FIG. 1

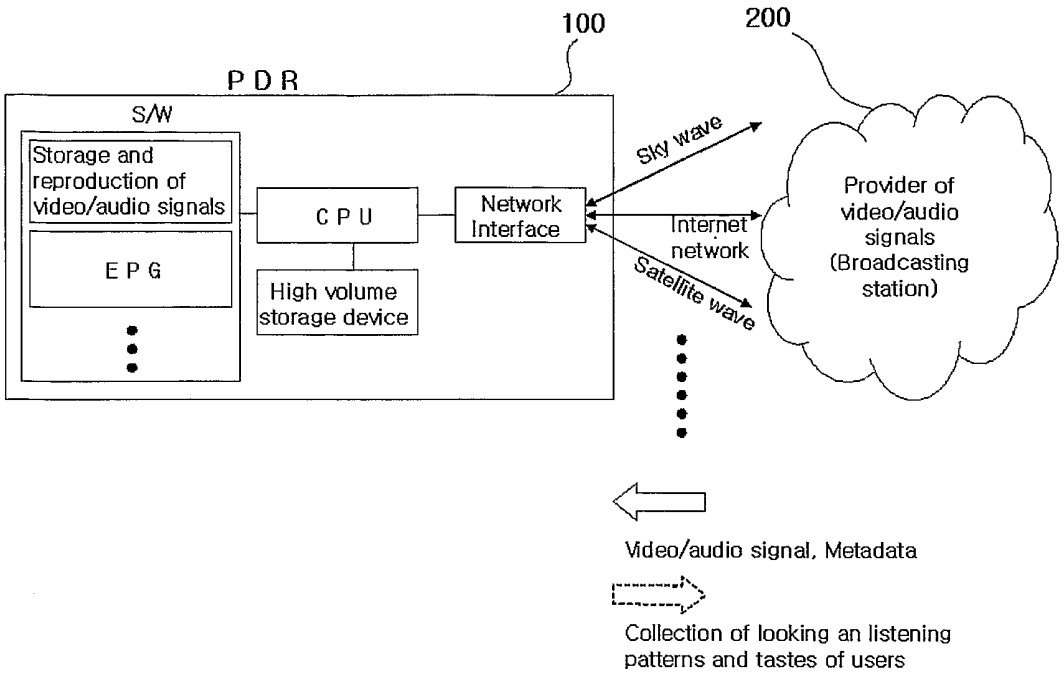

100
200
PDR
S/W
Storage and reproduction of video/audio signals
EPG
CPU
High volume storage device
Network Interface
Sky wave
Internet network
Satellite wave
Provider of video/audio signals (Broadcasting station)
Video/audio signal, Metadata
Collection of looking an listening patterns and tastes of users

FIG. 2

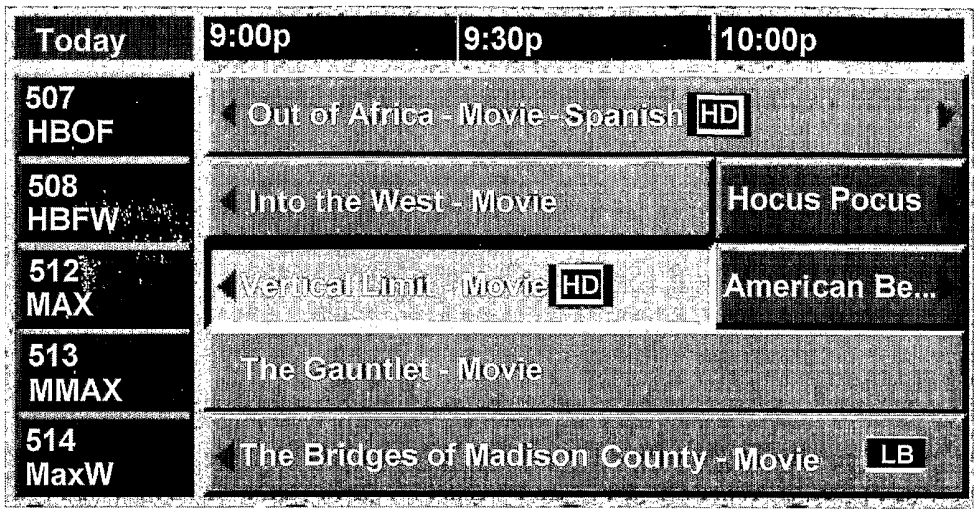

Today
9:00p
9:30p
10:00p
507 HBOF
Out of Africa - Movie - Spanish
HD
508 HBFW
Into the West - Movie
Hocus Pocus
512 MAX
Vertical Limit - Movie
HD
American Be...
513 MMAX
The Gauntlet - Movie
514 MaxW
The Bridges of Madison County - Movie
LB

FIG. 3

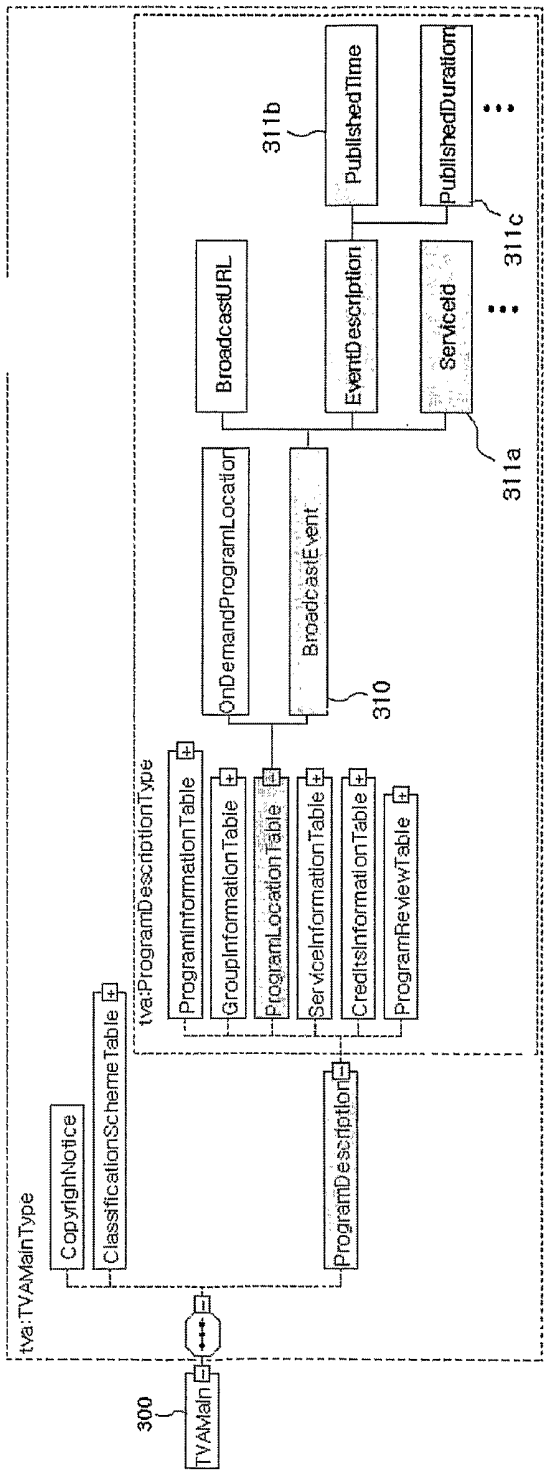

tva:TVAMainType
CopyrightNotice
ClassificationSchemeTable
ProgramDescription
tva:ProgramDescriptionType
ProgramInformationTable
GroupInformationTable
ProgramLocationTable
ServiceInformationTable
CreditsInformationTable
ProgramReviewTable
OnDemandProgramLocation
BroadcastEvent
310
BroadcastURL
EventDescription
ServiceId
311a
311b
PublishedTime
PublishedDuration
311c
300
TVAMain

FIG. 4

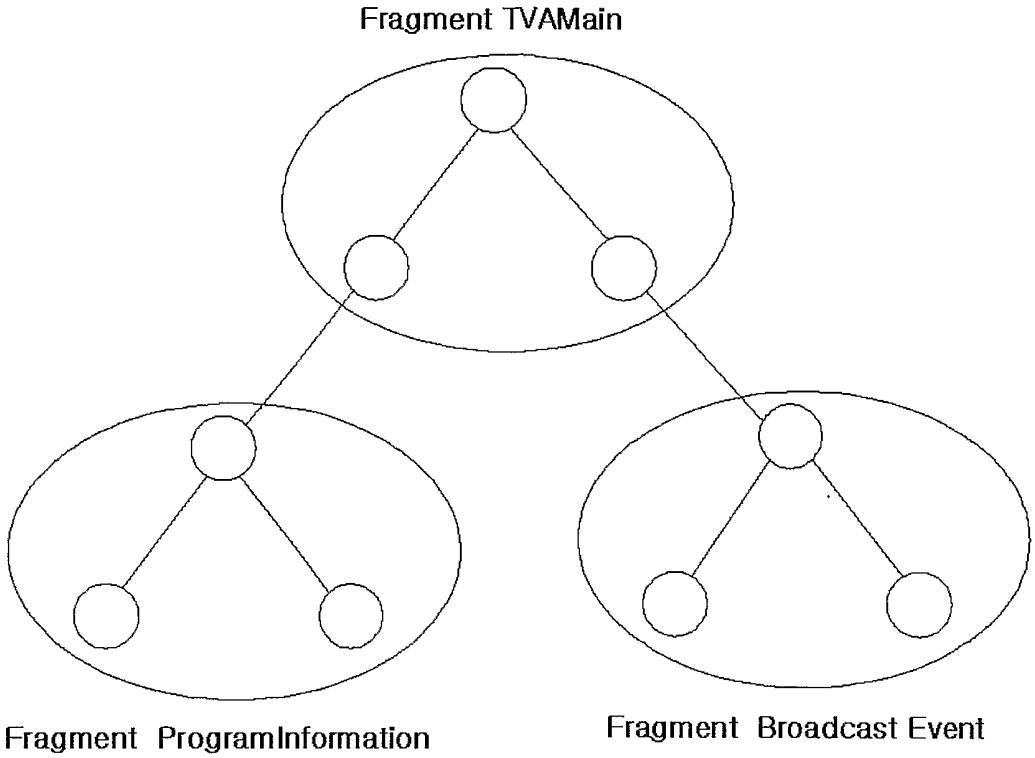

Fragment TVAMain
Fragment ProgramInformation
Fragment Broadcast Event

FIG. 5

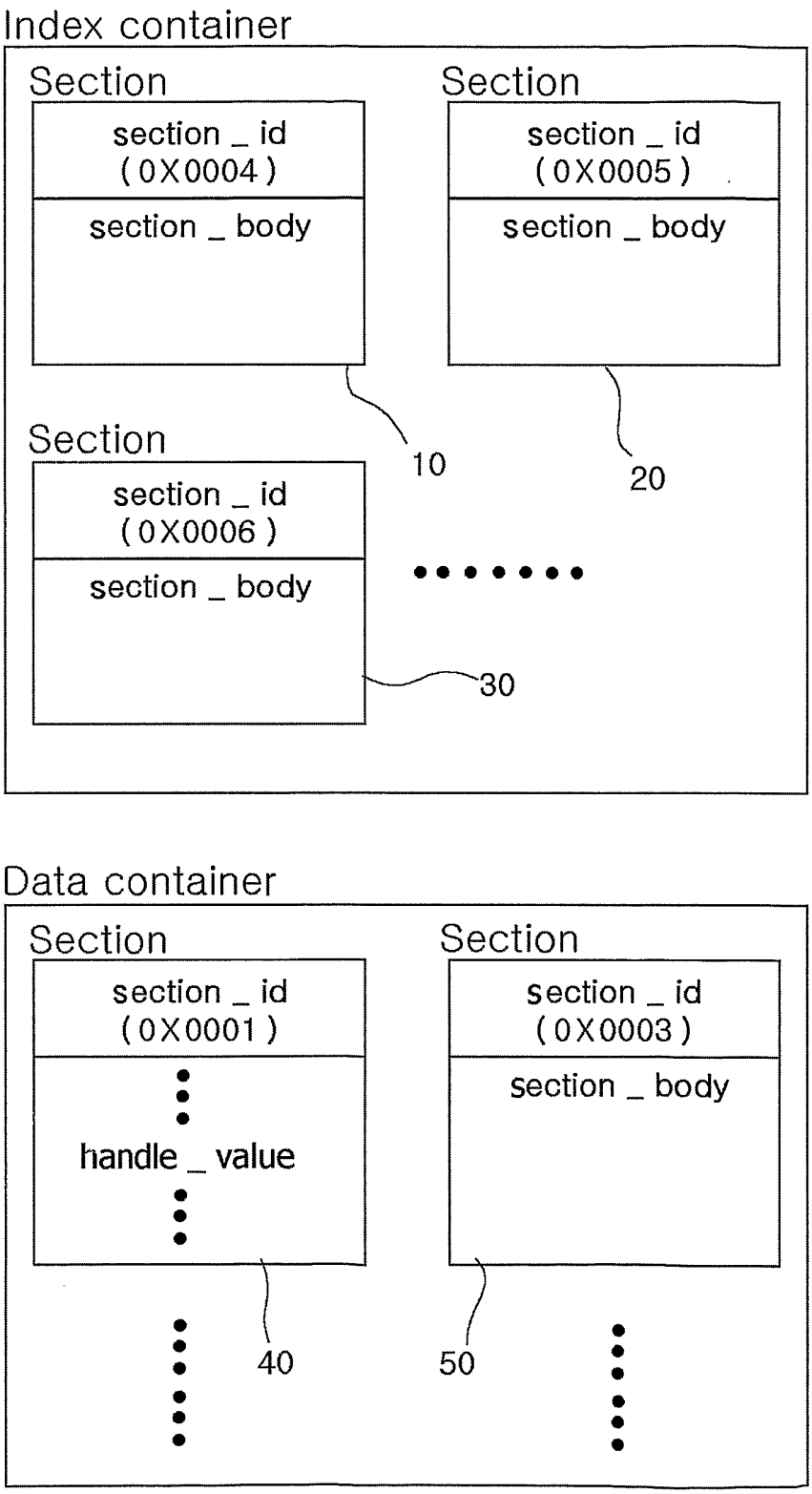

Index container
Section
section _ id
(0X0004)
section _ body
Section
section _ id
(0X0005)
section _ body
10
20
Section
section _ id
(0X0006)
section _ body
30
Data container
Section
section _ id
(0X0001)
handle _ value
Section
section _ id
(0X0003)
section _ body
40
50

FIG. 6

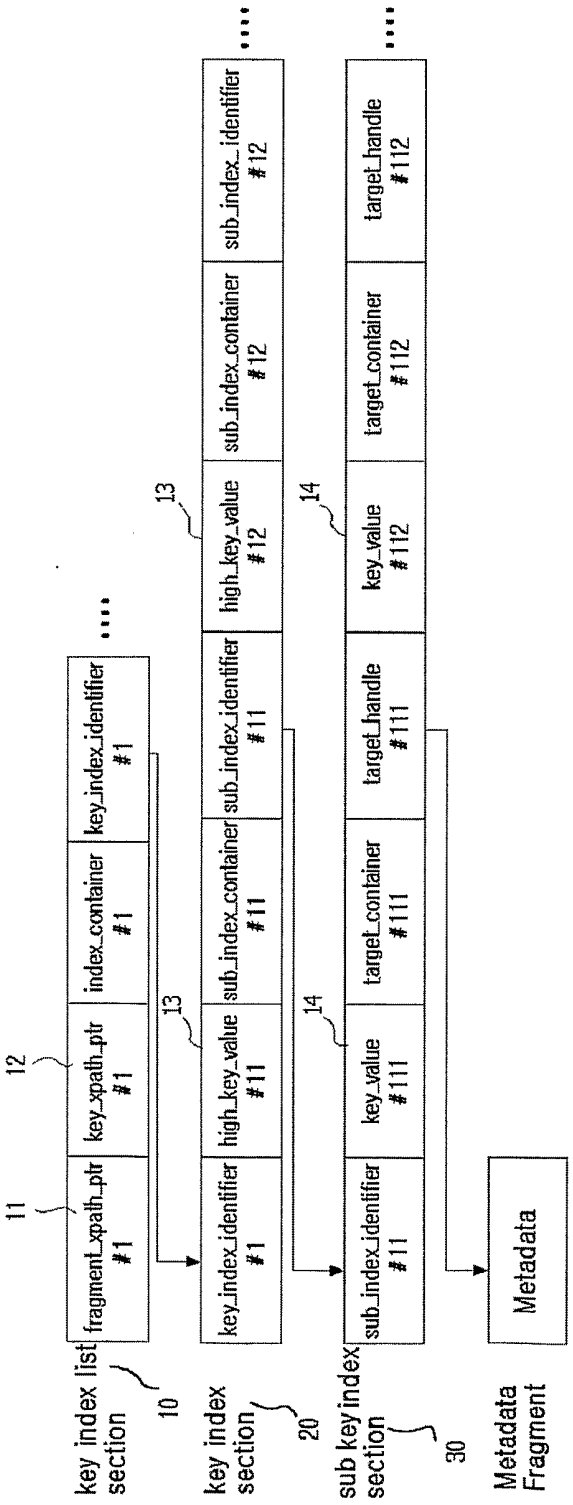

key index list section
10
fragment_xpath_ptr #1
key_xpath_ptr #1
index_container #1
key_index_identifier #1
11
12
13
14
key index section
20
key_index_identifier #1
high_key_value #11
sub_index_container #11
sub_index_identifier #11
high_key_value #12
sub_index_container #12
sub_index_identifier #12
sub key index section
30
sub_index_identifier #11
key_value #111
target_container #111
target_handle #111
key_value #112
target_container #112
target_handle #112
Metadata Fragment
Metadata

FIG. 7a

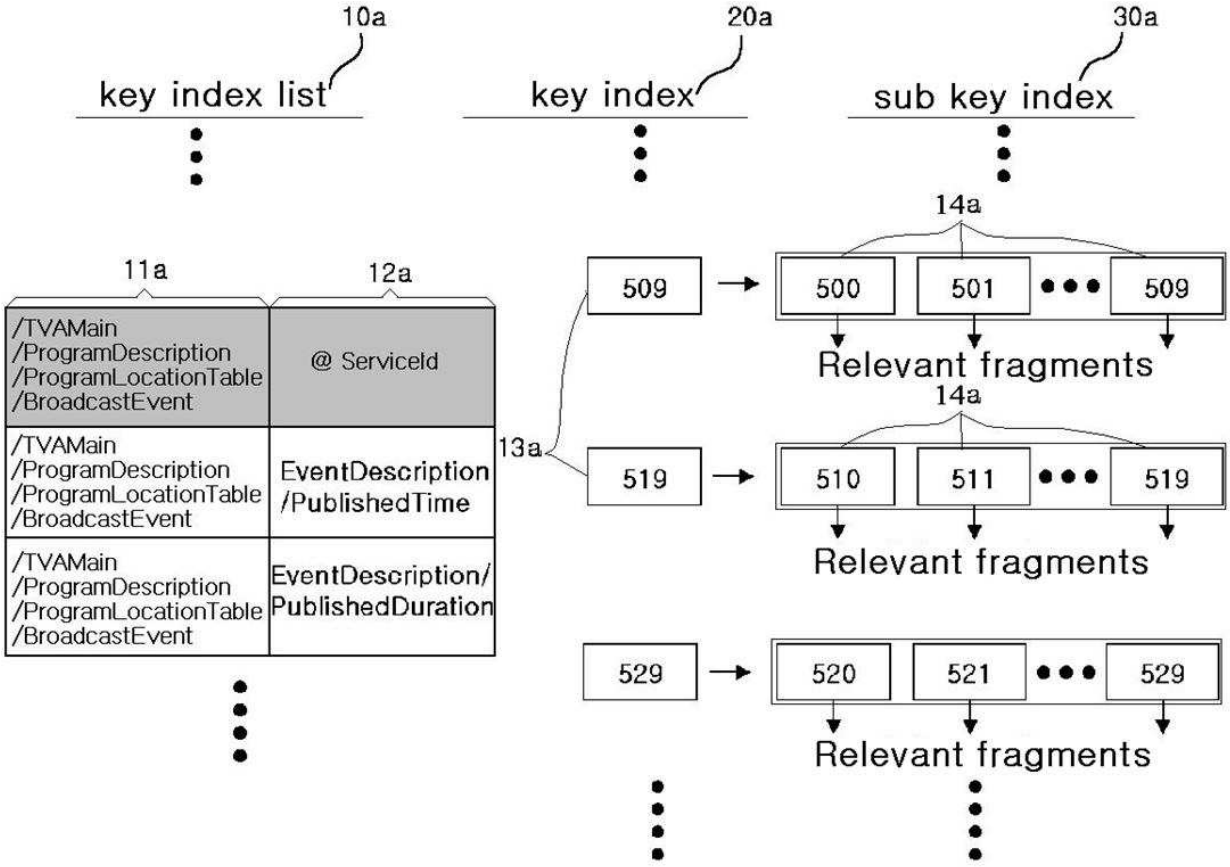

10a
key index list
20a
key index
30a
sub key index
11a
12a
/TVAMain /ProgramDescription /ProgramLocationTable /BroadcastEvent
@ ServiceId
/TVAMain /ProgramDescription /ProgramLocationTable /BroadcastEvent
EventDescription /PublishedTime
/TVAMain /ProgramDescription /ProgramLocationTable /BroadcastEvent
EventDescription/ PublishedDuration
13a
509
519
529
14a
500
501
509
Relevant fragments
14a
510
511
519
Relevant fragments
520
521
529
Relevant fragments

FIG. 7b

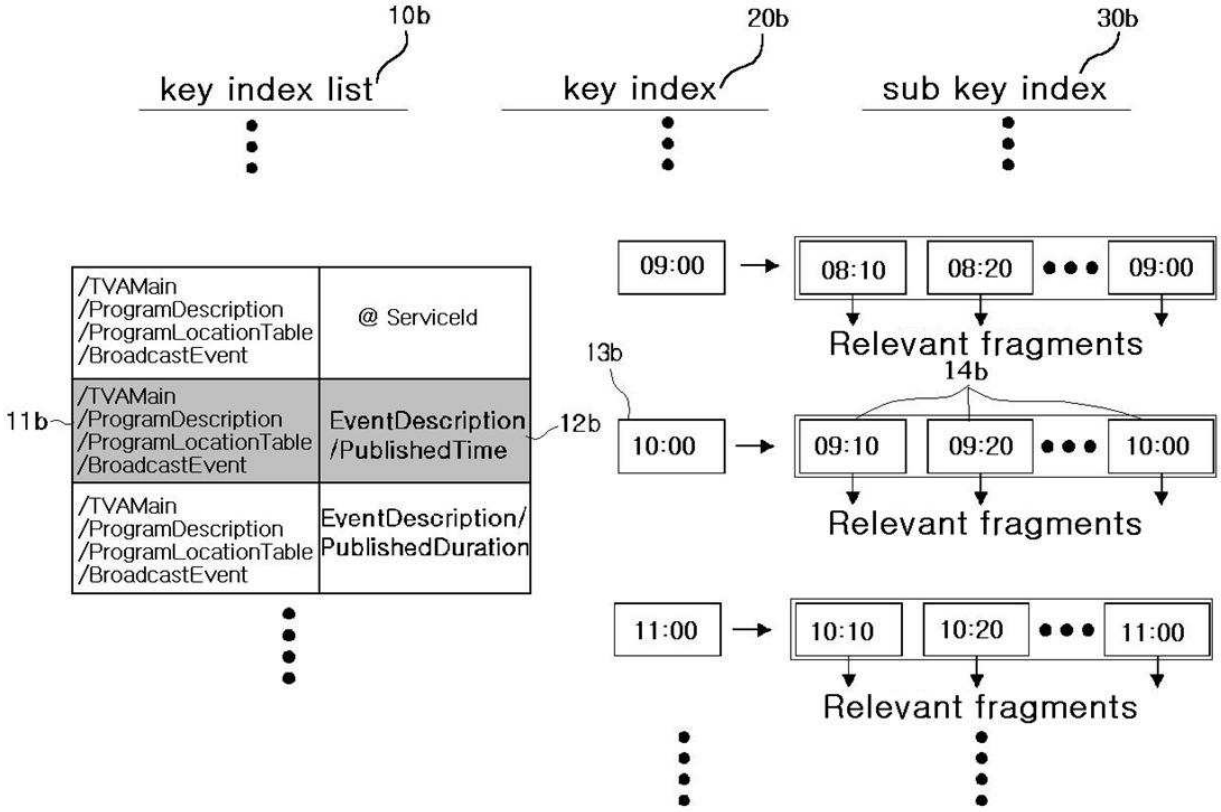

10b
key index list
20b
key index
30b
sub key index
/TVAMain
/ProgramDescription
/ProgramLocationTable
/BroadcastEvent
@ ServiceId
11b
/TVAMain
/ProgramDescription
/ProgramLocationTable
/BroadcastEvent
EventDescription
/PublishedTime
12b
/TVAMain
/ProgramDescription
/ProgramLocationTable
/BroadcastEvent
EventDescription/
PublishedDuration
13b
14b
09:00
08:10
08:20
09:00
Relevant fragments
10:00
09:10
09:20
10:00
Relevant fragments
11:00
10:10
10:20
11:00
Relevant fragments

FIG. 8a

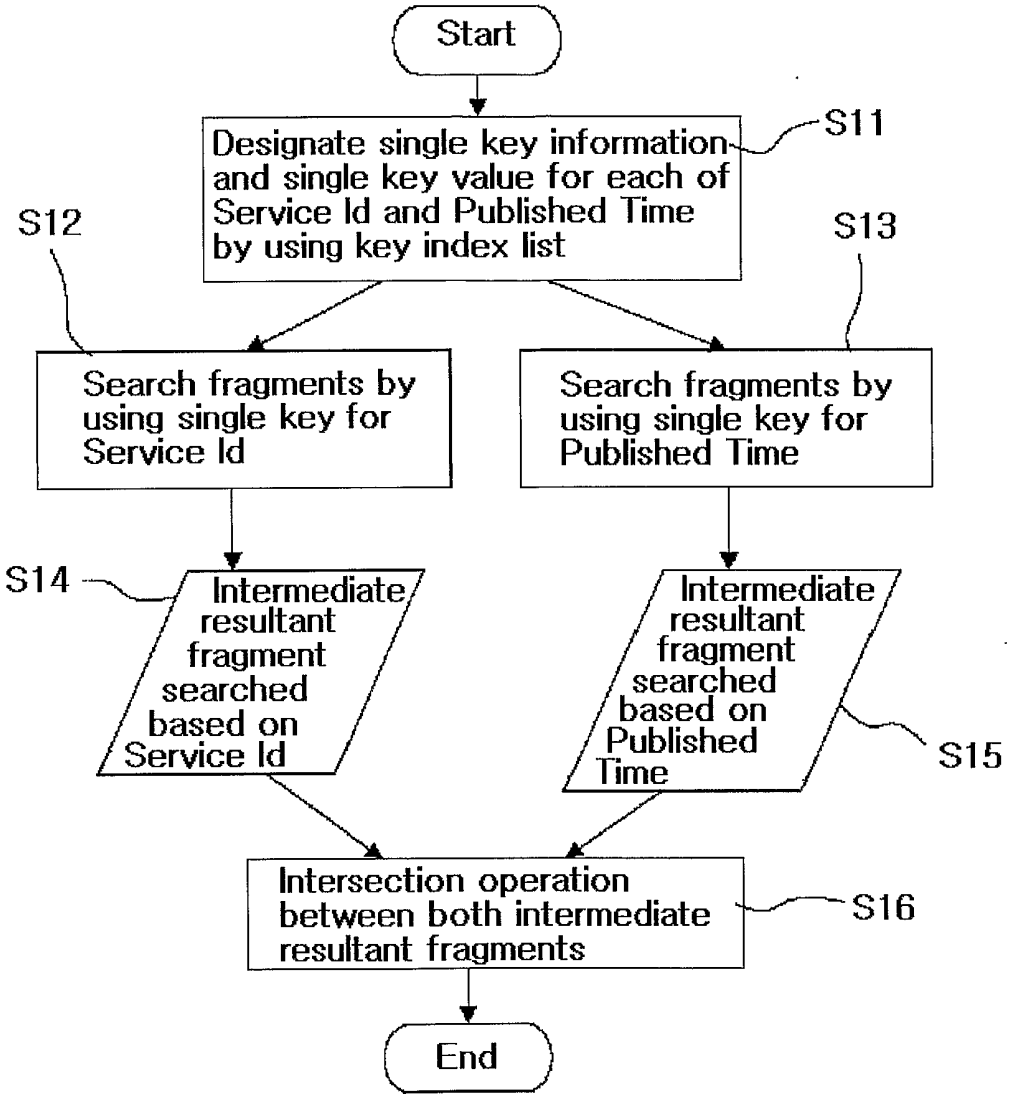

Start
Designate single key information and single key value for each of Service Id and Published Time by using key index list
S11
S12
S13
Search fragments by using single key for Service Id
Search fragments by using single key for Published Time
S14
Intermediate resultant fragment searched based on Service Id
Intermediate resultant fragment searched based on Published Time
S15
Intersection operation between both intermediate resultant fragments
S16
End

FIG. 8b

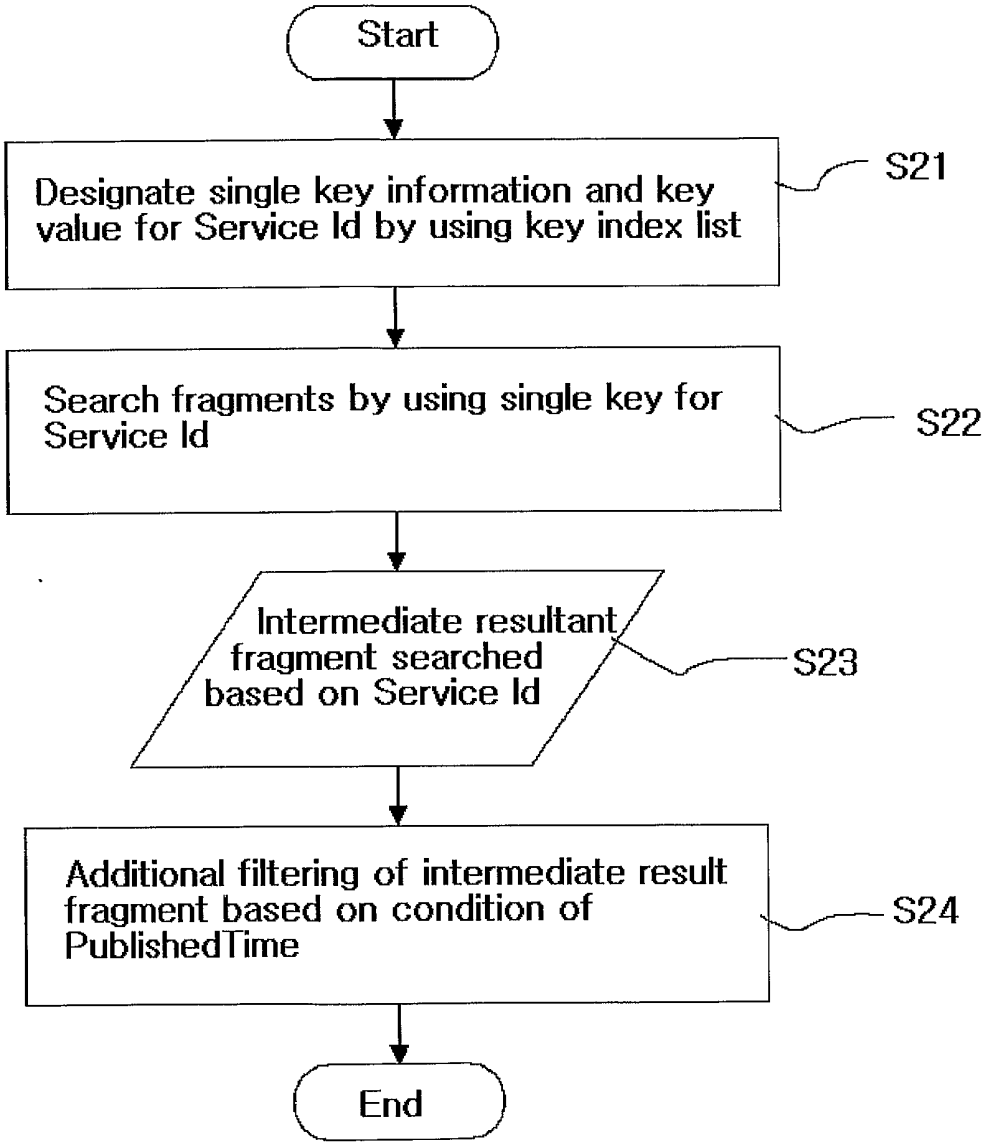

Start
Designate single key information and key value for Service Id by using key index list
S21
Search fragments by using single key for Service Id
S22
Intermediate resultant fragment searched based on Service Id
S23
Additional filtering of intermediate result fragment based on condition of PublishedTime
S24
End

FIG. 9

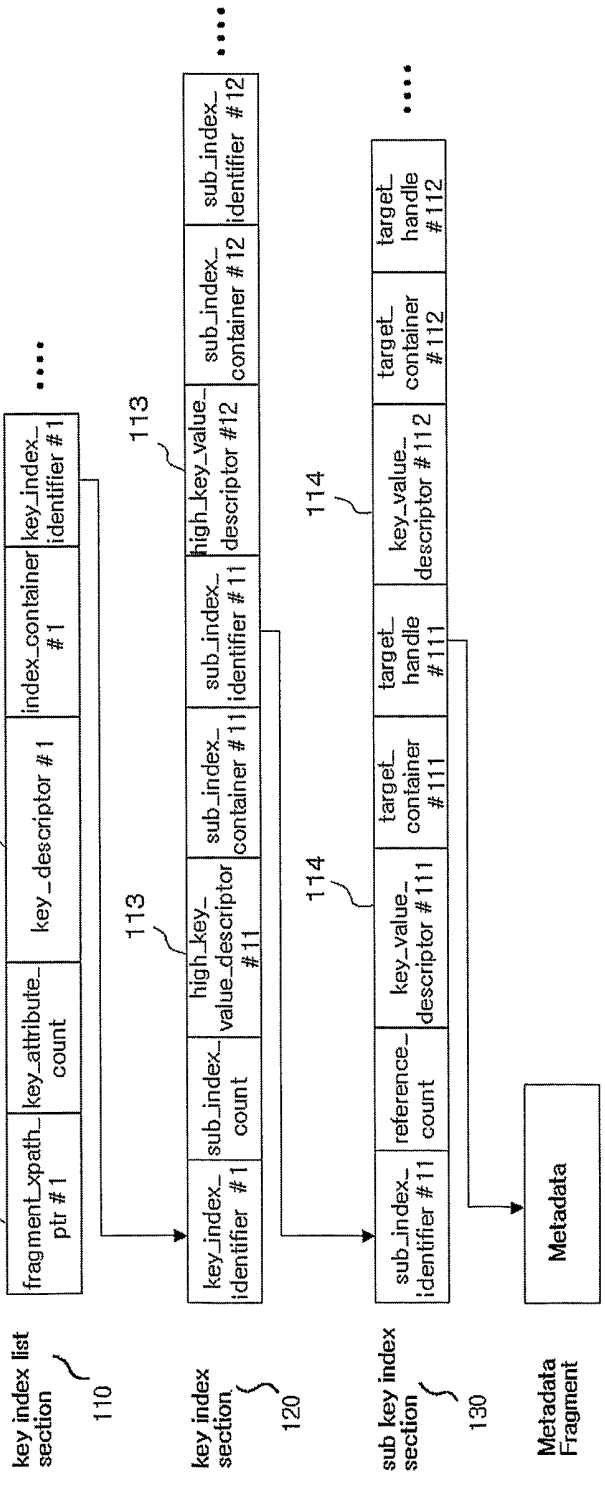

key index list section
110
fragment_xpath_ptr #1
key_attribute_count
key_descriptor #1
index_container #1
key_index_identifier #1
111
112
113
114
key index section
120
key_index_identifier #1
sub_index_count
high_key_value_descriptor #11
sub_index_container #11
sub_index_identifier #11
high_key_value_descriptor #12
sub_index_container #12
sub_index_identifier #12
sub key index section
130
sub_index_identifier #11
reference_count
key_value_descriptor #111
target_container #111
target_handle #111
key_value_descriptor #112
target_container #112
target_handle #112
Metadata Fragment
Metadata

FIG. 10

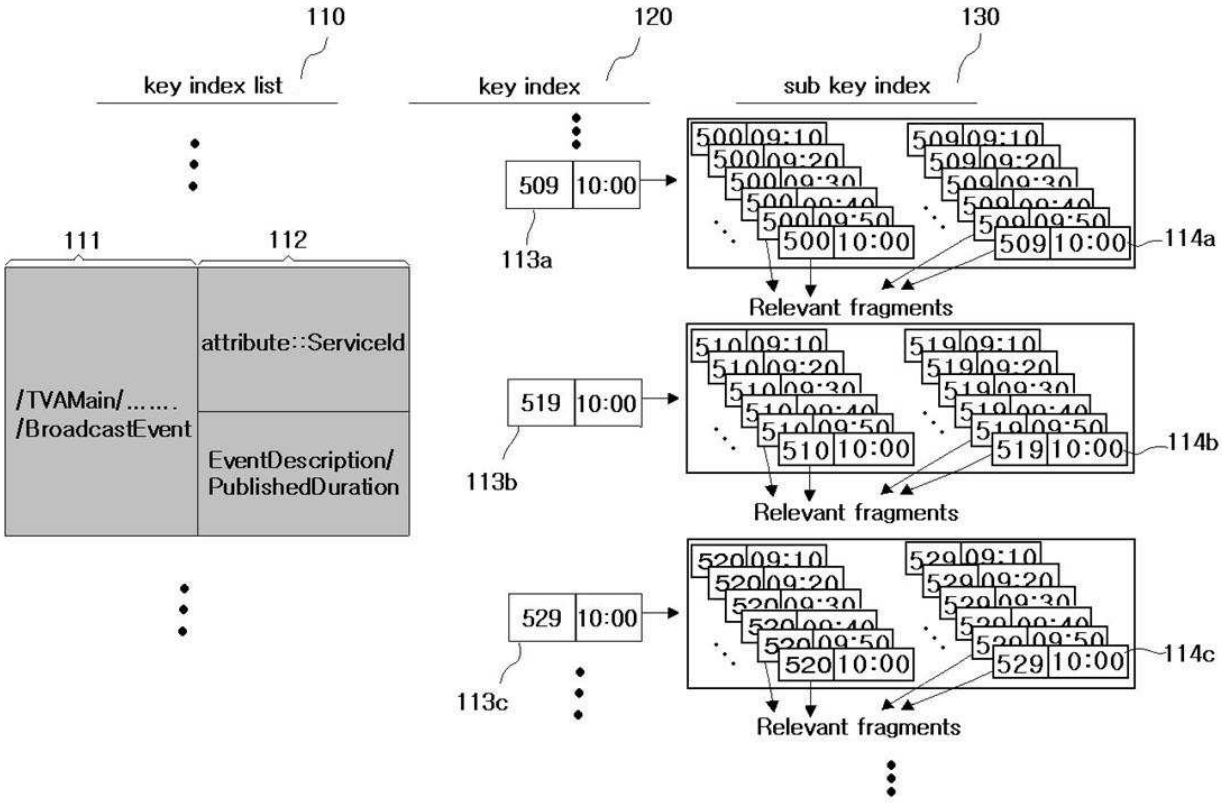

110
120
130
key index list
key index
sub key index
111
112
/TVAMain/……
/BroadcastEvent
attribute::ServiceId
EventDescription/
PublishedDuration
509 10:00
113a
519 10:00
113b
529 10:00
113c
500 10:00
509 10:00
114a
Relevant fragments
510 10:00
519 10:00
114b
Relevant fragments
520 10:00
529 10:00
114c
Relevant fragments

FIG. 11

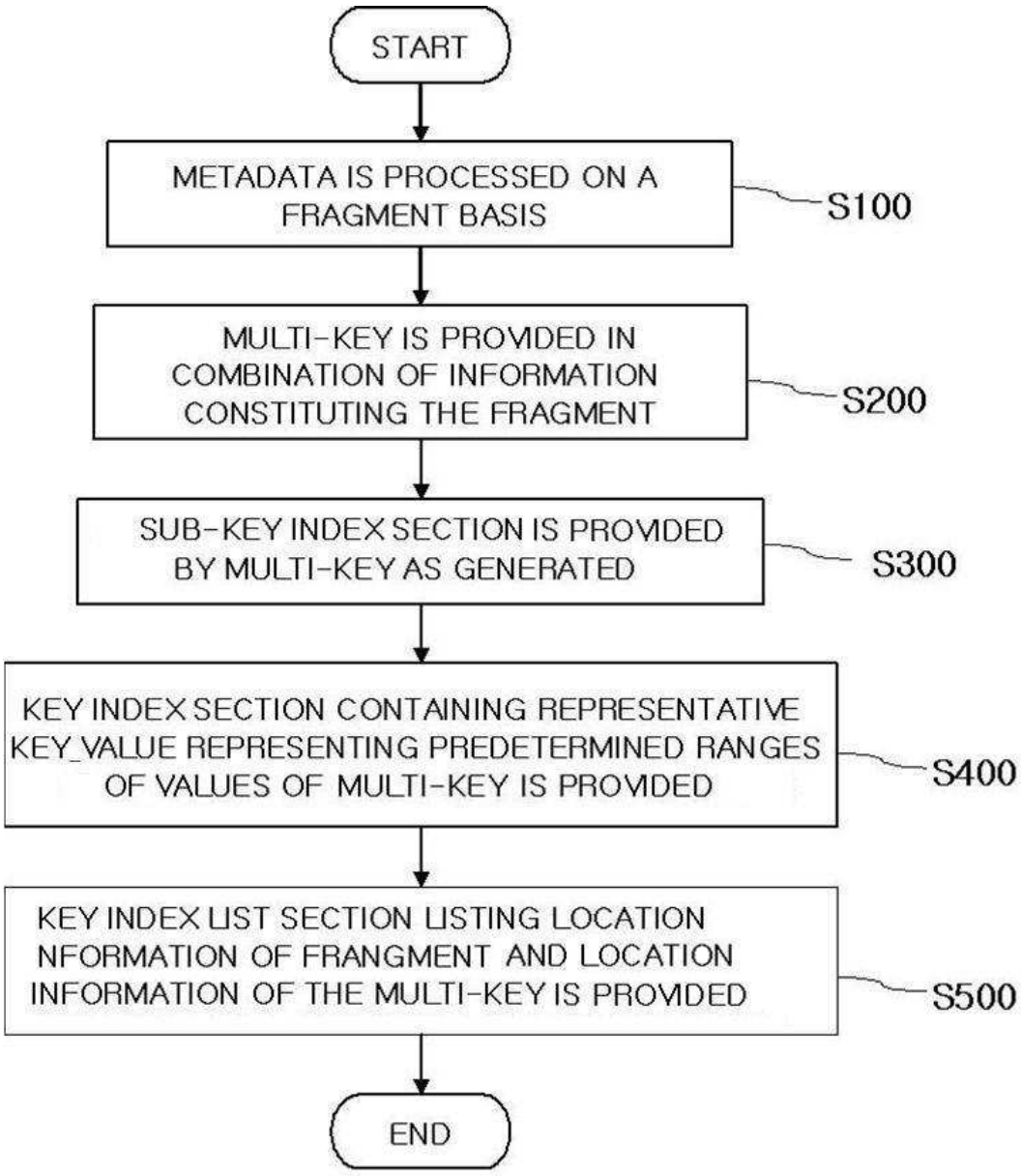

START
METADATA IS PROCESSED ON A FRAGMENT BASIS
S100
MULTI-KEY IS PROVIDED IN COMBINATION OF INFORMATION CONSTITUTING THE FRAGMENT
S200
SUB-KEY INDEX SECTION IS PROVIDED BY MULTI-KEY AS GENERATED
S300
KEY INDEX SECTION CONTAINING REPRESENTATIVE KEY_VALUE REPRESENTING PREDETERMINED RANGES OF VALUES OF MULTI-KEY IS PROVIDED
S400
KEY INDEX LIST SECTION LISTING LOCATION NFORMATION OF FRANGMENT AND LOCATION INFORMATION OF THE MULTI-KEY IS PROVIDED
S500
END

FIG. 12

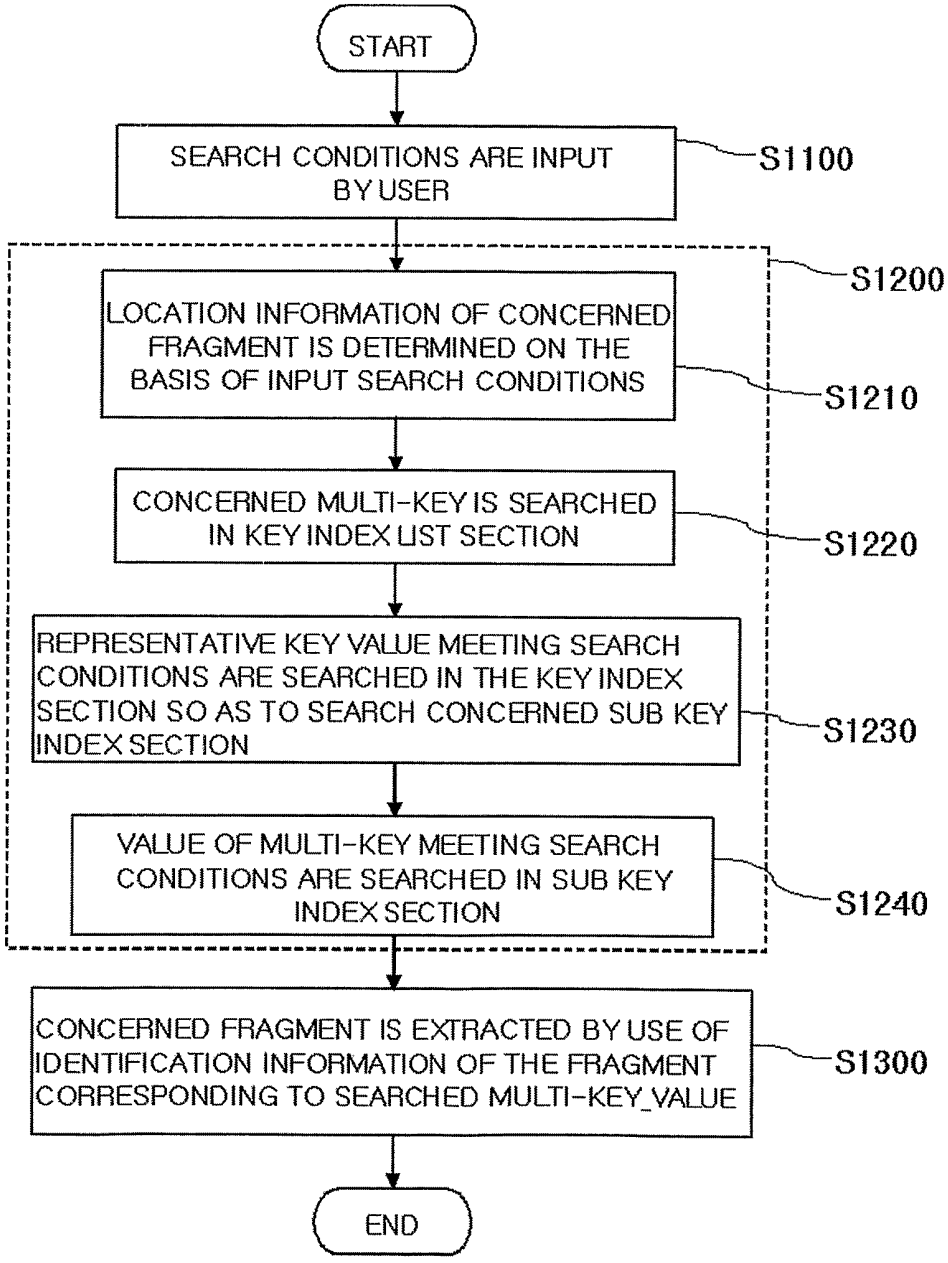
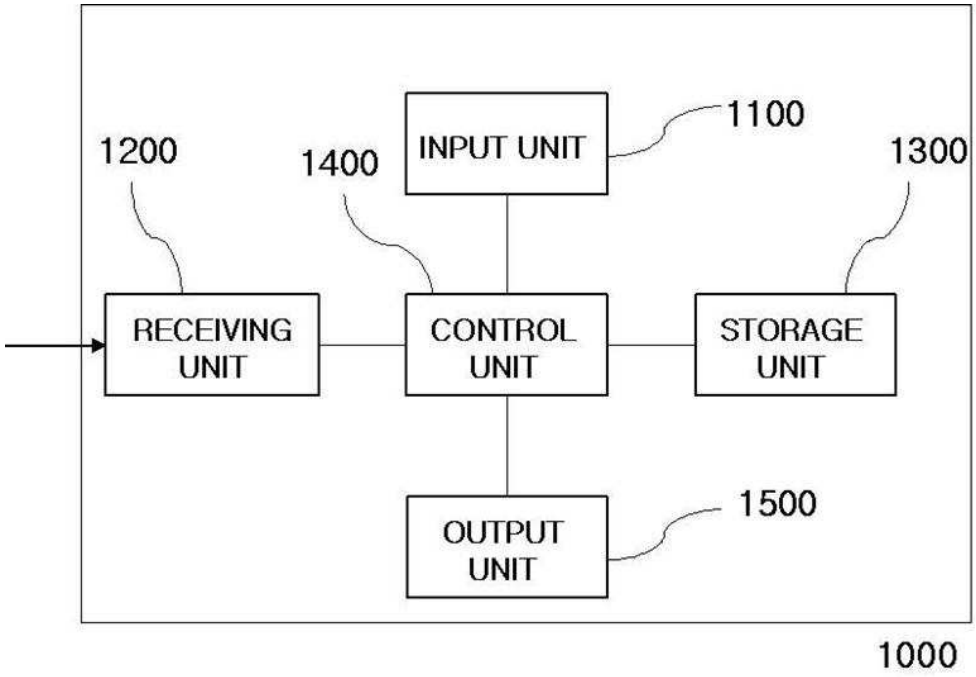

START
SEARCH CONDITIONS ARE INPUT BY USER
S1100
S1200
LOCATION INFORMATION OF CONCERNED FRAGMENT IS DETERMINED ON THE BASIS OF INPUT SEARCH CONDITIONS
S1210
CONCERNED MULTI-KEY IS SEARCHED IN KEY INDEX LIST SECTION
S1220
REPRESENTATIVE KEY VALUE MEETING SEARCH CONDITIONS ARE SEARCHED IN THE KEY INDEX SECTION SO AS TO SEARCH CONCERNED SUB KEY INDEX SECTION
S1230
VALUE OF MULTI-KEY MEETING SEARCH CONDITIONS ARE SEARCHED IN SUB KEY INDEX SECTION
S1240
CONCERNED FRAGMENT IS EXTRACTED BY USE OF IDENTIFICATION INFORMATION OF THE FRAGMENT CORRESPONDING TO SEARCHED MULTI-KEY_VALUE
S1300
END

FIG. 13


1200
1400
INPUT UNIT
1100
1300
RECEIVING UNIT
CONTROL UNIT
STORAGE UNIT
OUTPUT UNIT
1500
1000