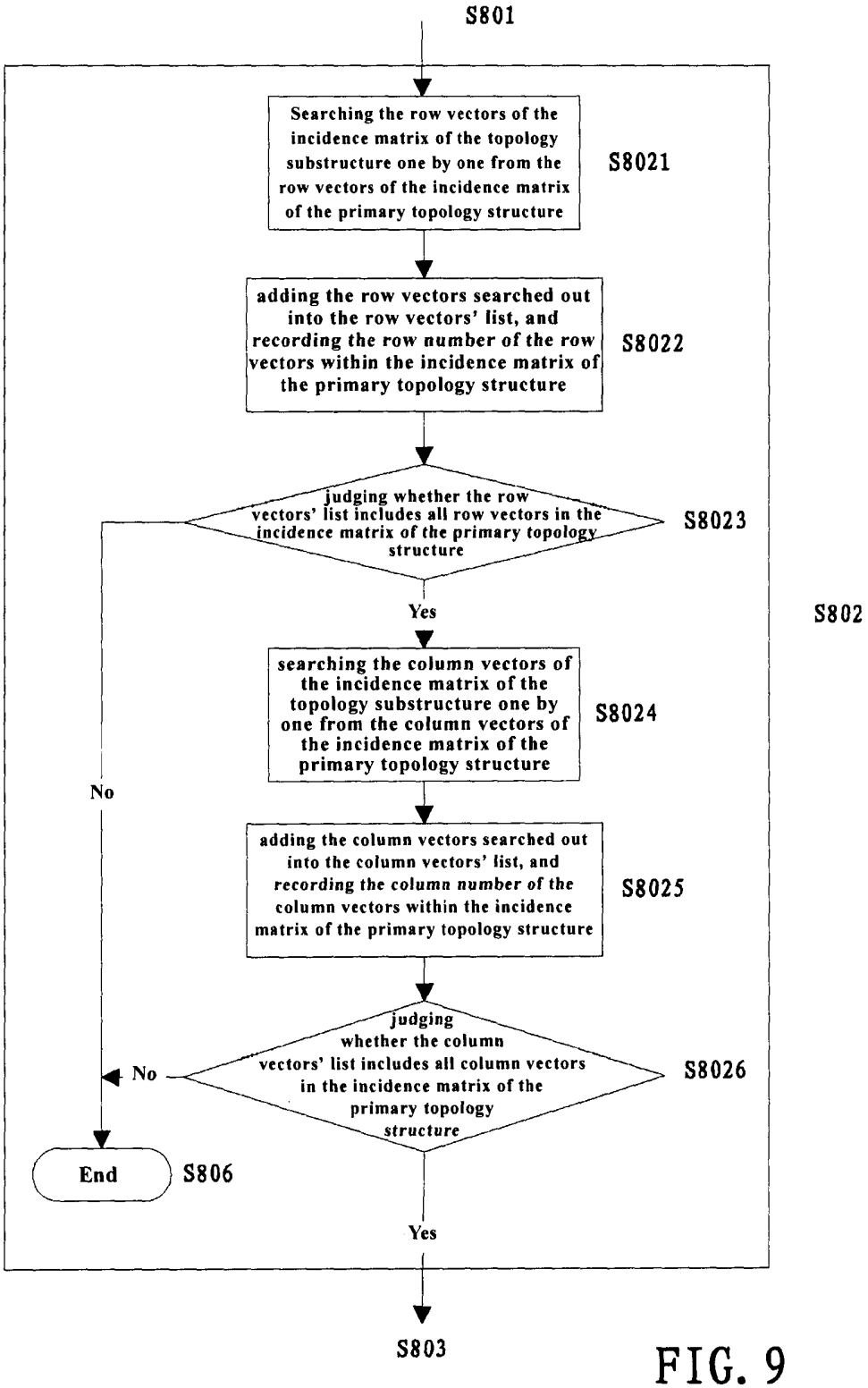

S801
Searching the row vectors of the incidence matrix of the topology substructure one by one from the row vectors of the incidence matrix of the primary topology structure
S8021
adding the row vectors searched out into the row vectors' list, and recording the row number of the row vectors within the incidence matrix of the primary topology structure
S8022
judging whether the row vectors' list includes all row vectors in the incidence matrix of the primary topology structure
S8023
Yes
No
S802
searching the column vectors of the incidence matrix of the topology substructure one by one from the column vectors of the incidence matrix of the primary topology structure
S8024
adding the column vectors searched out into the column vectors' list, and recording the column number of the column vectors within the incidence matrix of the primary topology structure
S8025
judging whether the column vectors' list includes all column vectors in the incidence matrix of the primary topology structure
S8026
No
Yes
End
S806
S803

FIG. 9

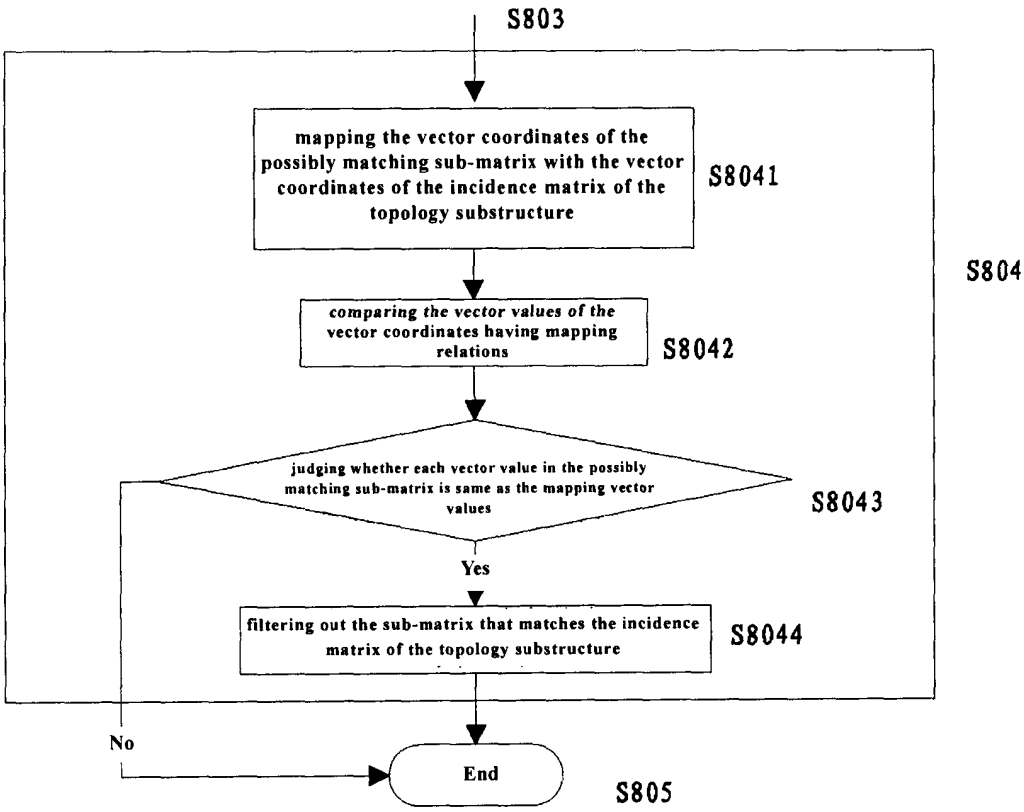

S803
mapping the vector coordinates of the possibly matching sub-matrix with the vector coordinates of the incidence matrix of the topology substructure
S8041
S804
comparing the vector values of the vector coordinates having mapping relations
S8042
judging whether each vector value in the possibly matching sub-matrix is same as the mapping vector values
S8043
Yes
filtering out the sub-matrix that matches the incidence matrix of the topology substructure
S8044
No
End
S805

FIG. 10

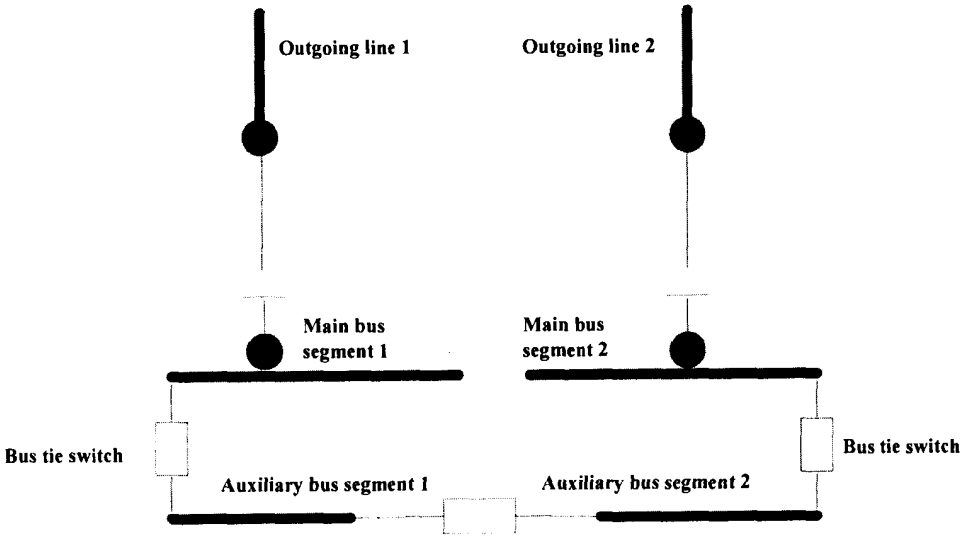

Outgoing line 1
Outgoing line 2
Main bus segment 1
Main bus segment 2
Bus tie switch
Bus tie switch
Auxiliary bus segment 1
Auxiliary bus segment 2

FIG. 11

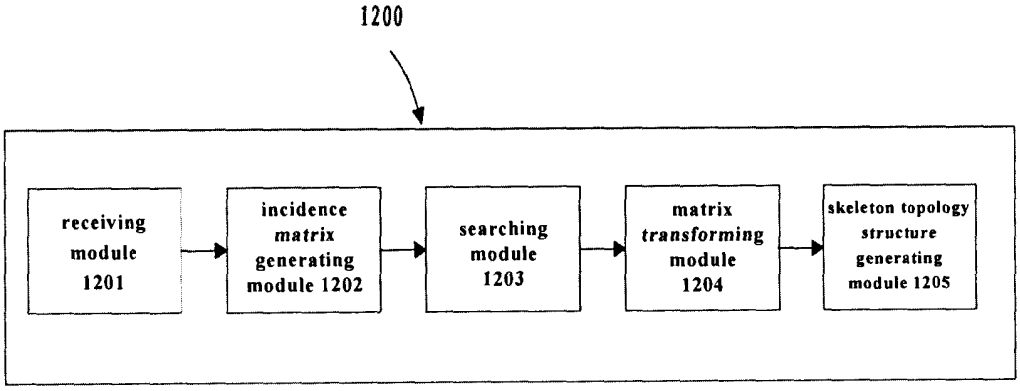

1200
receiving module 1201
incidence matrix generating module 1202
searching module 1203
matrix transforming module 1204
skeleton topology structure generating module 1205

FIG. 12

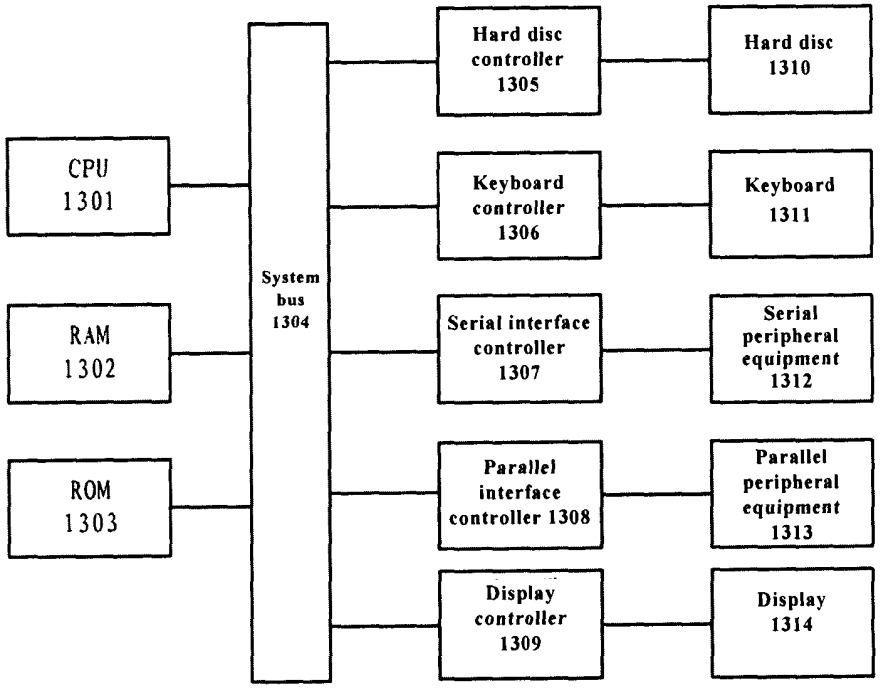

CPU 1301
RAM 1302
ROM 1303
System bus 1304
Hard disc controller 1305
Keyboard controller 1306
Serial interface controller 1307
Parallel interface controller 1308
Display controller 1309
Hard disc 1310
Keyboard 1311
Serial peripheral equipment 1312
Parallel peripheral equipment 1313
Display 1314

FIG. 13