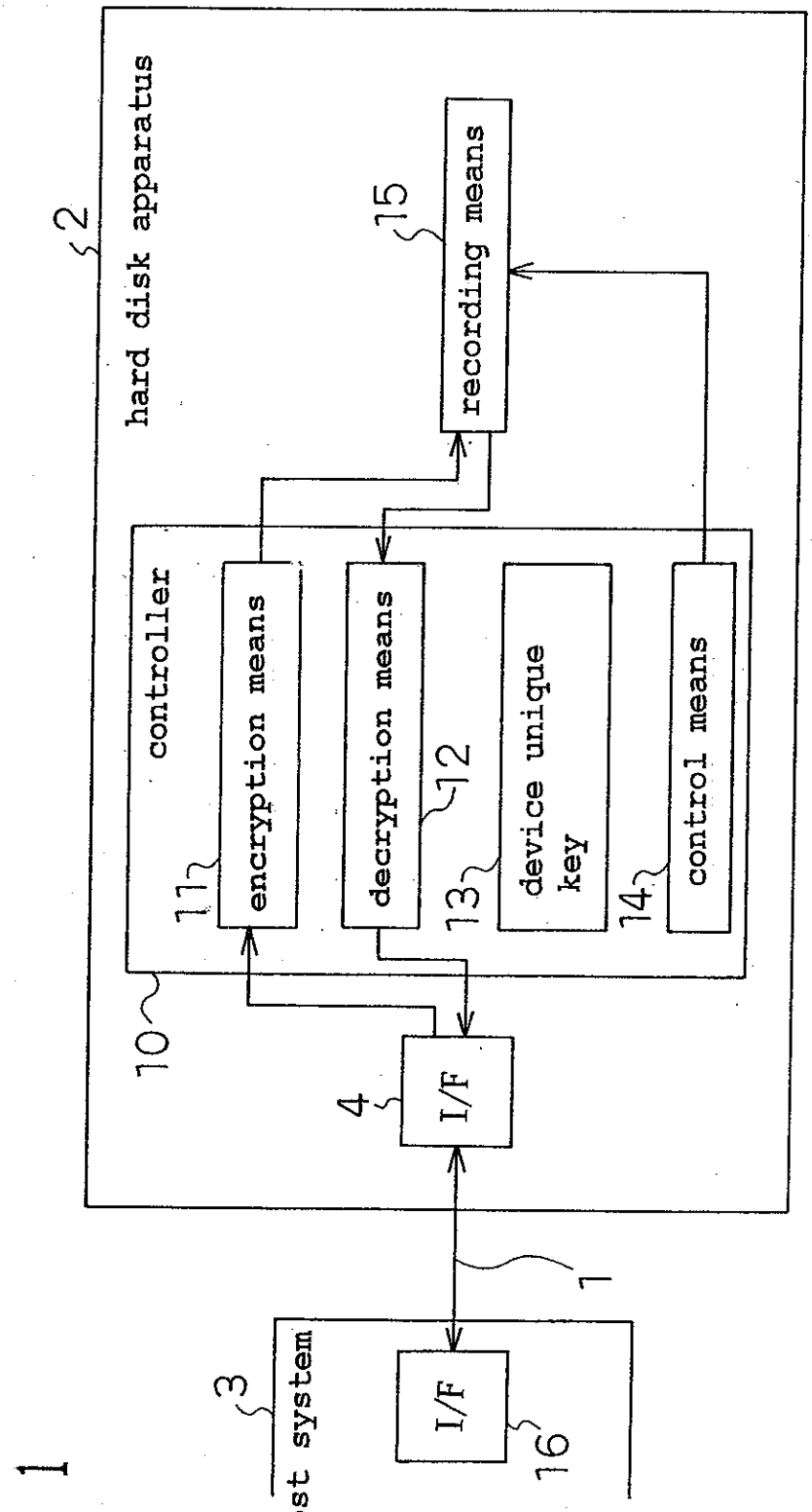

hard disk apparatus
2
recording means
15
controller
encryption means
11
decryption means
12
device unique key
13
control means
14
10
I/F
4
1
host system
3
I/F
16

Fig. 1

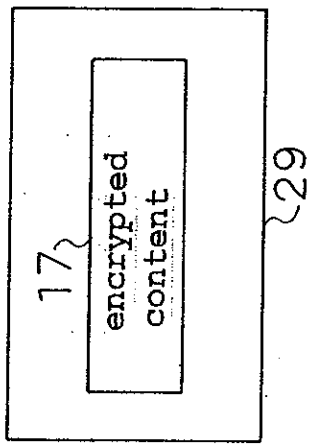

encrypted content
17
29

Fig. 2

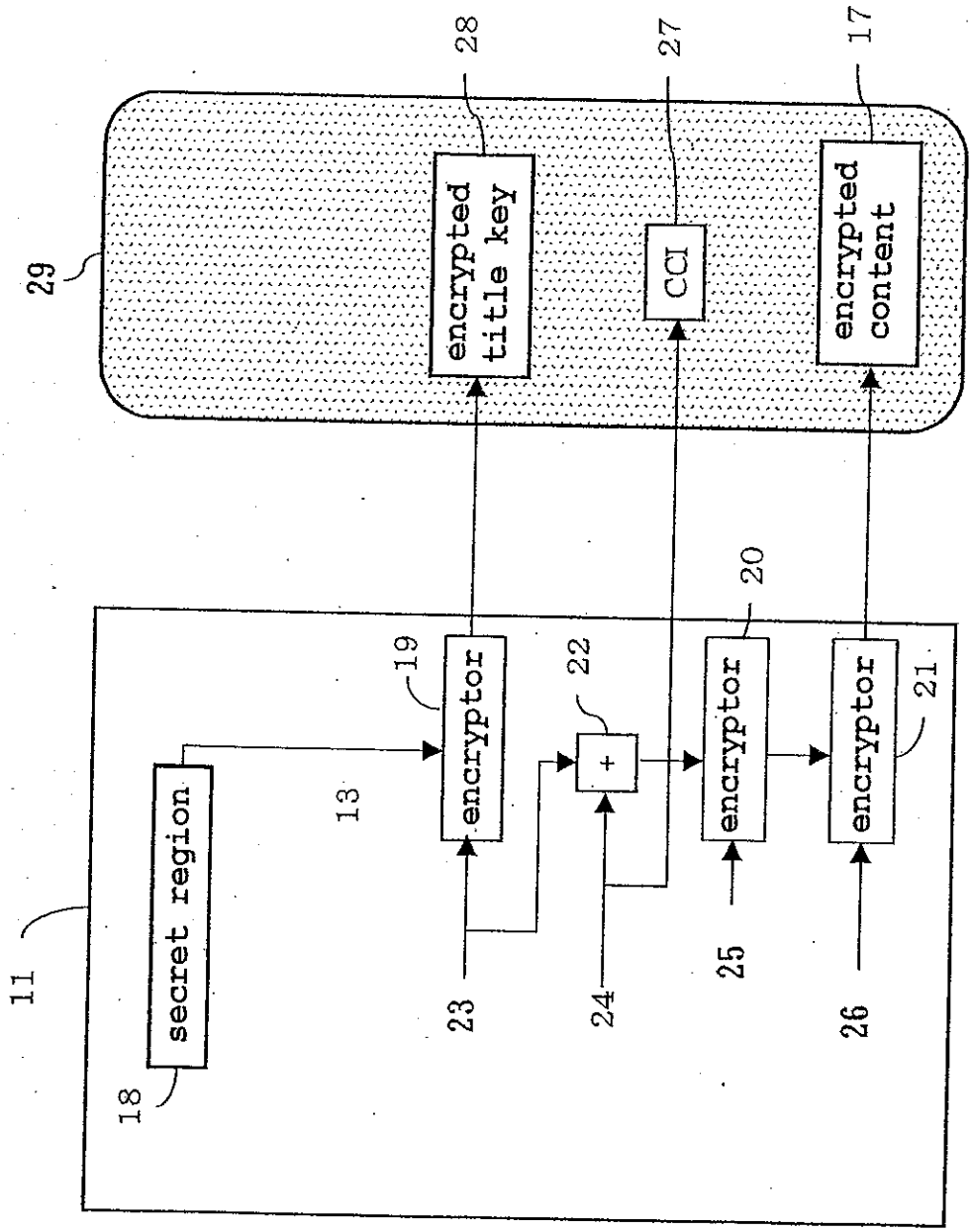

29
28
27
17
encrypted title key
CCI
encrypted content
11
secret region
18
13
19
encryptor
22
+
20
encryptor
21
encryptor
23
24
25
26

Fig. 3

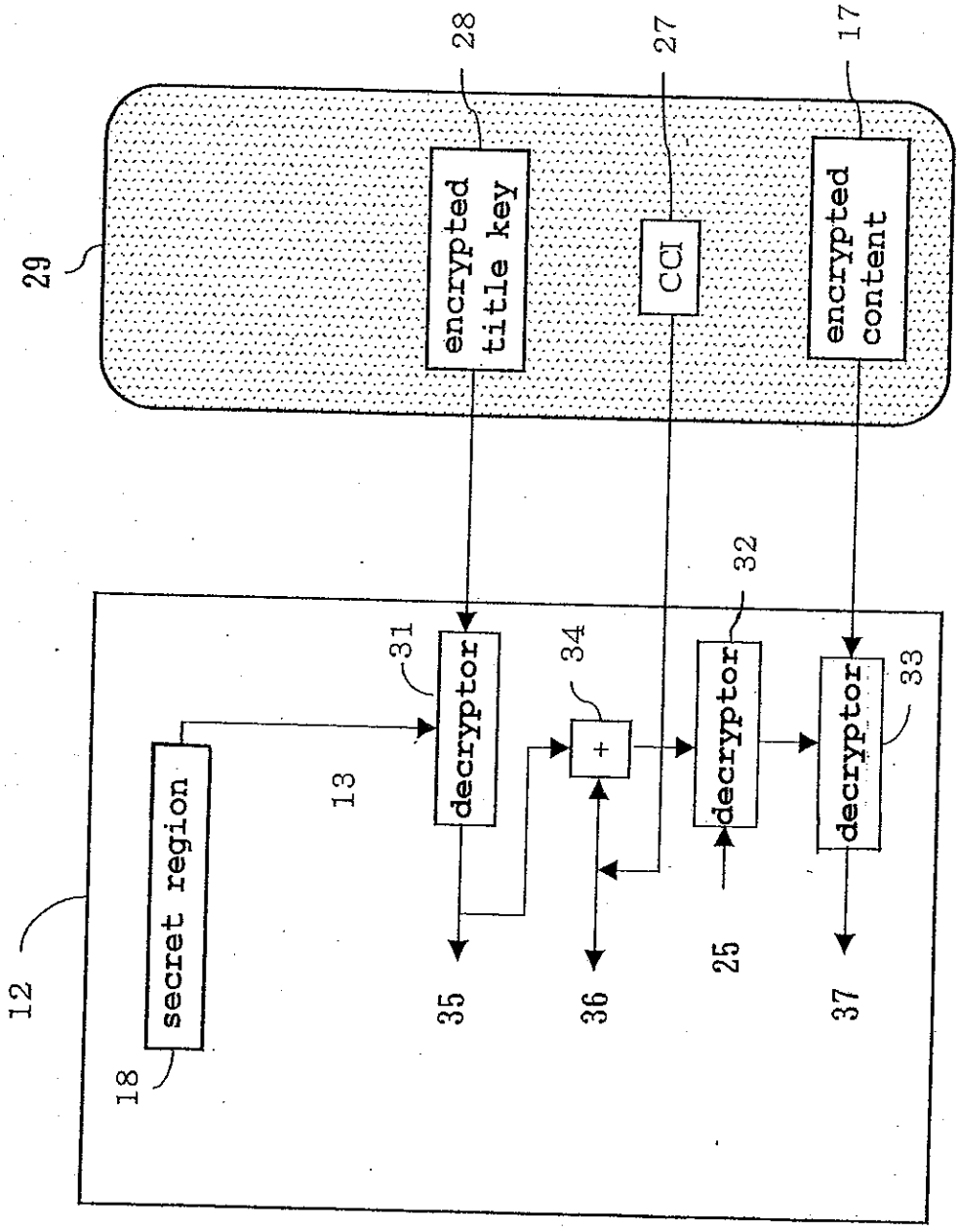

29
28
27
17
encrypted title key
CCI
encrypted content
12
secret region
18
13
31
decryptor
34
+
32
decryptor
33
decryptor
35
36
25
37

Fig. 4

Fig. 5 (a)

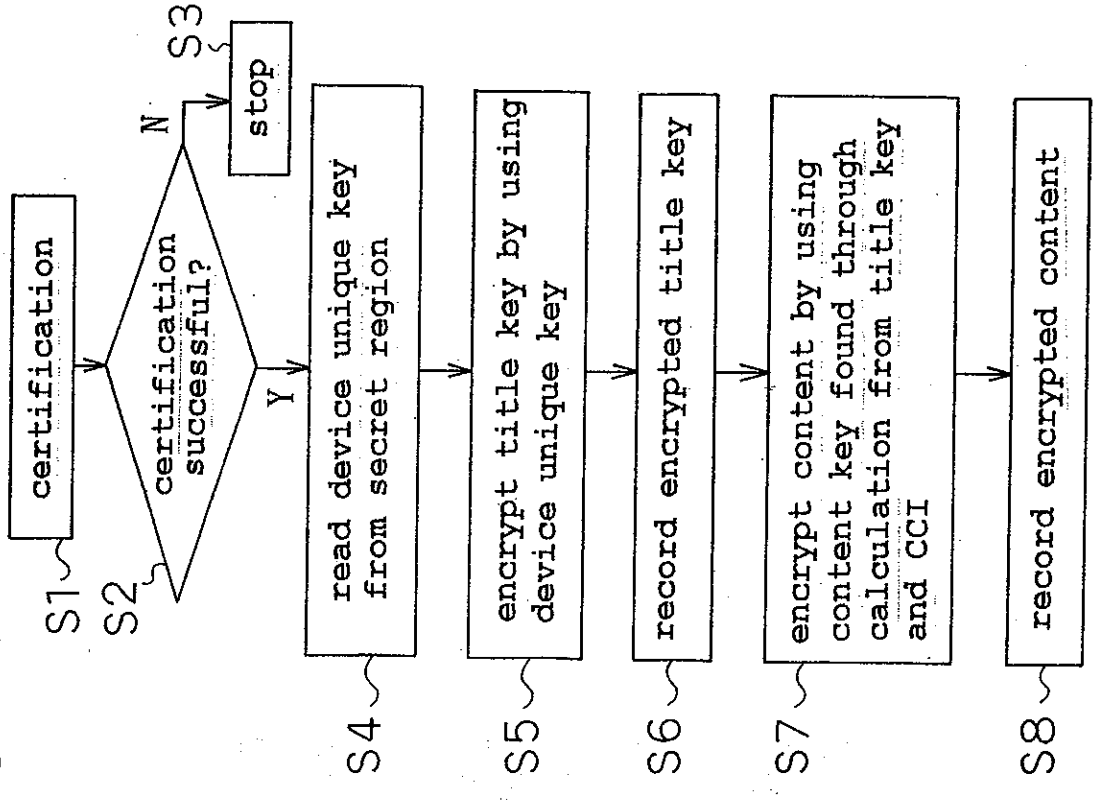

certification
S1
certification successful?
S2
N
S3
stop
Y
read device unique key from secret region
S4
encrypt title key by using device unique key
S5
record encrypted title key
S6
encrypt content by using content key found through calculation from title key and CCI
S7
record encrypted content
S8

Fig. 5 (b)

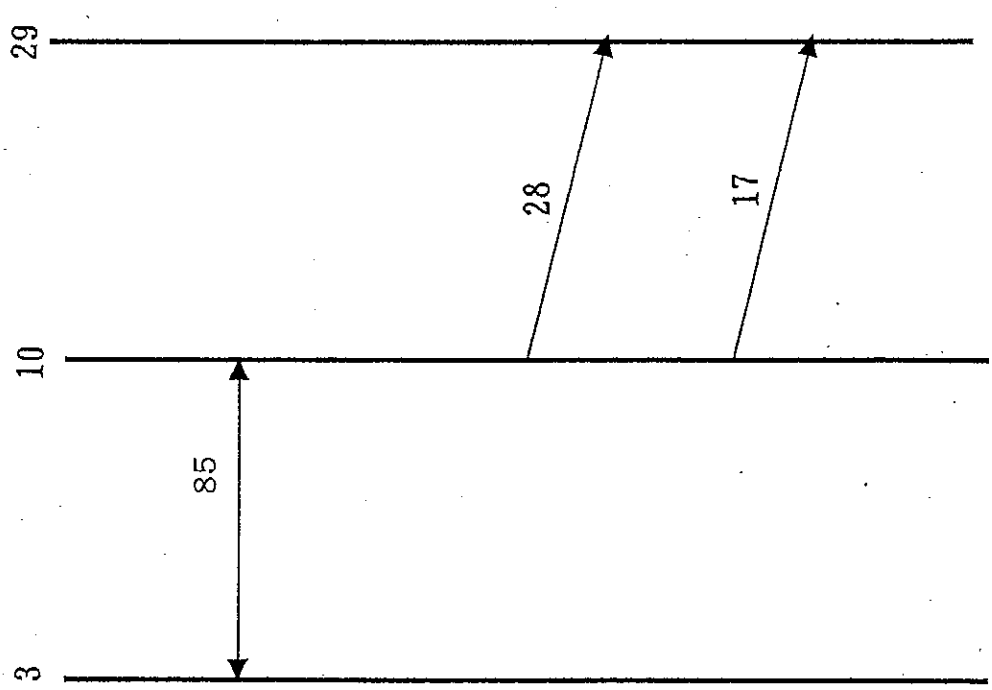

2
29
28
17
10
85
3

Fig. 6 (a)

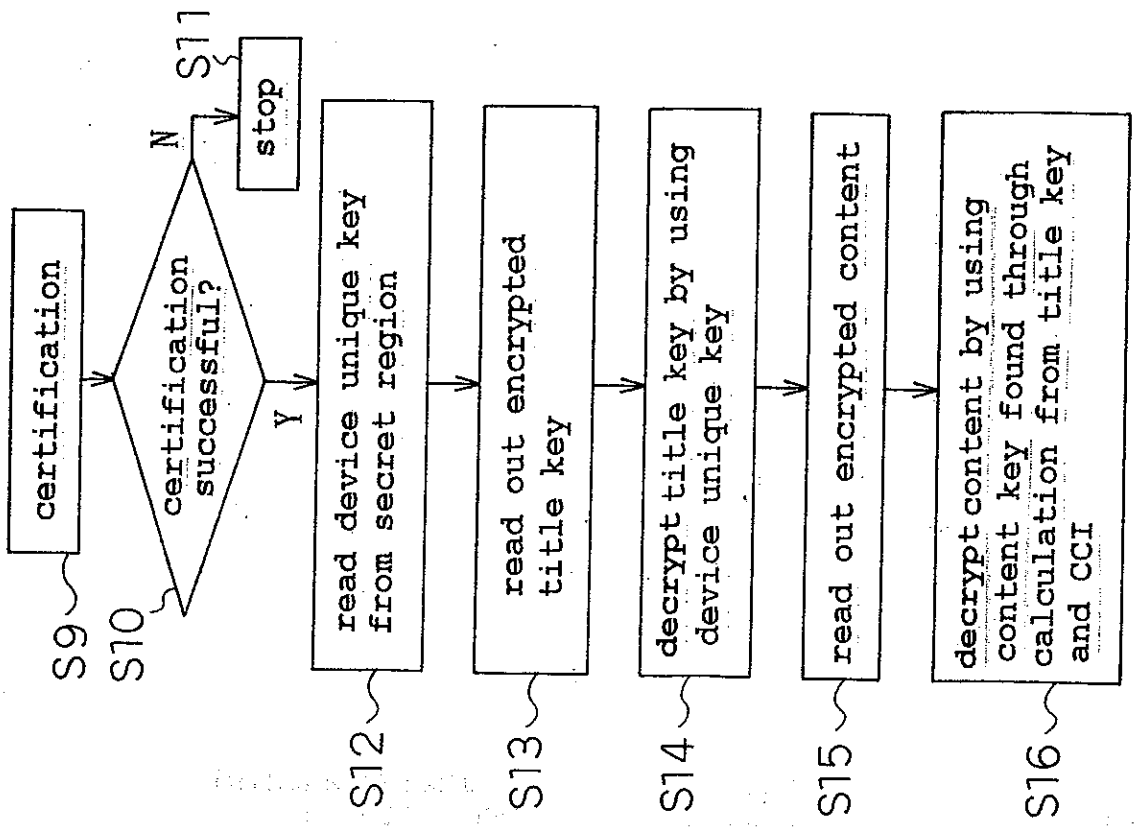

certification
S9
certification successful?
S10
N
S11
stop
Y
read device unique key from secret region
S12
read out encrypted title key
S13
decrypt title key by using device unique key
S14
read out encrypted content
S15
decrypt content by using content key found through calculation from title key and CCI
S16

Fig. 6 (b)

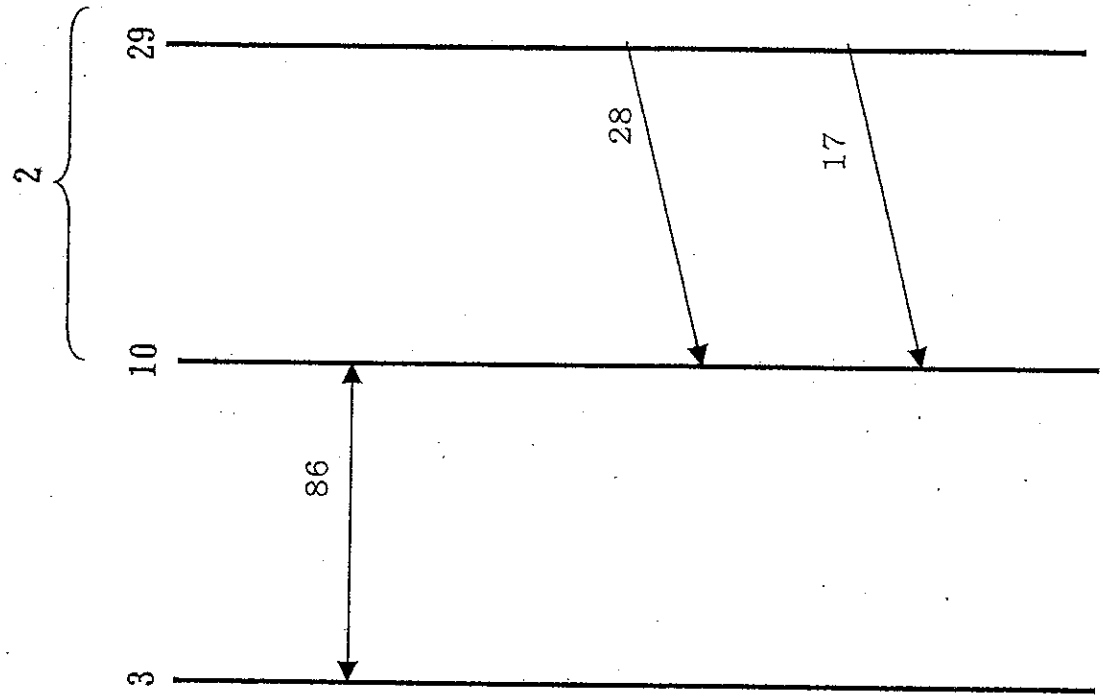

2
29
10
3
86
28
17

Fig. 7 (a)

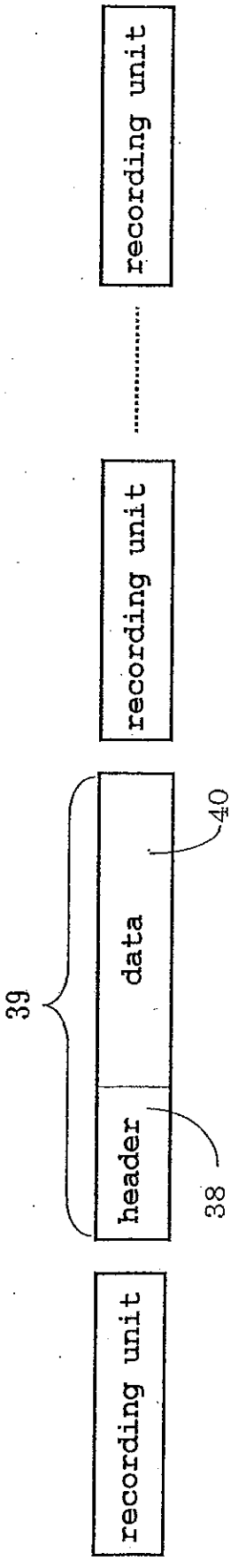

recording unit
header
data
recording unit
recording unit
39
38
40

Fig. 7 (b)

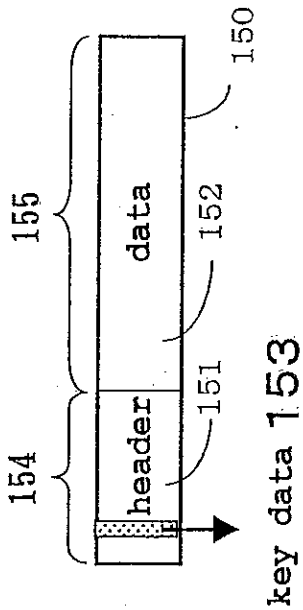

header
data
154
155
151
152
150
key data 153

Fig. 8

value of CCI	meaning
11	Copy Never
10	Copy Once
01	No More Copy
00	Copy Free

Fig. 9

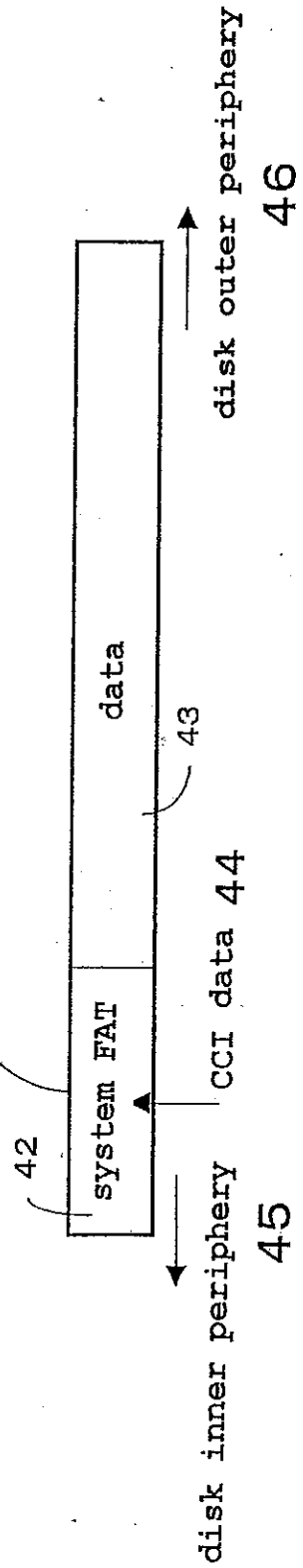
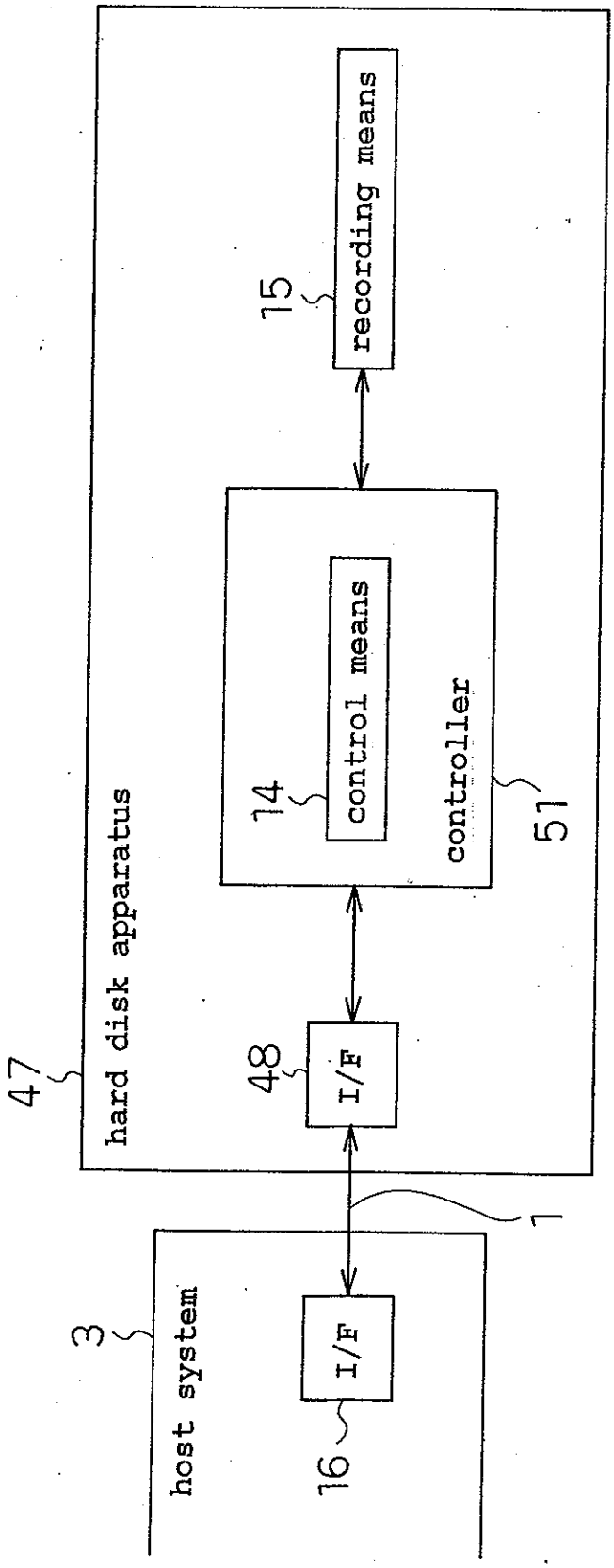


Fig. 10


recording means
15
control means
14
controller
51
hard disk apparatus
47
I/F
48
1
host system
3
I/F
16

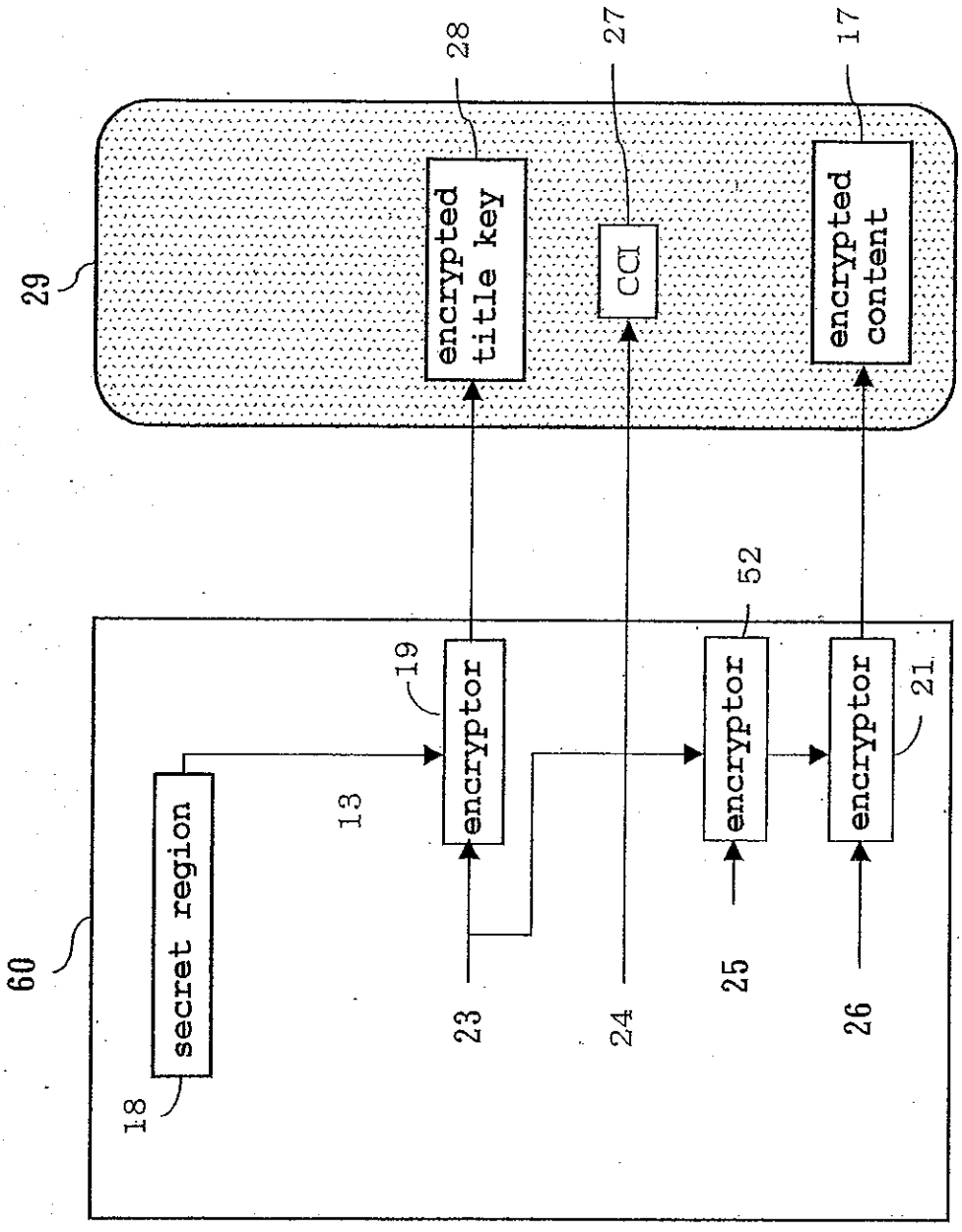

29
28
27
17
encrypted title key
CCI
encrypted content
60
secret region
18
13
19
encryptor
52
encryptor
21
encryptor
23
24
25
26

Fig. 11

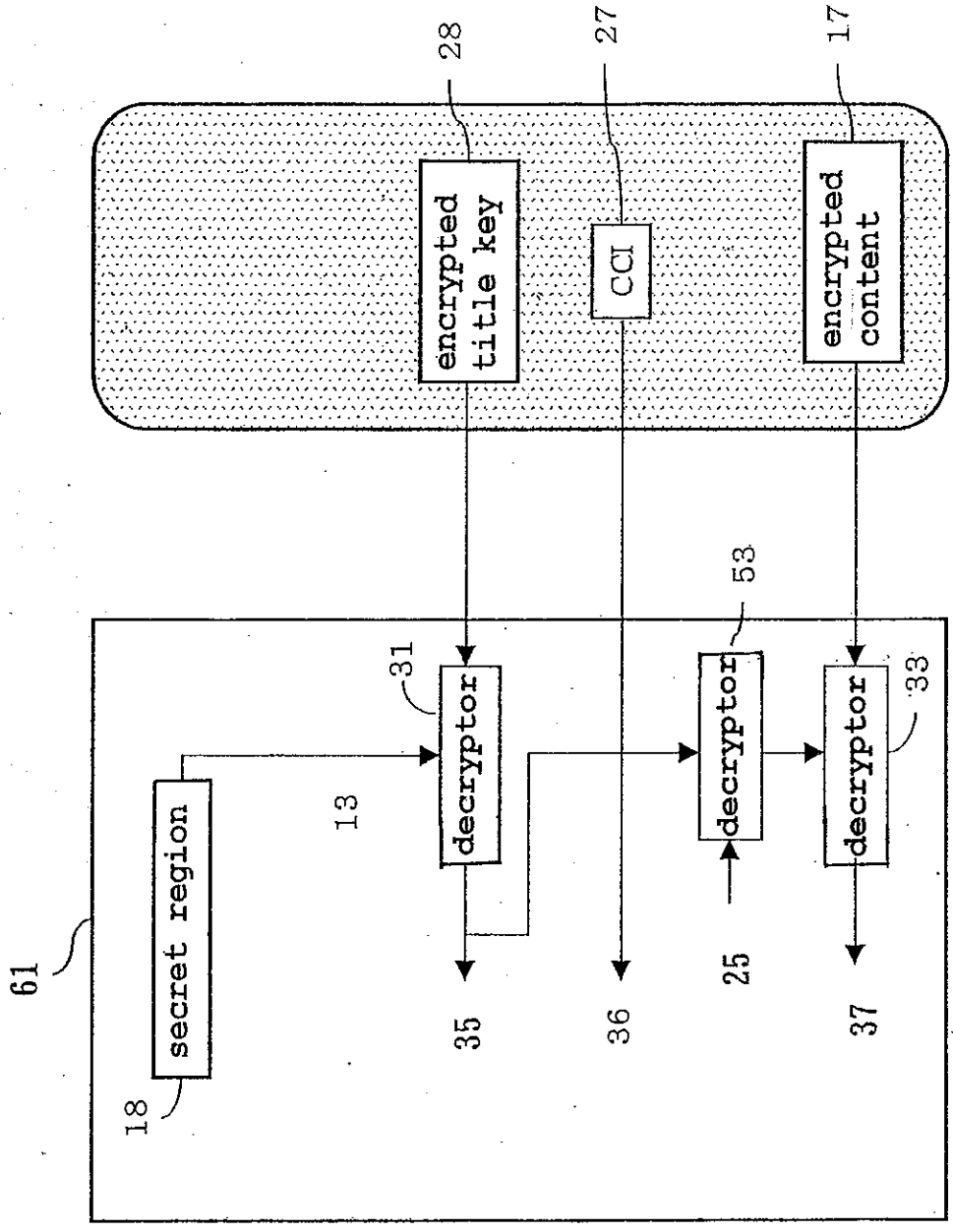

28
27
17
encrypted title key
CCI
encrypted content
53
31
33
decryptor
decryptor
decryptor
secret region
13
61
18
35
36
25
37

Fig. 12

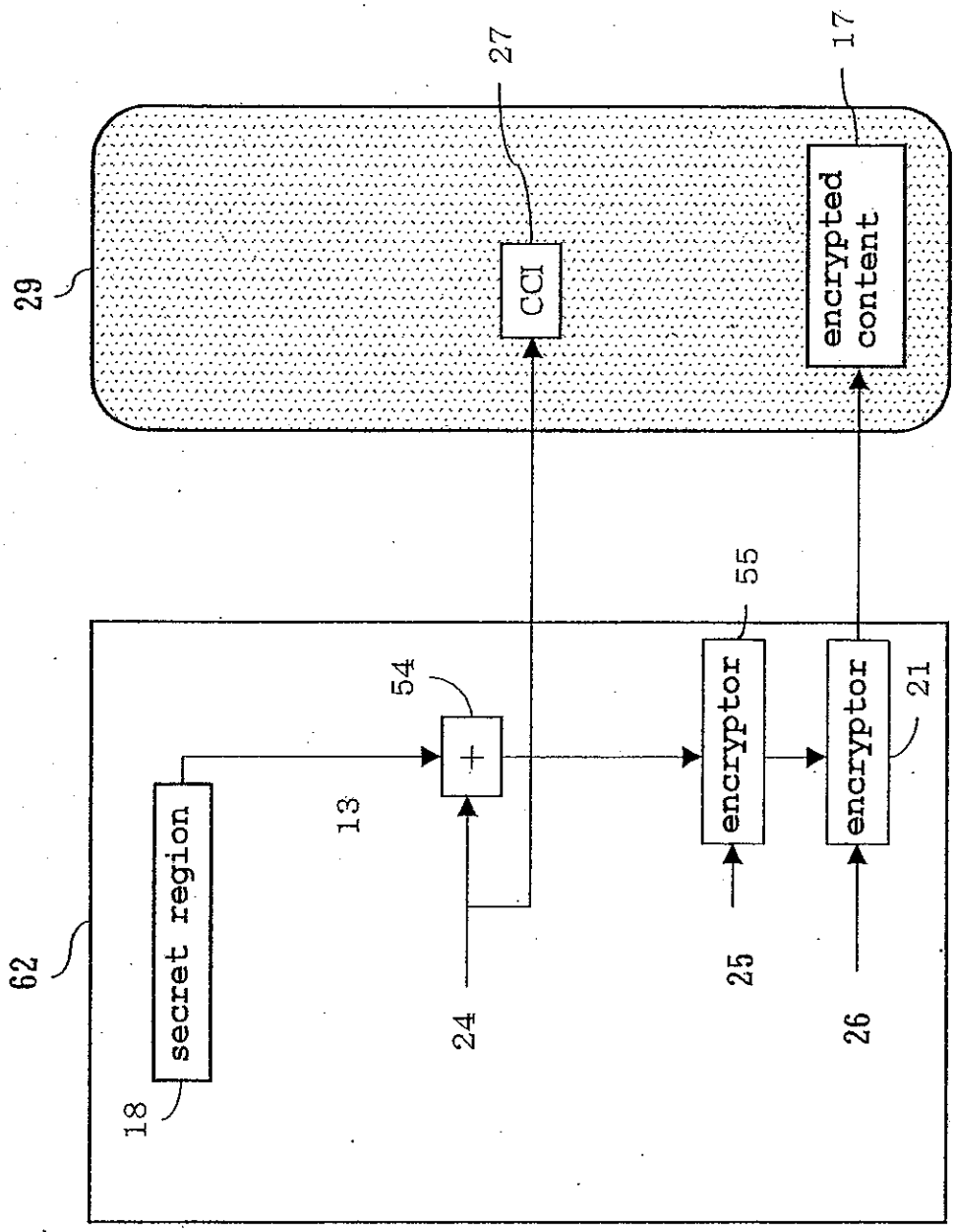

29
27
CCI
17
encrypted content
62
secret region
18
13
54
+
24
55
encryptor
25
encryptor
21
26

Fig. 13

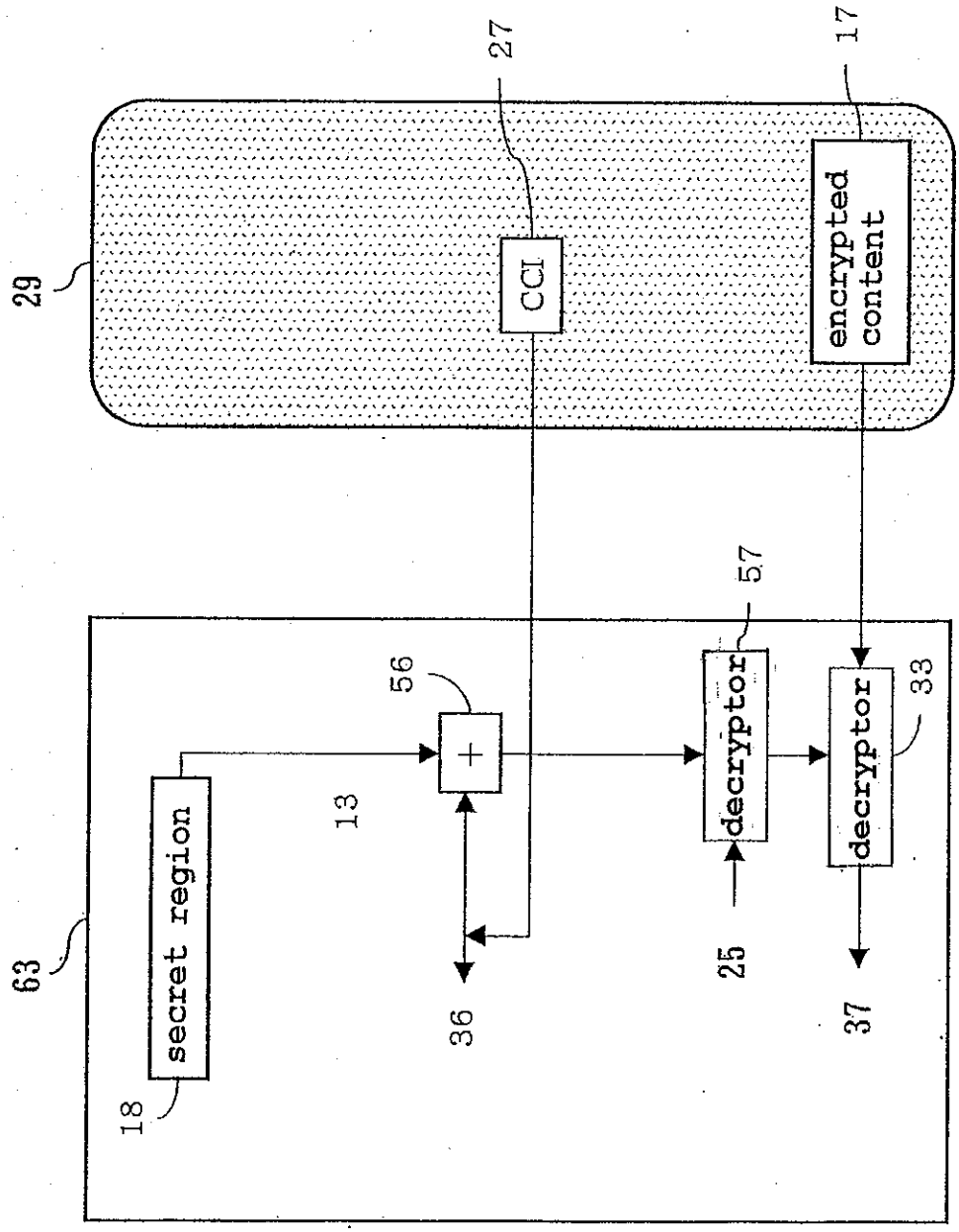

29
27
CCI
17
encrypted content
63
secret region
18
13
56
36
57
decryptor
25
33
decryptor
37

Fig. 14

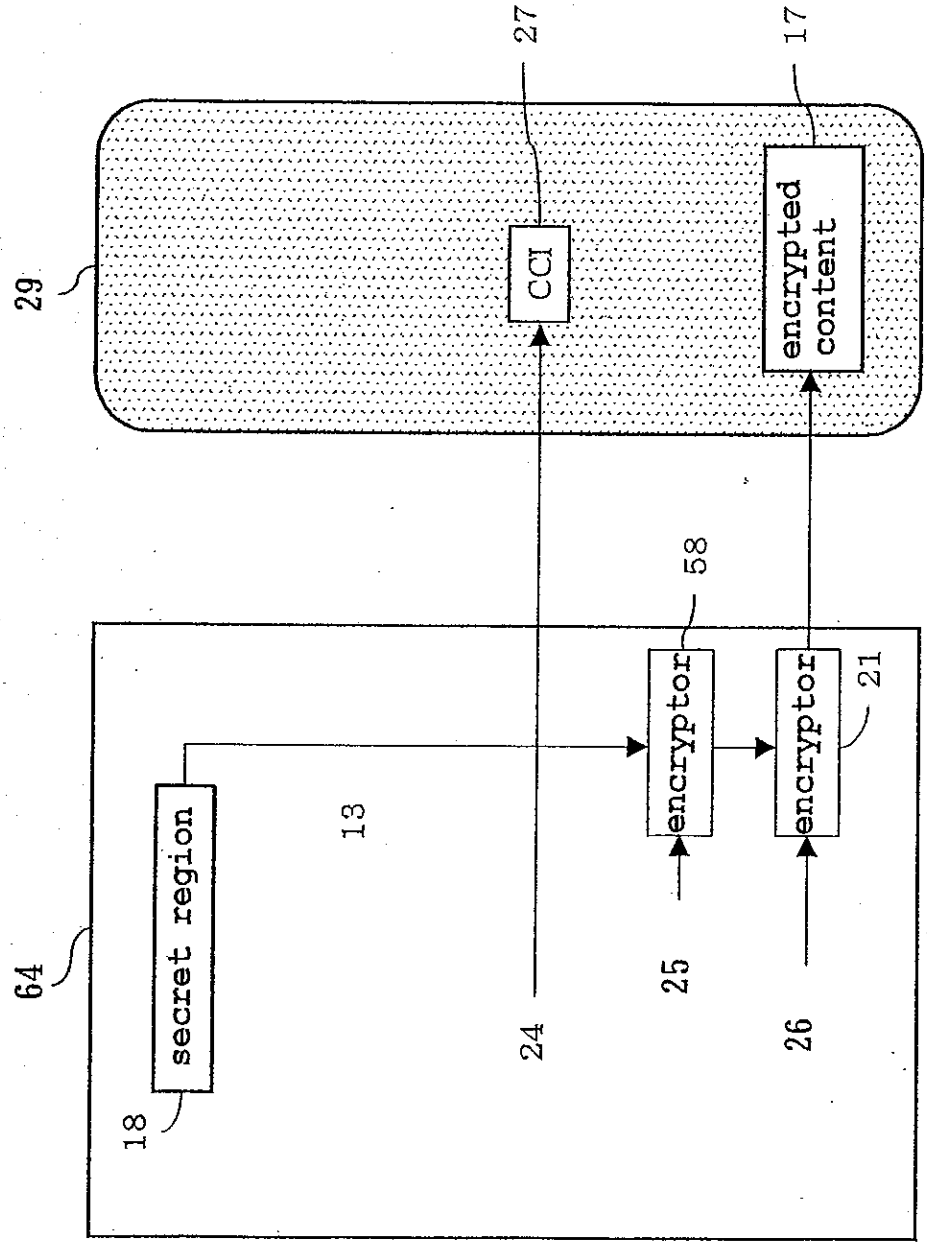

29
27
CCI
17
encrypted content
58
encryptor
21
encryptor
13
secret region
64
18
24
25
26

Fig. 15

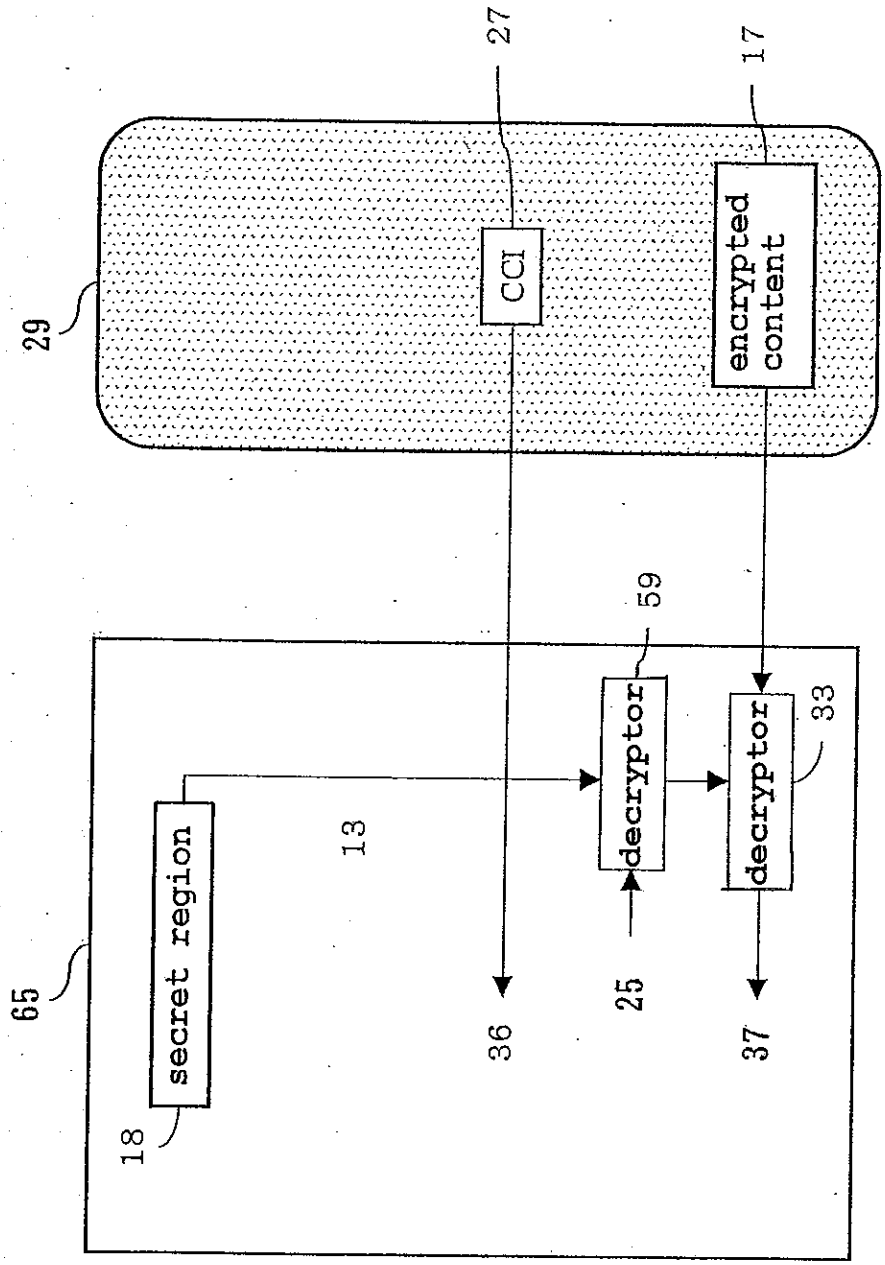

29
27
CCI
17
encrypted content
59
decryptor
33
decryptor
13
secret region
65
18
25
36
37

Fig. 16

Fig. 17 (a)

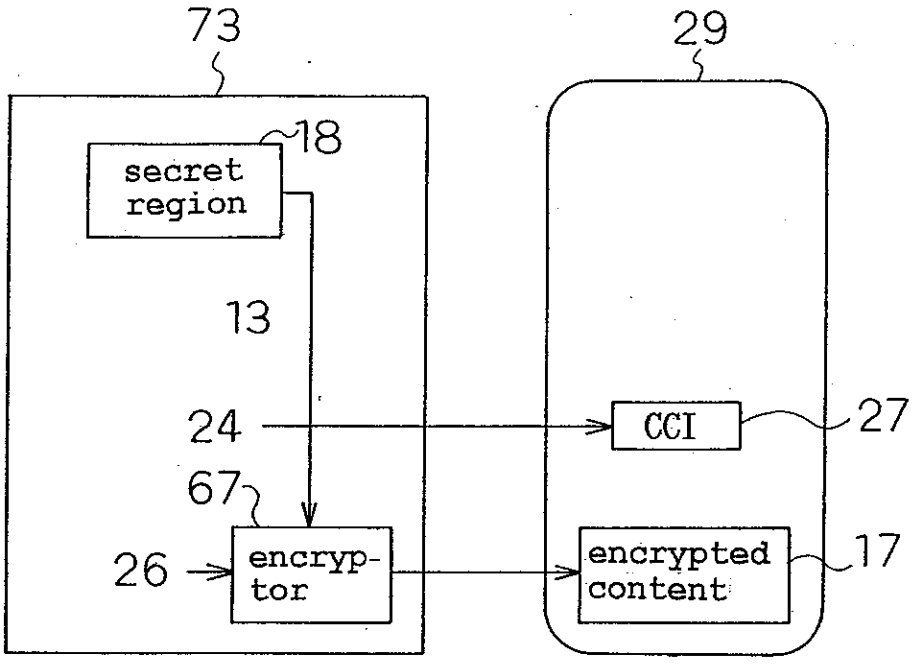


Fig. 17 (b)

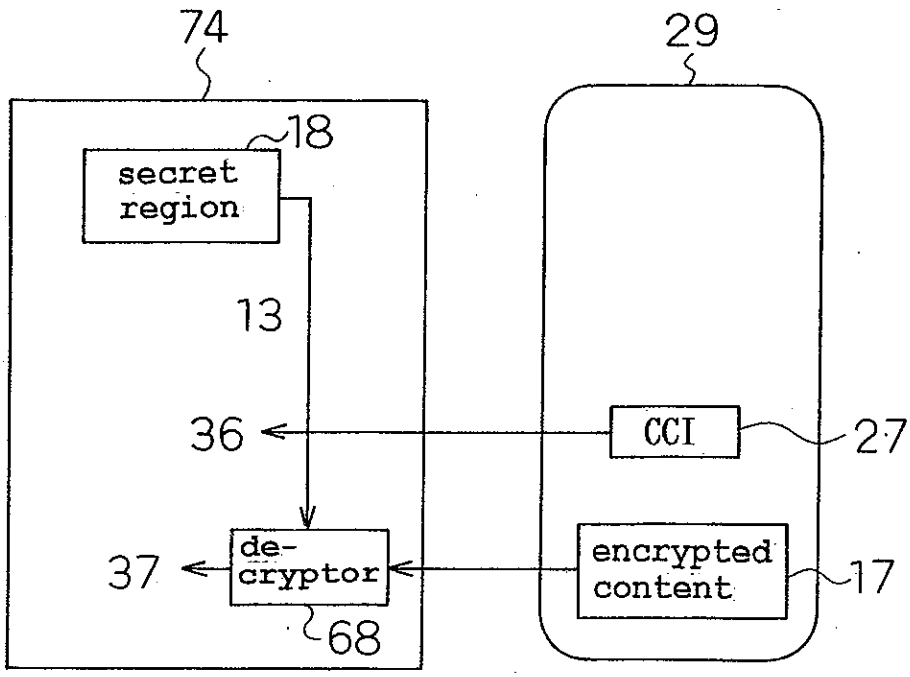


Fig. 18 (a)

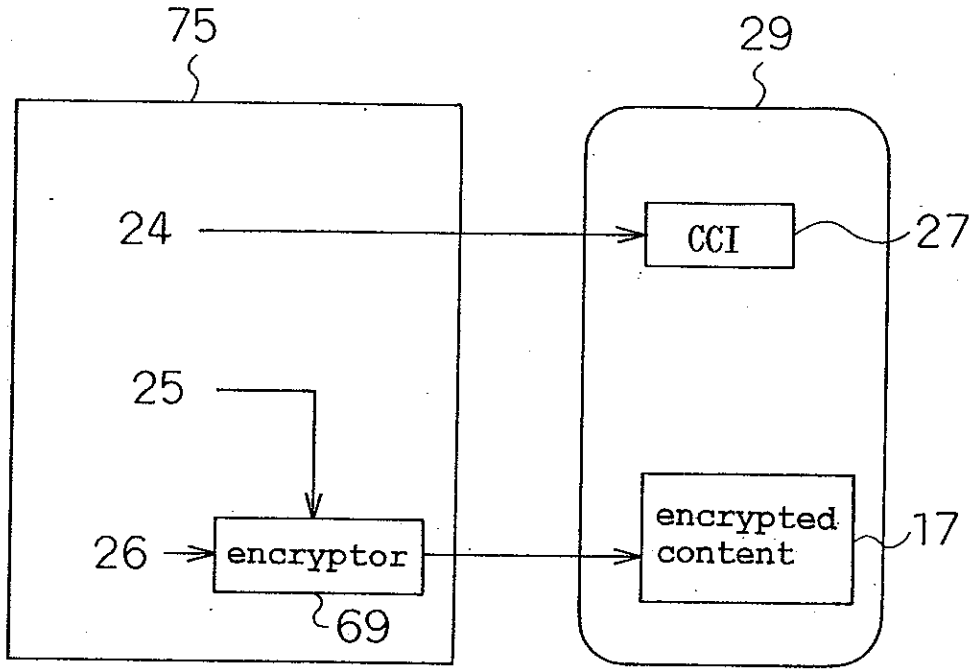


Fig. 18 (b)

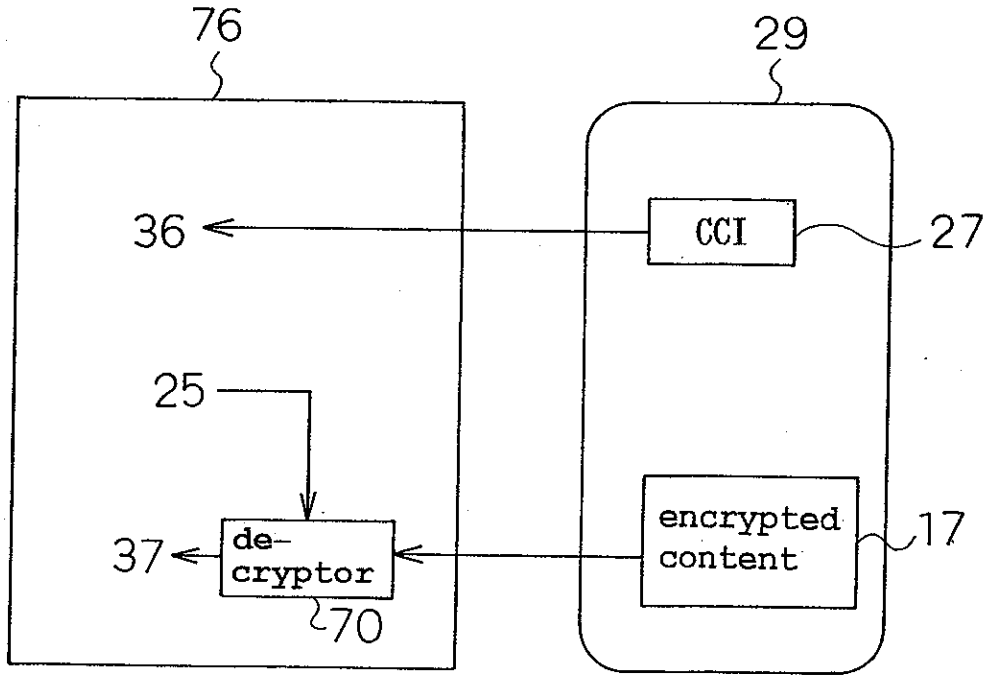


Fig. 19 (a)

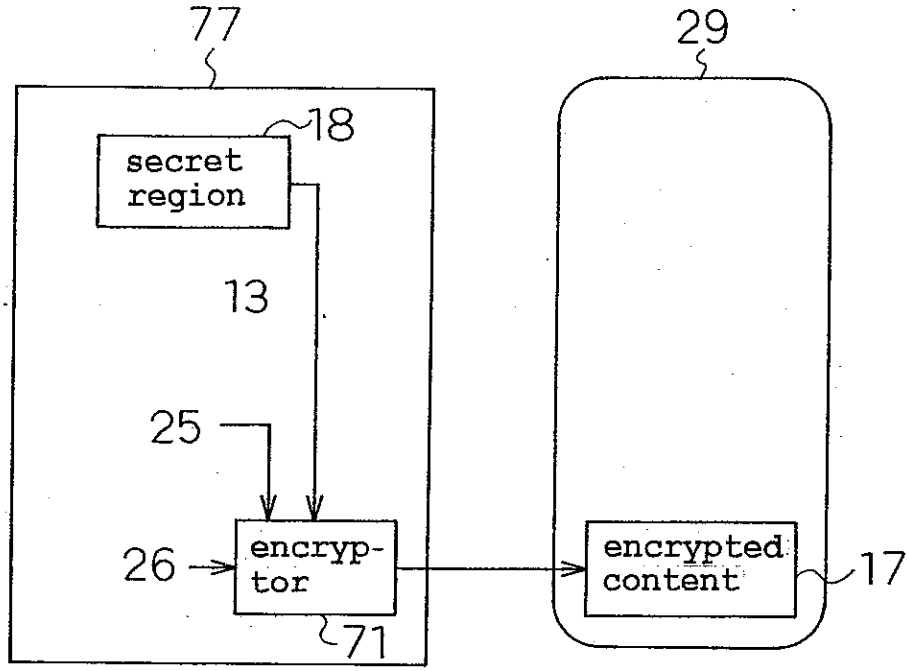


Fig. 19 (b)

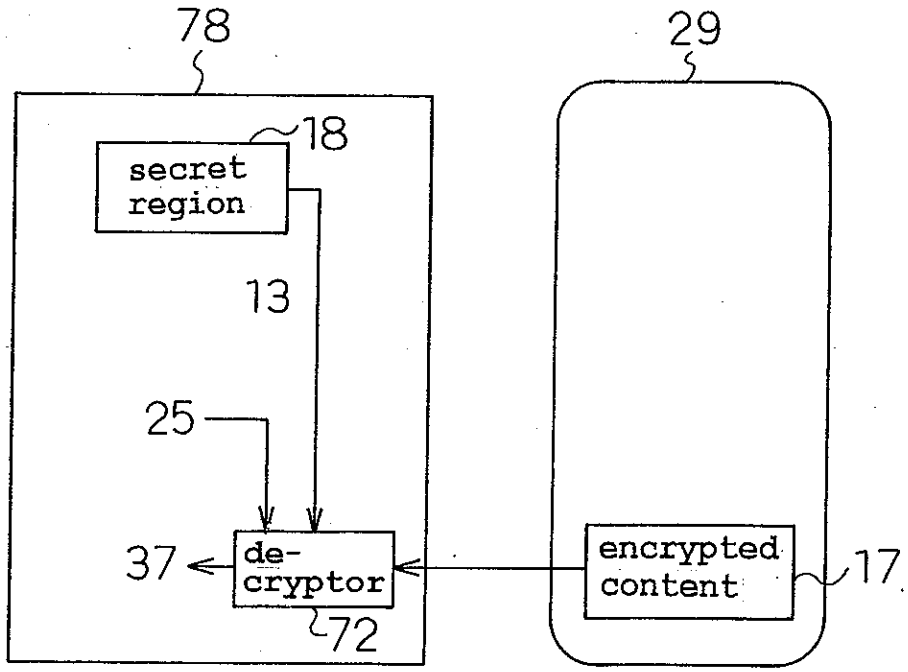
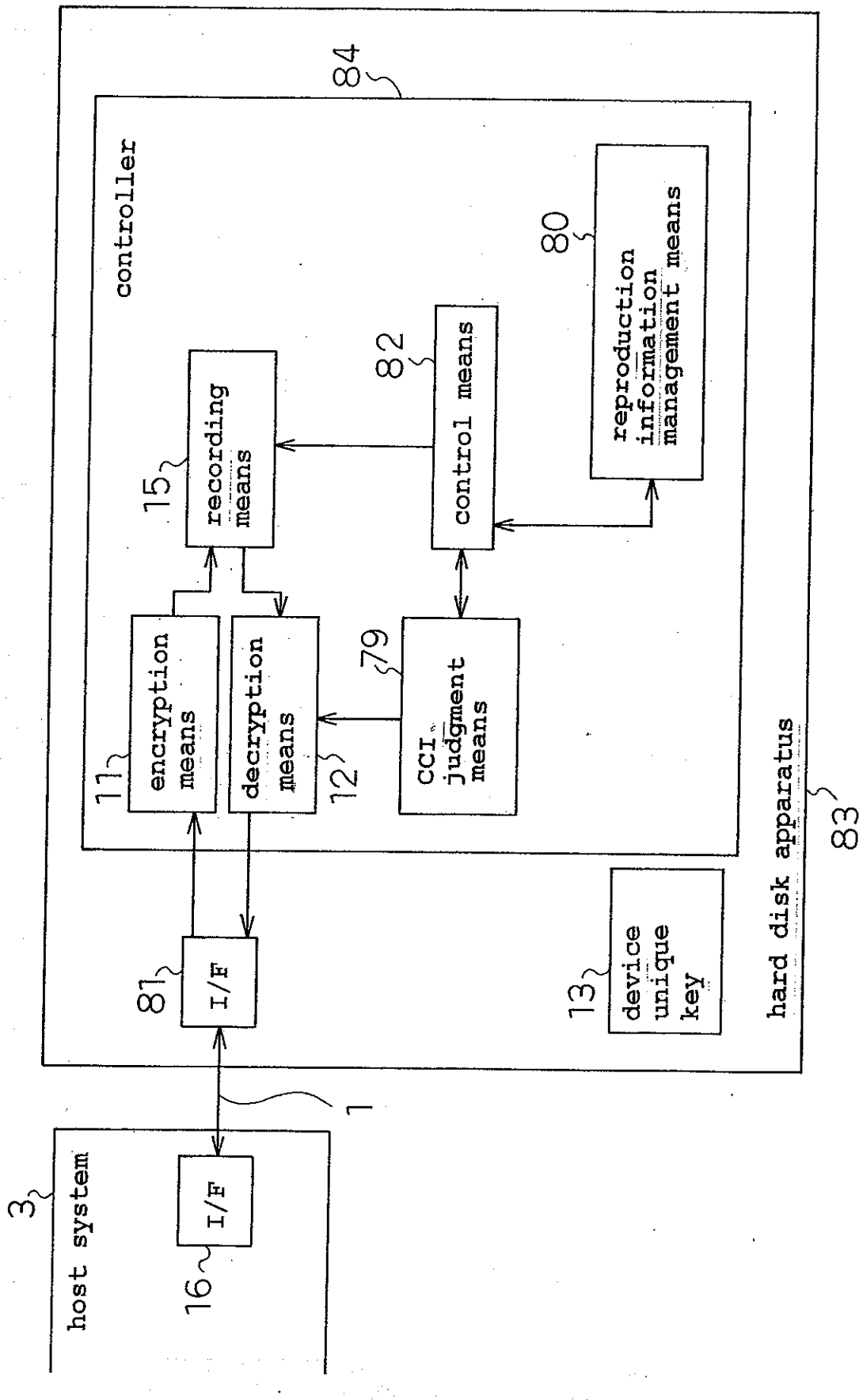


Fig. 20


host system
3
I/F
16
1
hard disk apparatus
83
84
controller
I/F
81
encryption means
11
decryption means
12
CCI judgment means
79
recording means
15
control means
82
reproduction information management means
80
device unique key
13

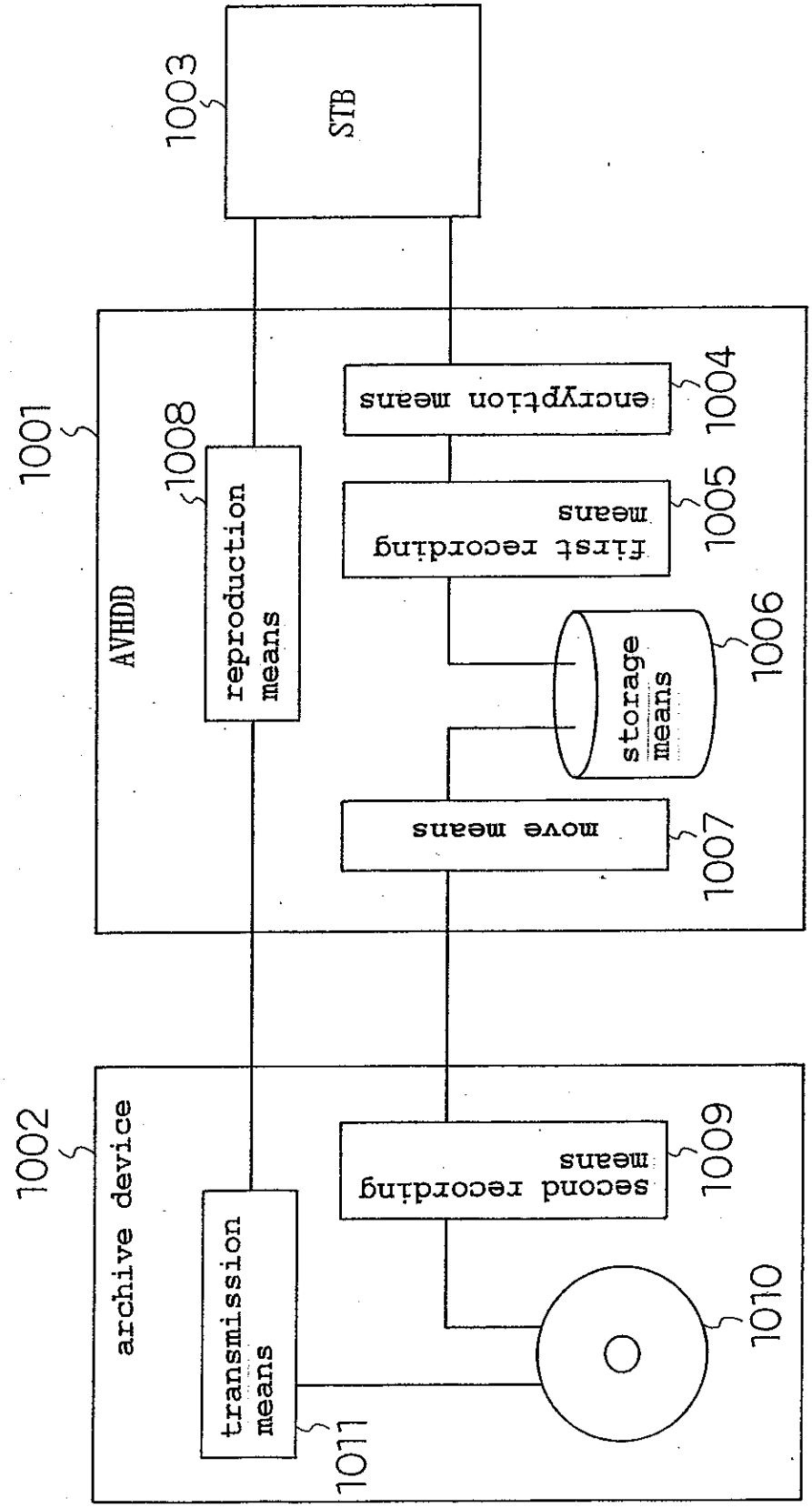

1003
STB
1001
AVHDD
1008
reproduction means
encryption means
1004
first recording means
1005
storage means
1006
move means
1007
1002
archive device
transmission means
1011
second recording means
1009
1010

Fig. 21

Fig. 22

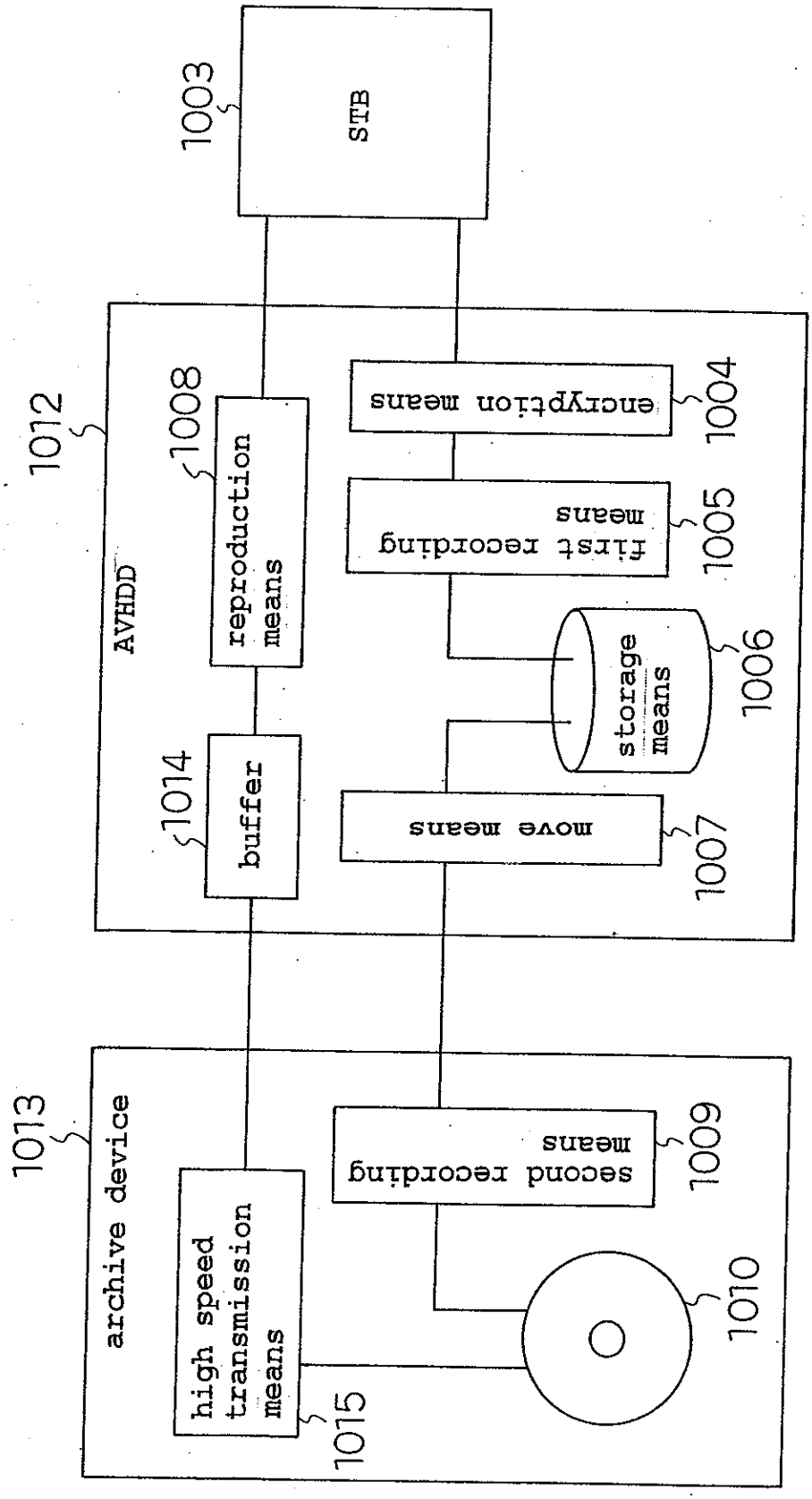

1003
STB
1012
AVHDD
1008
reproduction means
encryption means
1004
first recording means
1005
storage means
1006
move means
1007
1014
buffer
1013
archive device
high speed transmission means
1015
second recording means
1009
1010

Fig. 23

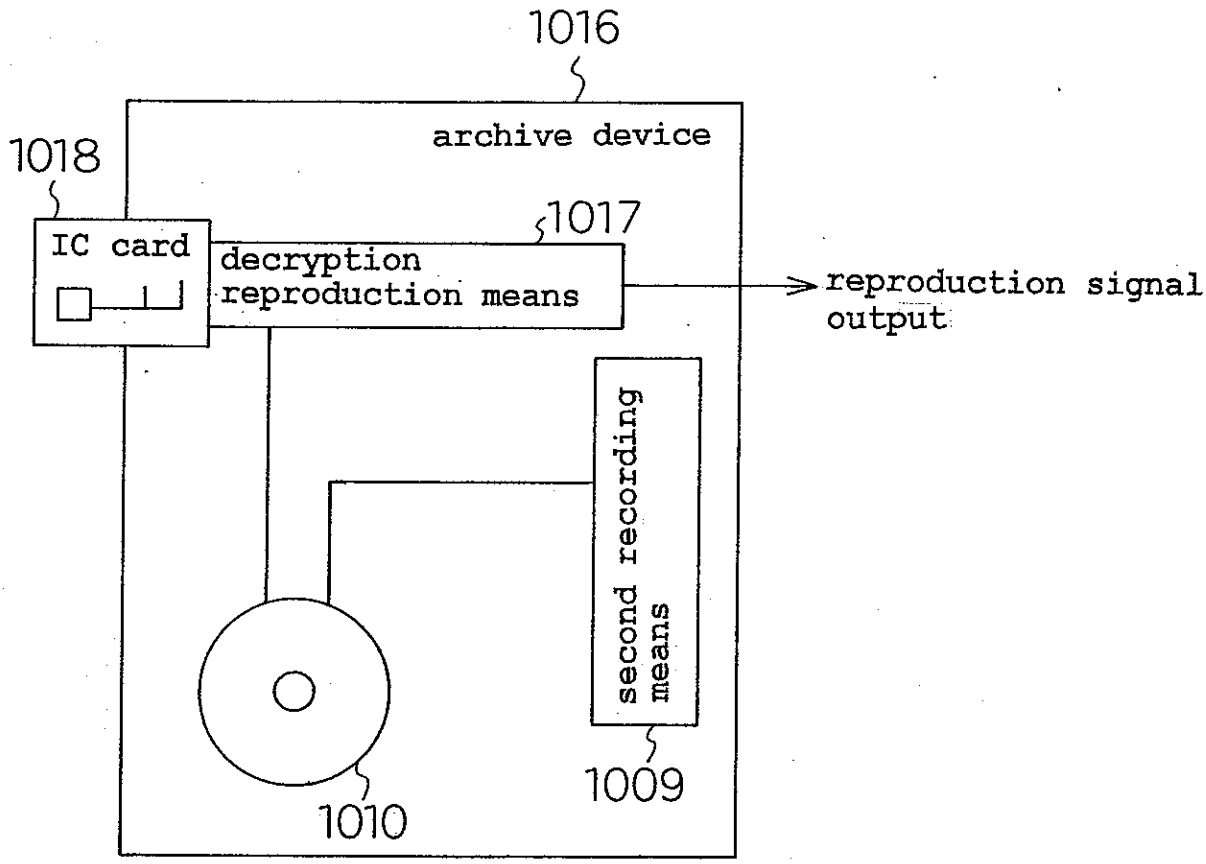
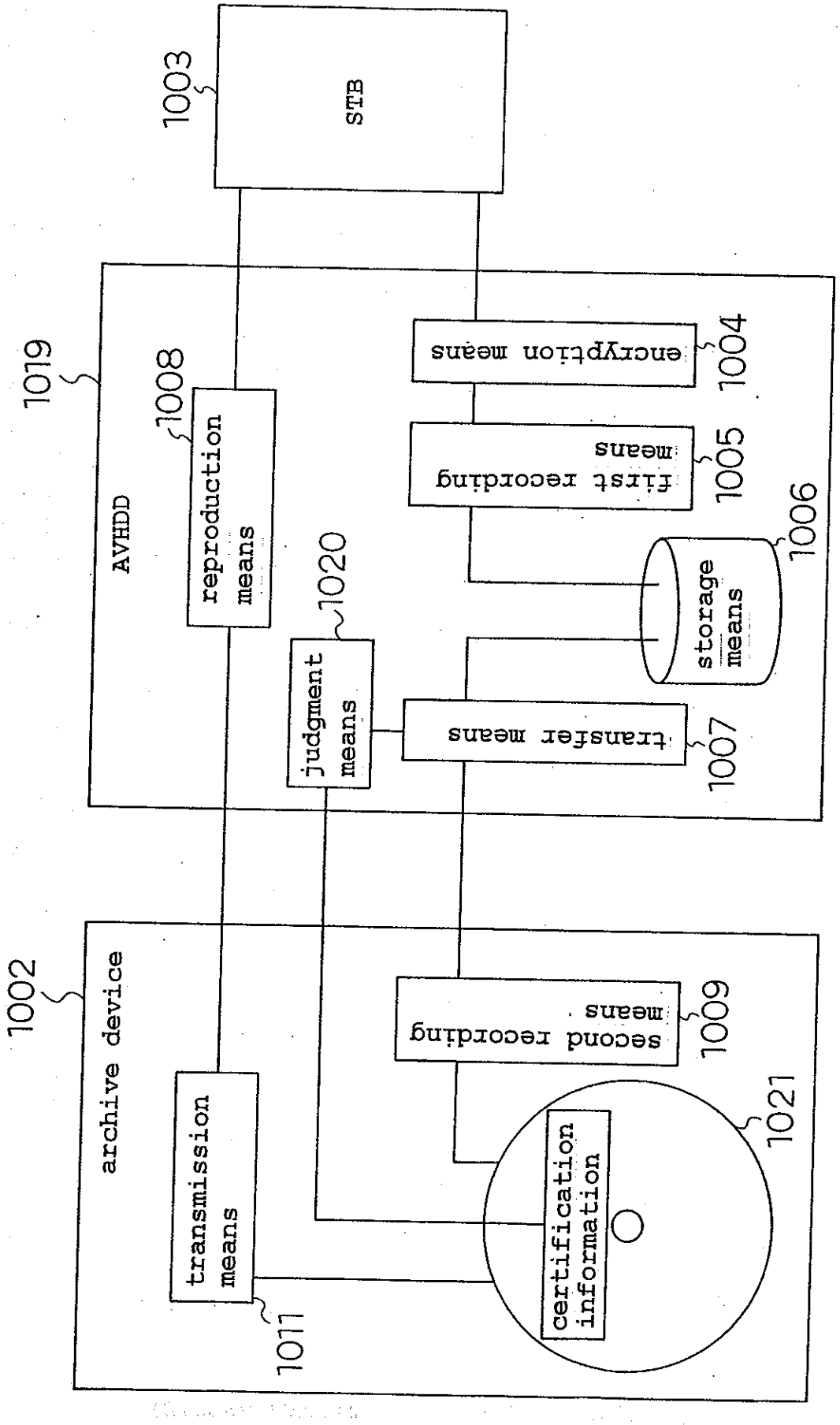

1016
archive device
1018
IC card
1017
decryption
reproduction means
reproduction signal
output
second recording
means
1009
1010

Fig. 24


1003
STB
1019
AVHDD
1008
reproduction means
encryption means
1004
first recording means
1005
1006
storage means
1020
judgment means
transfer means
1007
1002
archive device
second recording means
1009
1021
certification information
transmission means
1011

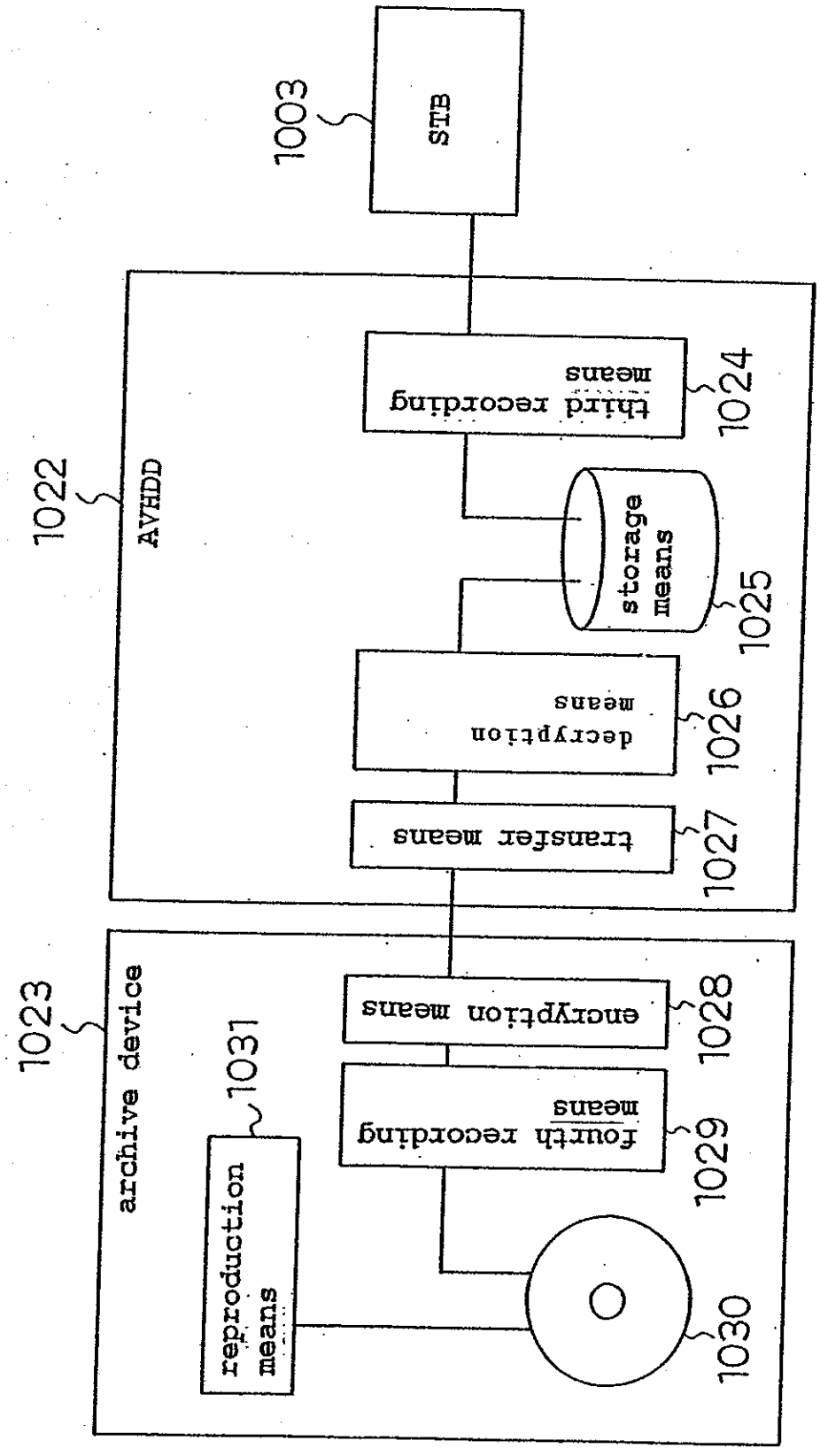

1003
STB
1022
AVHDD
third recording means
1024
storage means
1025
decryption means
1026
transfer means
1027
1023
archive device
encryption means
1028
1031
fourth recording means
1029
reproduction means
1030

Fig. 25

Fig. 26

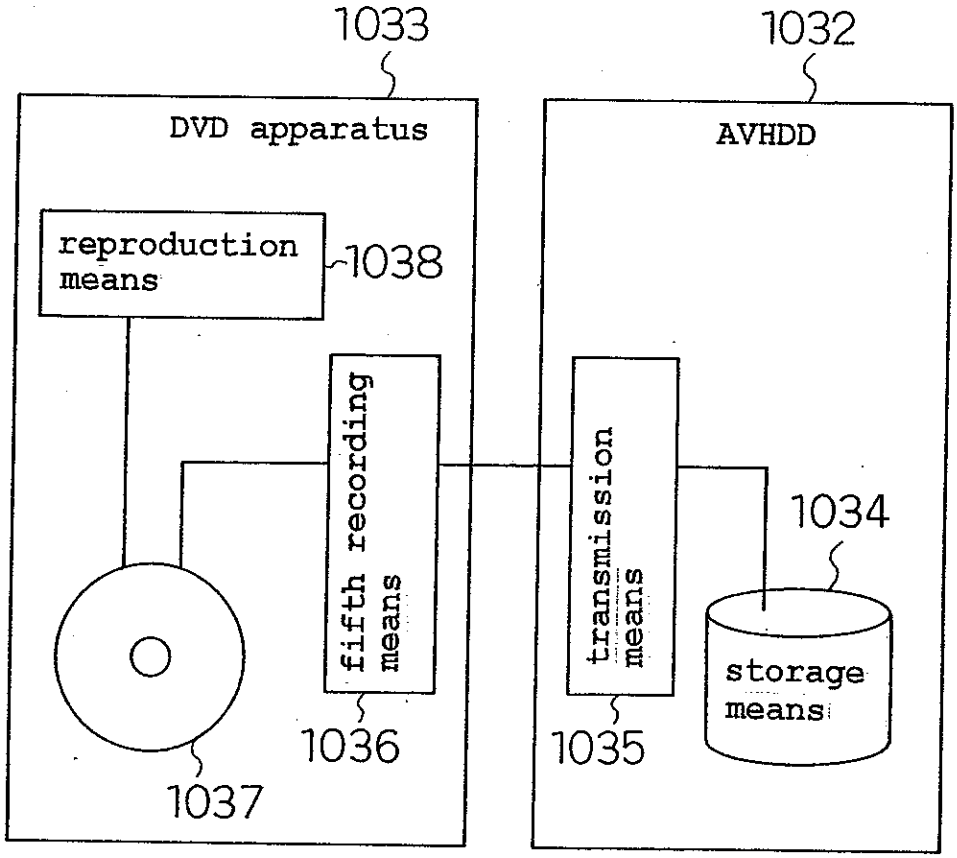

1033
1032
DVD apparatus
AVHDD
reproduction means
1038
fifth recording means
transmission means
1034
storage means
1036
1035
1037

Fig. 27

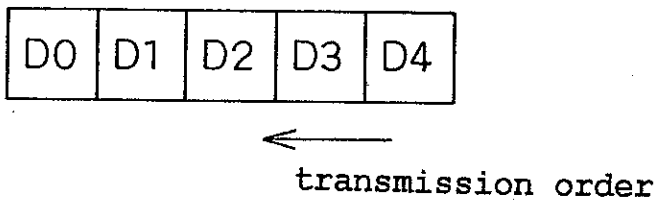

D0
D1
D2
D3
D4
transmission order

Fig. 28

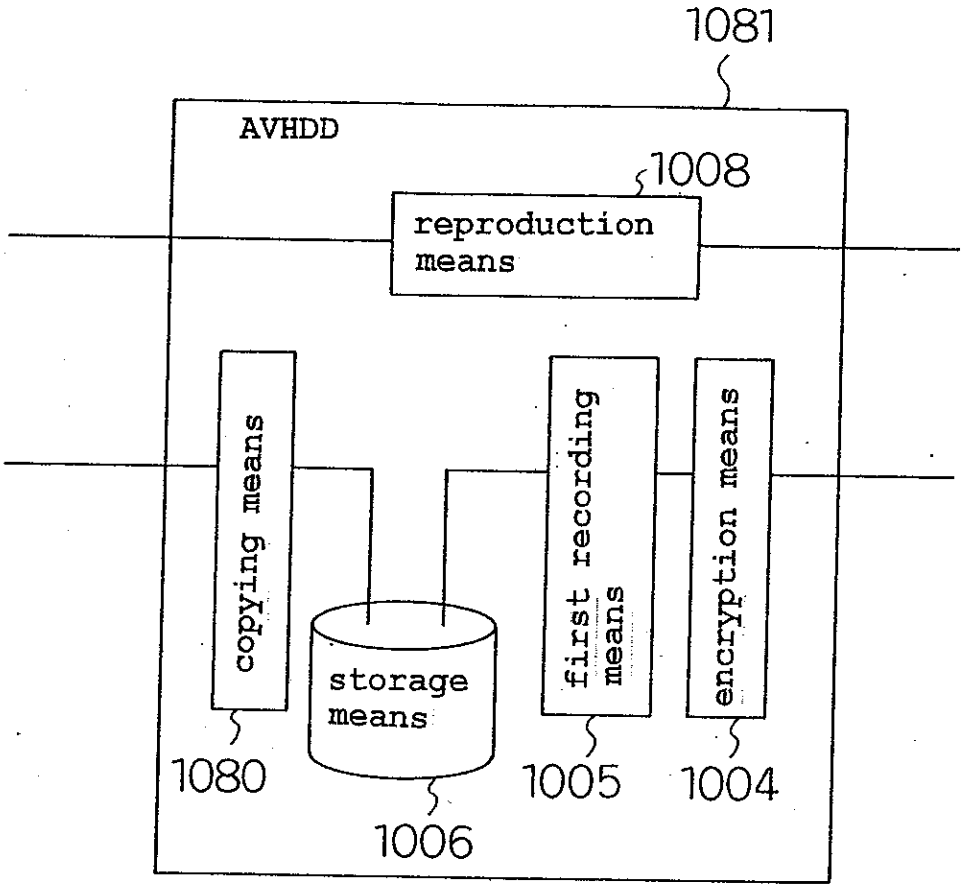
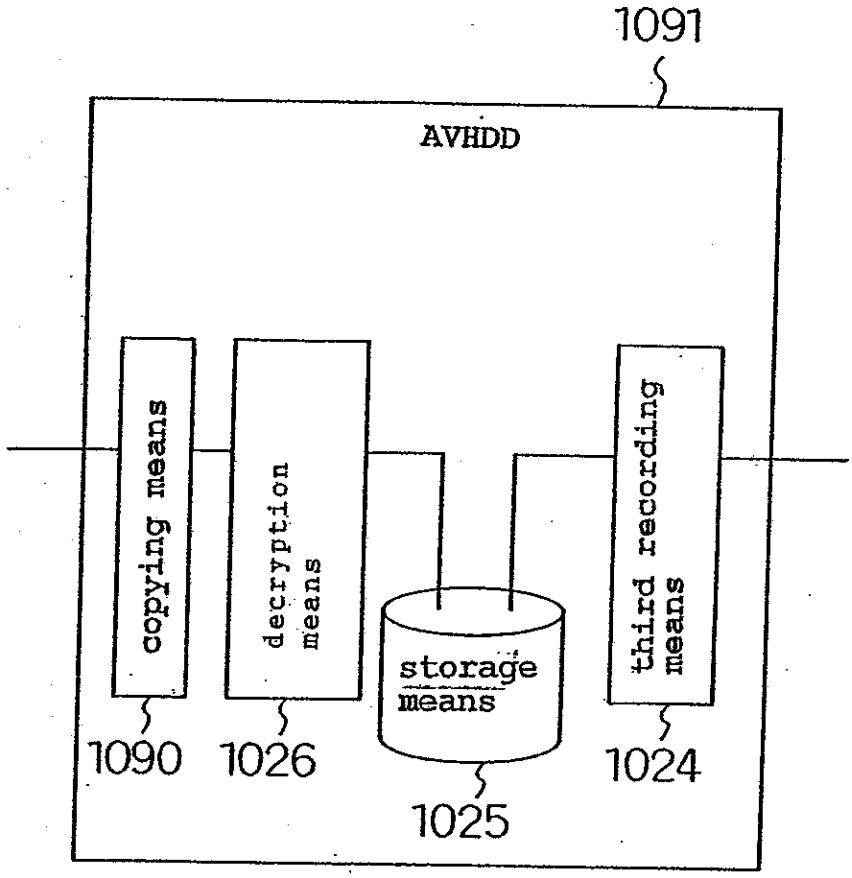

1081
AVHDD
1008
reproduction means
copying means
storage means
first recording means
encryption means
1080
1006
1005
1004

Fig. 29


1091
AVHDD
copying means
decryption means
storage means
third recording means
1090
1026
1025
1024

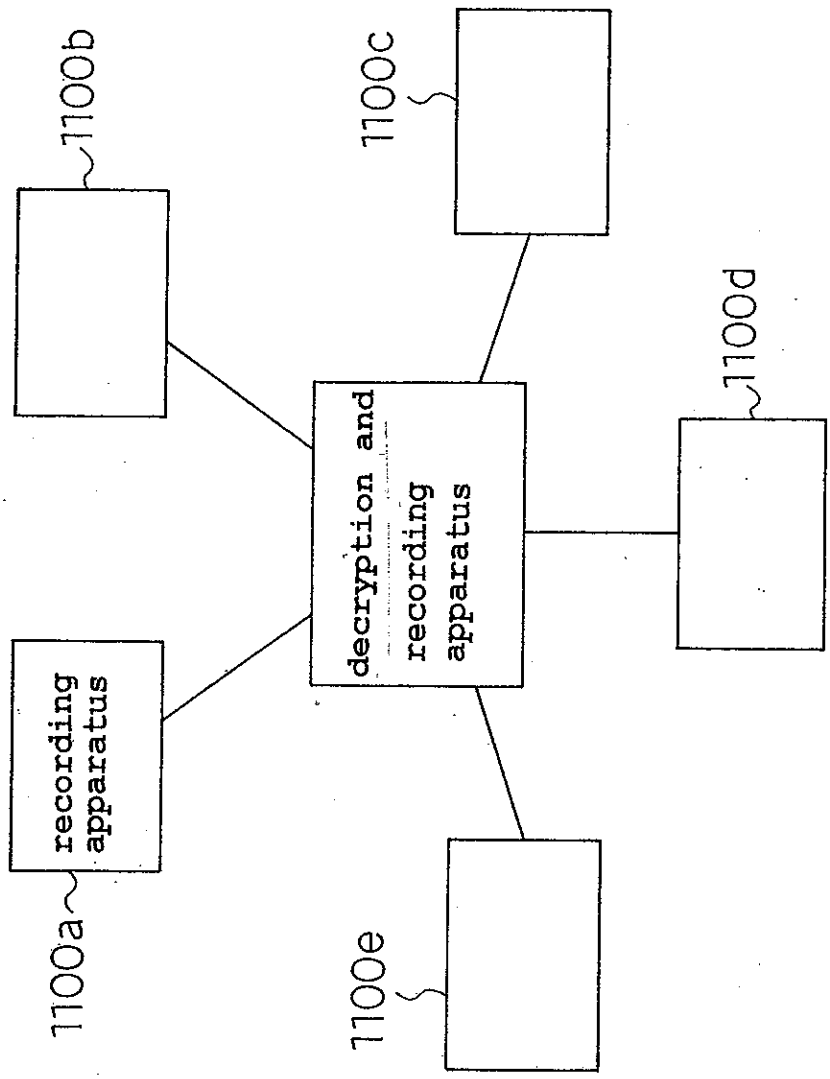

1100b
1100c
1100d
decryption and recording apparatus
recording apparatus
1100a
1100e

Fig. 30

Fig. 31

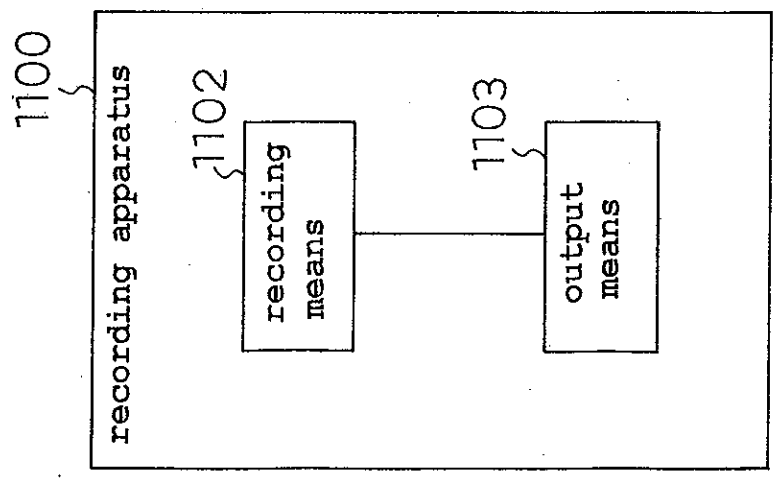

1100
recording apparatus
1102
recording means
1103
output means

Fig. 32

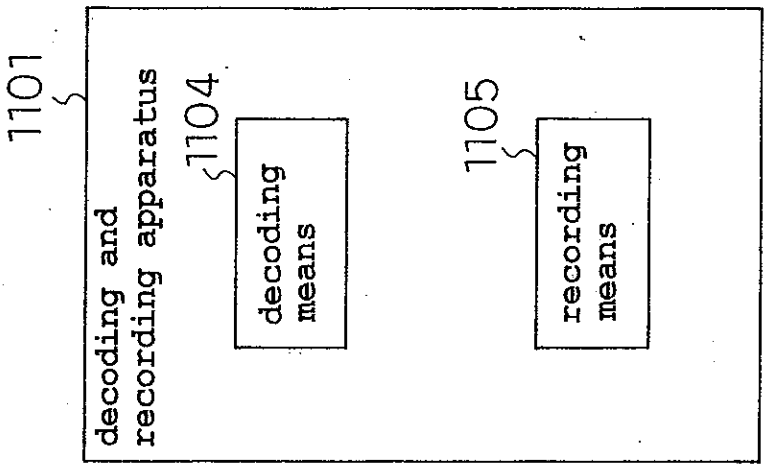

1101
decoding and recording apparatus
1104
decoding means
1105
recording means

Fig. 33

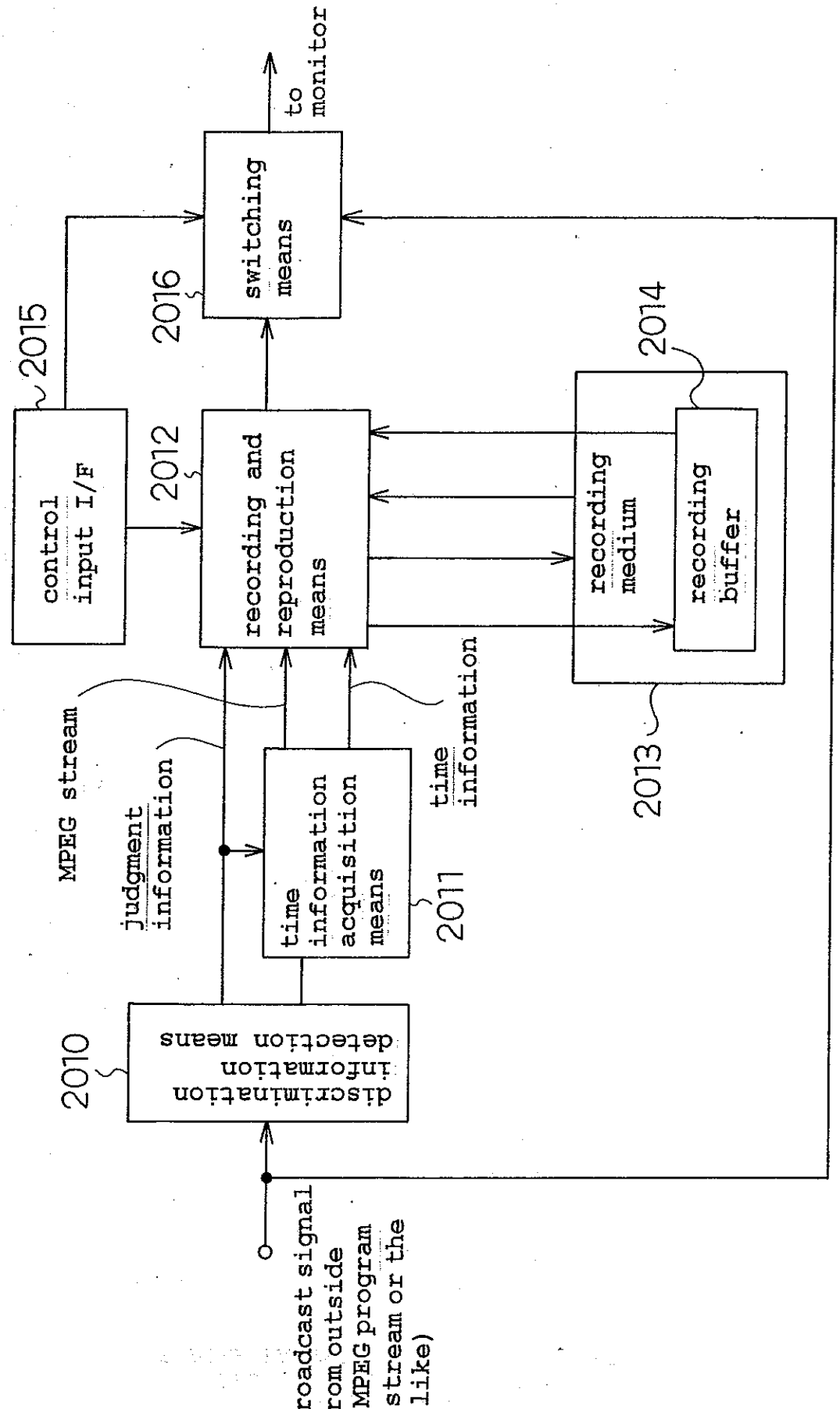

broadcast signal from outside (MPEG program stream or the like)
discrimination information detection means
2010
time information acquisition means
2011
MPEG stream
judgment information
time information
recording medium
recording buffer
2013
2014
control input I/F
2015
recording and reproduction means
2012
switching means
2016
to monitor

Fig. 34

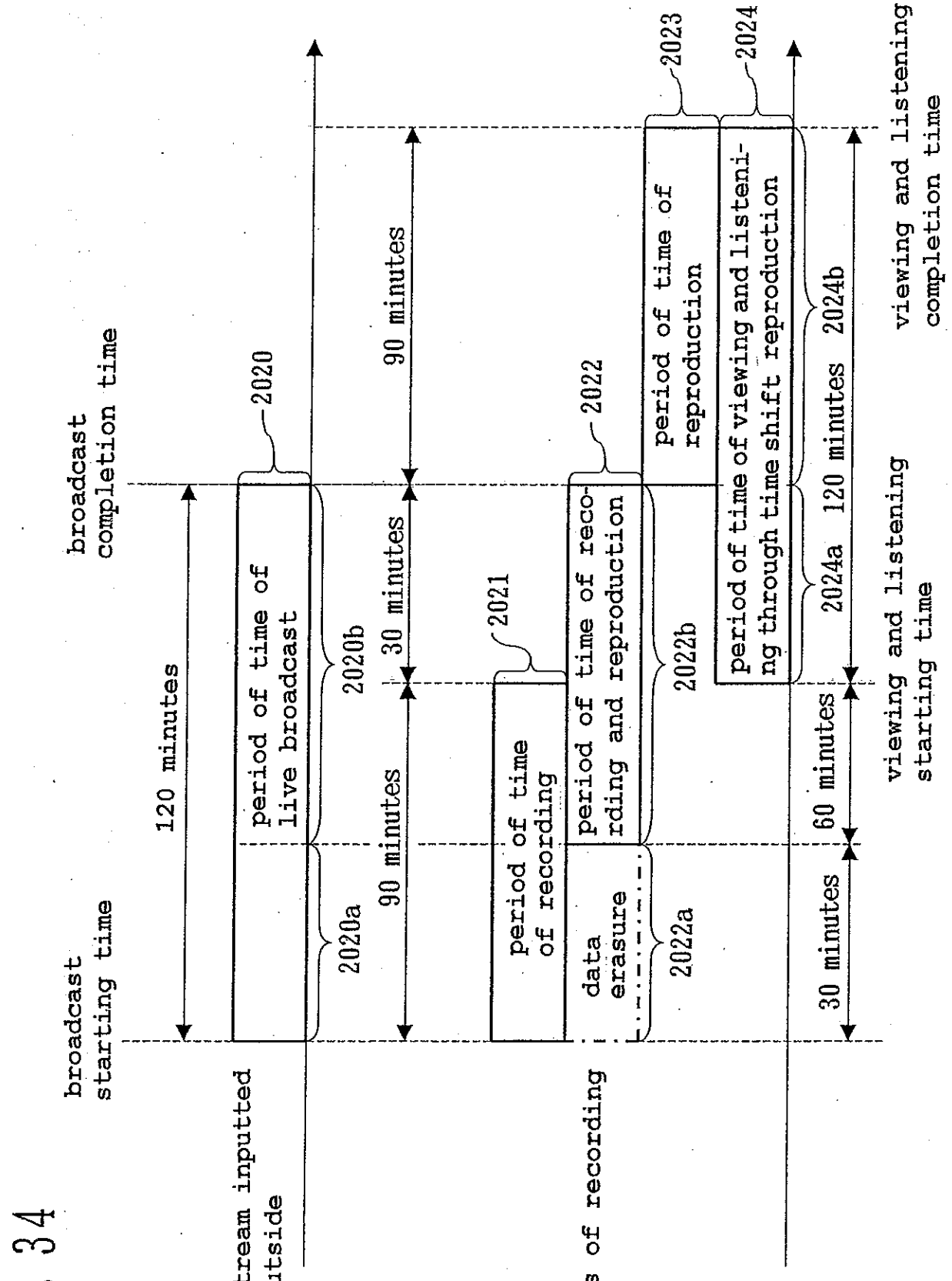
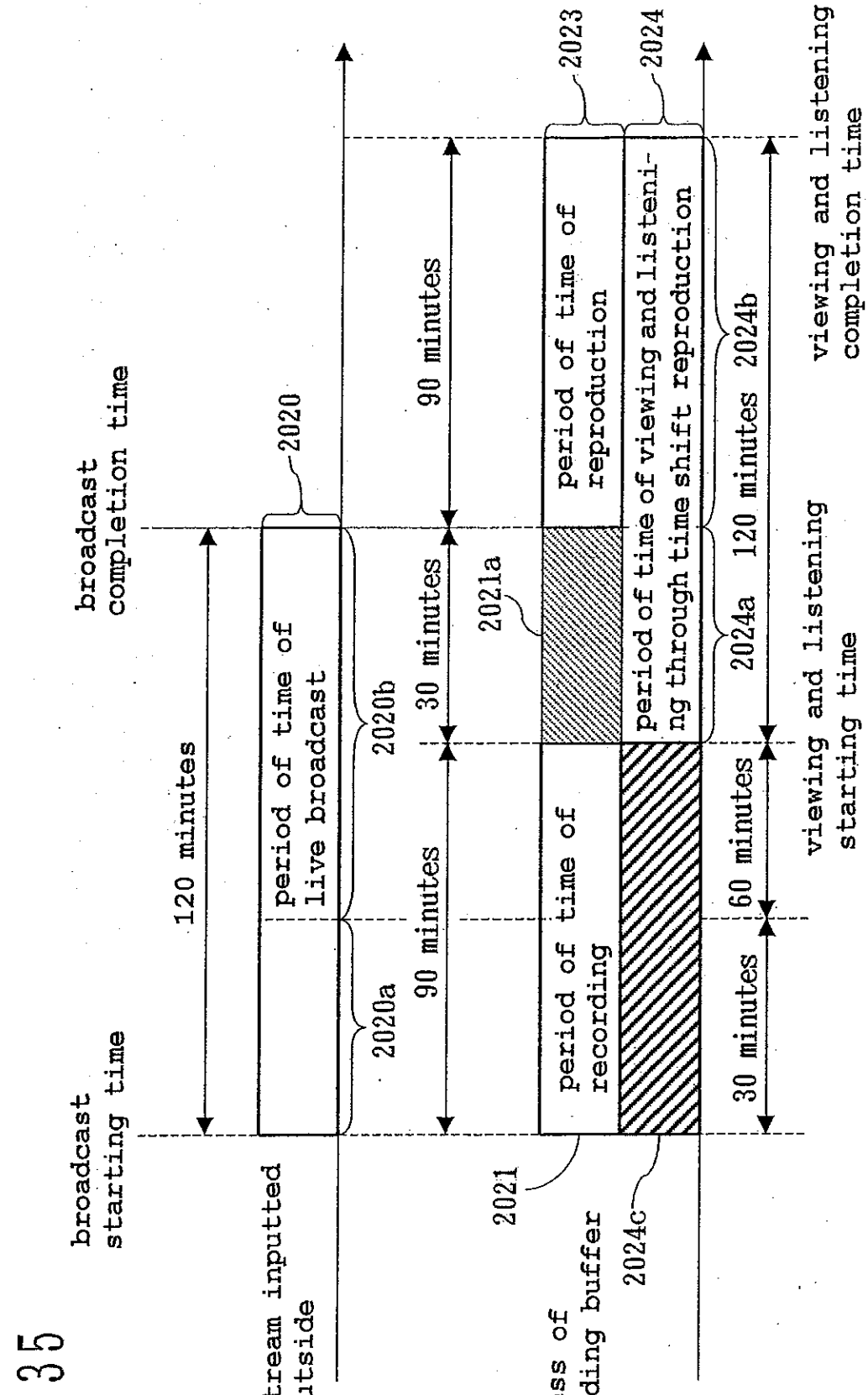

MPEG stream inputted from outside
broadcast starting time
broadcast completion time
120 minutes
2020
period of time of live broadcast
2020a
2020b
90 minutes
30 minutes
90 minutes
2021
period of time of recording
2022
period of time of recording and reproduction
data erasure
2022a
2022b
2023
period of time of reproduction
2024
period of time of viewing and listening through time shift reproduction
2024a
120 minutes
2024b
60 minutes
30 minutes
viewing and listening starting time
viewing and listening completion time
process of recording buffer

Fig. 35


broadcast starting time
broadcast completion time
120 minutes
2020
period of time of live broadcast
2020a
2020b
90 minutes
90 minutes
30 minutes
2021a
2023
period of time of reproduction
2024
period of time of viewing and listening through time shift reproduction
2024a
120 minutes
2024b
viewing and listening starting time
viewing and listening completion time
60 minutes
30 minutes
MPEG stream inputted from outside
process of recording buffer
2021
period of time of recording
2024c

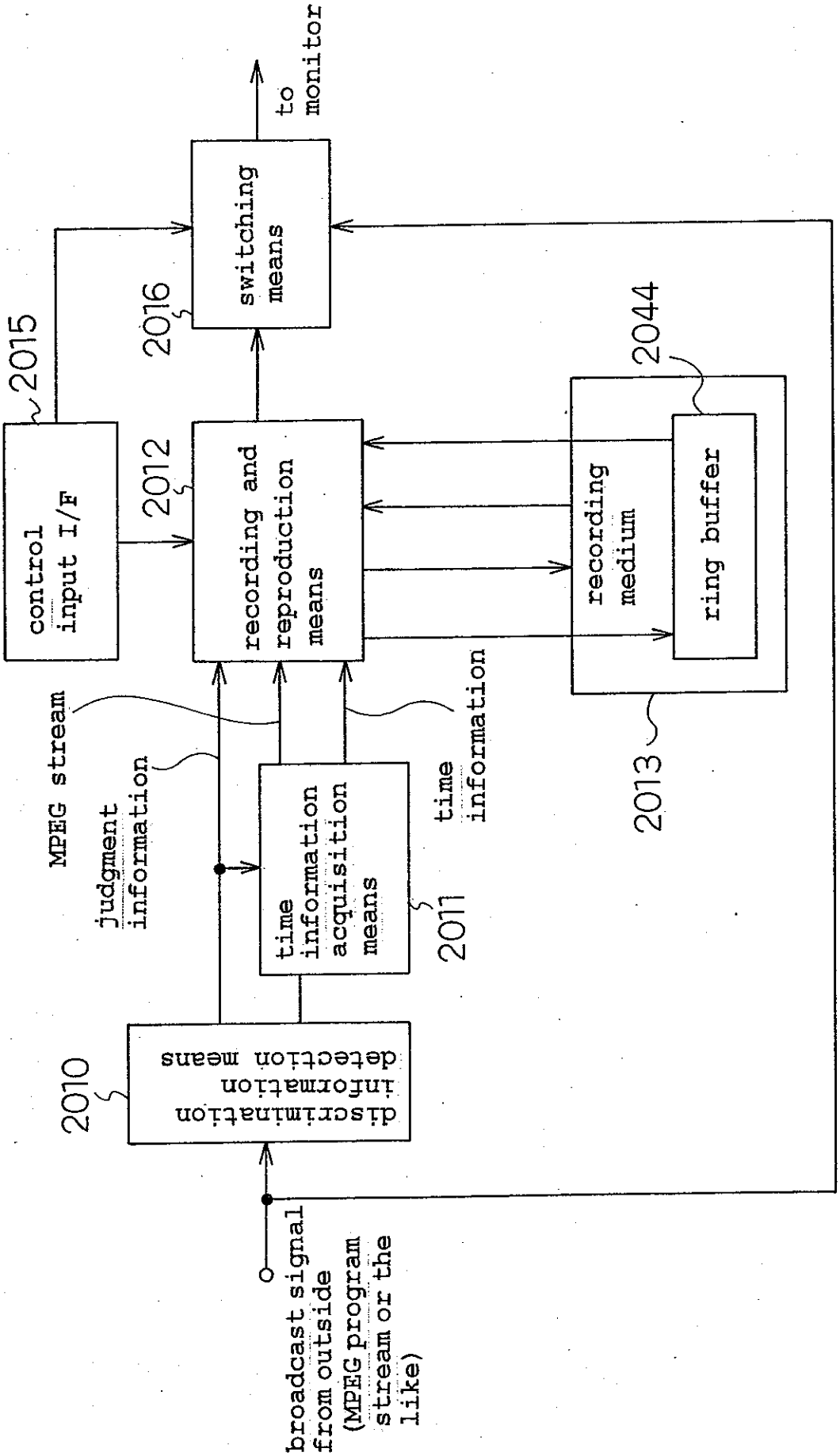

broadcast signal from outside (MPEG program stream or the like)
discrimination information detection means
2010
time information acquisition means
2011
MPEG stream
judgment information
time information
recording and reproduction means
2012
control input I/F
2015
switching means
2016
to monitor
recording medium
ring buffer
2044
2013

Fig. 36

Fig. 37

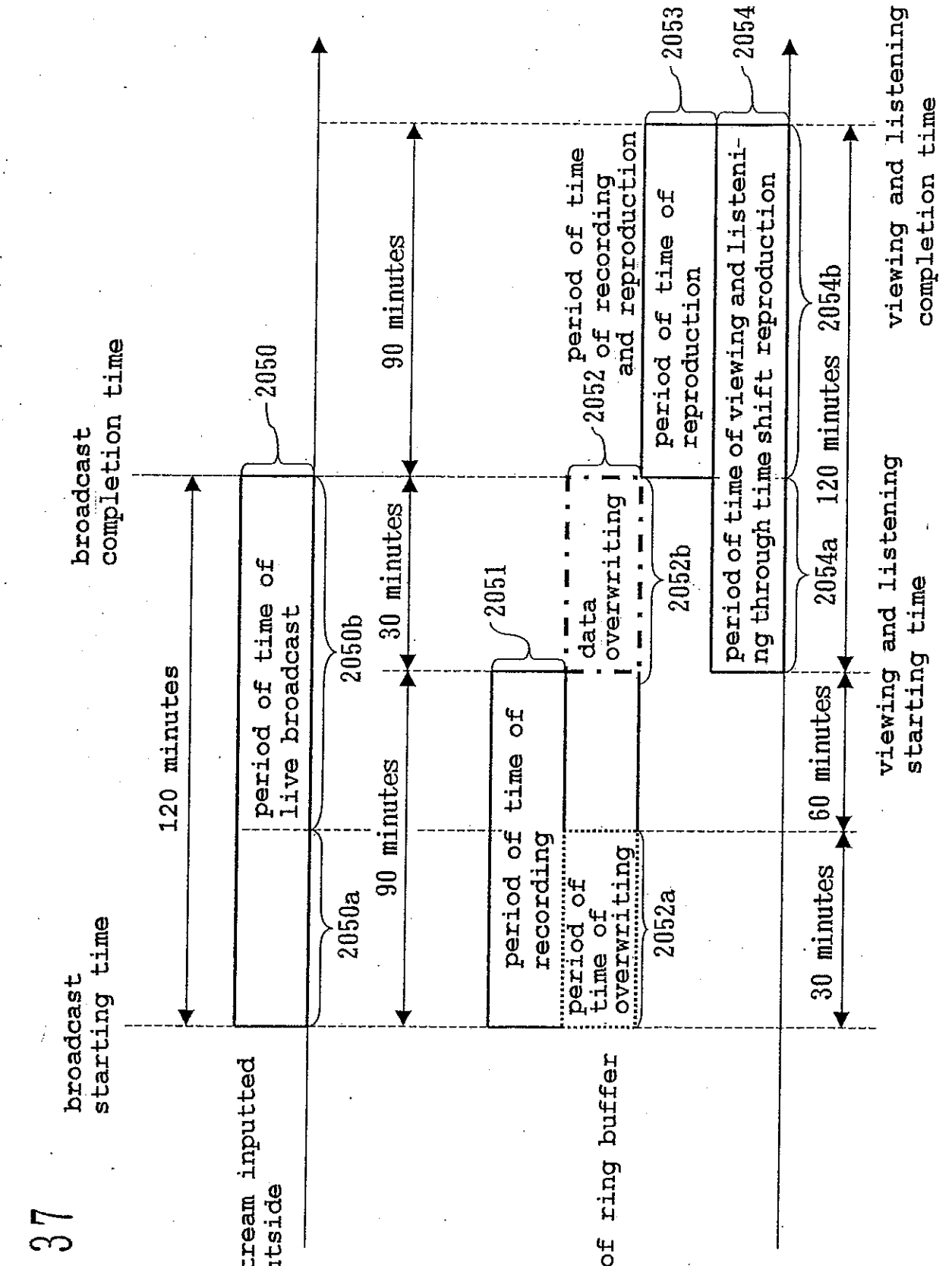

broadcast starting time
broadcast completion time
MPEG stream inputted from outside
process of ring buffer
viewing and listening starting time
viewing and listening completion time
120 minutes
90 minutes
30 minutes
90 minutes
60 minutes
30 minutes
2050
2050a
2050b
2051
2052
2052a
2052b
2053
2054
2054a
2054b
period of time of live broadcast
period of time of recording
period of time of overwriting
data overwriting
period of time of recording and reproduction
period of time of reproduction
period of time of viewing and listening through time shift reproduction
120 minutes

Fig. 38

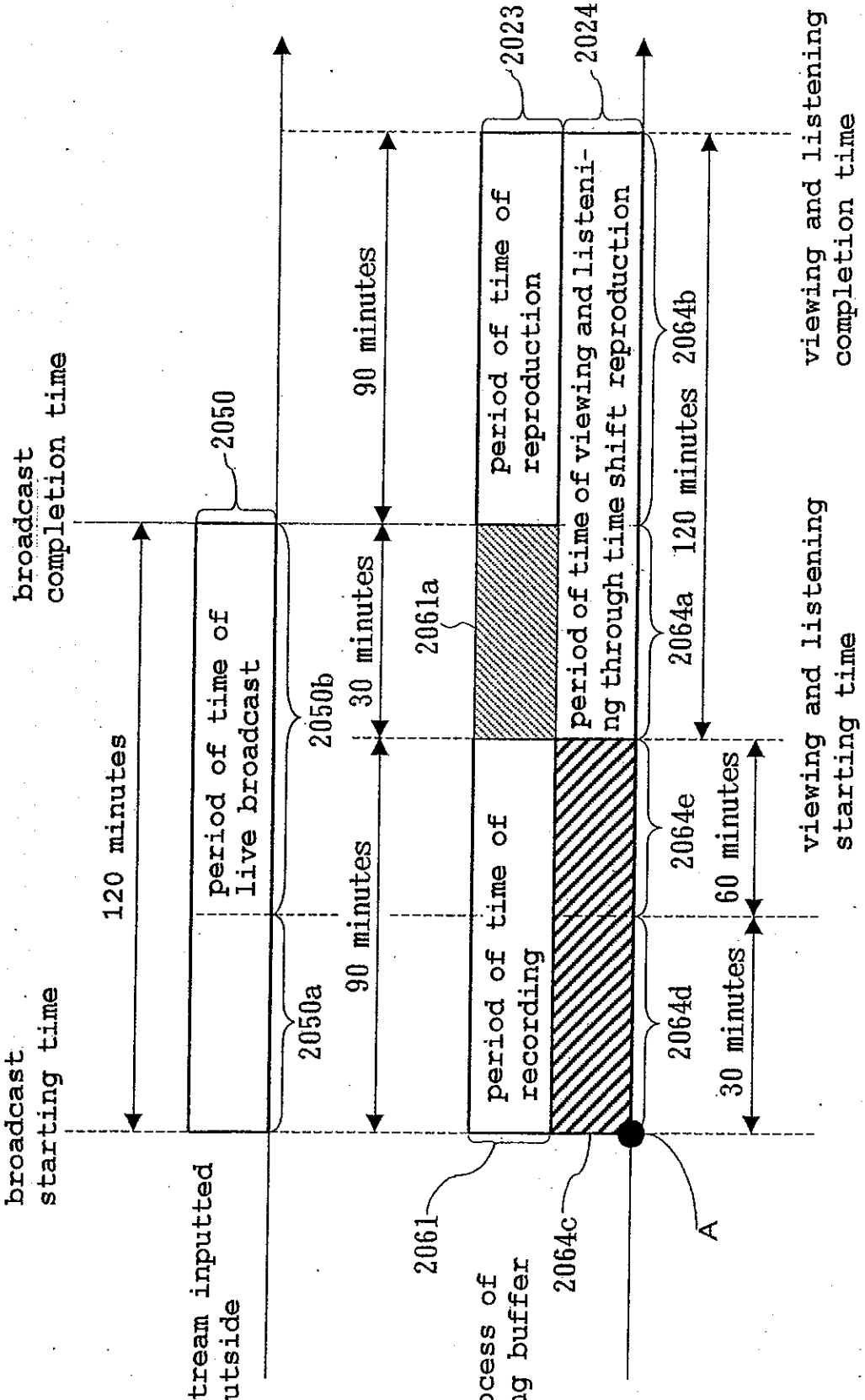
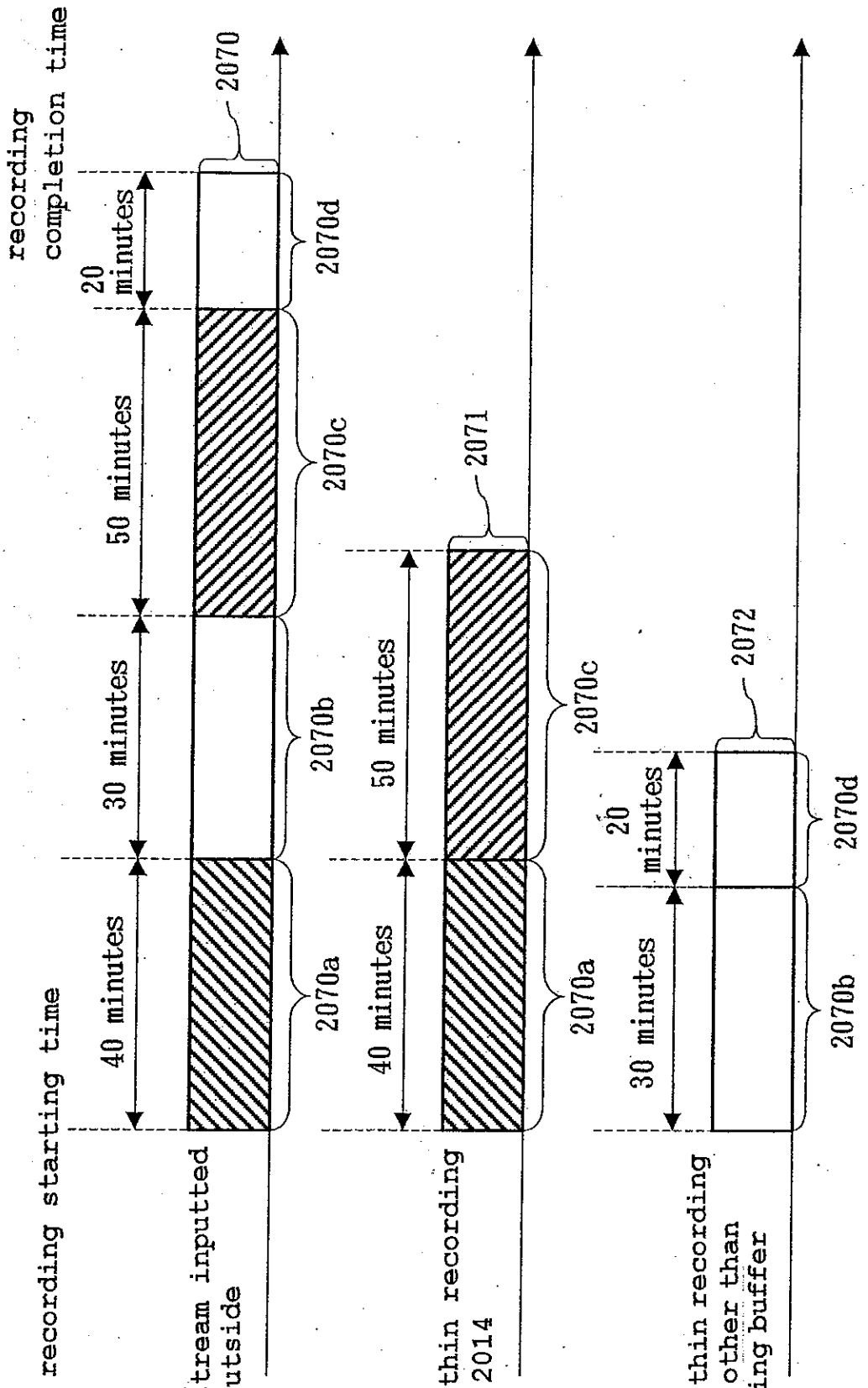

broadcast starting time
broadcast completion time
120 minutes
2050
period of time of live broadcast
2050a
2050b
90 minutes
30 minutes
90 minutes
2061a
2023
2024
period of time of reproduction
period of time of viewing and listening through time shift reproduction
2064a
120 minutes
2064b
viewing and listening starting time
viewing and listening completion time
2064e
60 minutes
2064d
30 minutes
MPEG stream inputted from outside
process of ring buffer
period of time of recording
2061
2064c
A

Fig. 39


recording starting time
recording completion time
40 minutes
30 minutes
50 minutes
20 minutes
2070a
2070b
2070c
2070d
2070
2071
2072
MPEG stream inputted from outside
data within recording buffer 2014
data within recording medium other than recording buffer

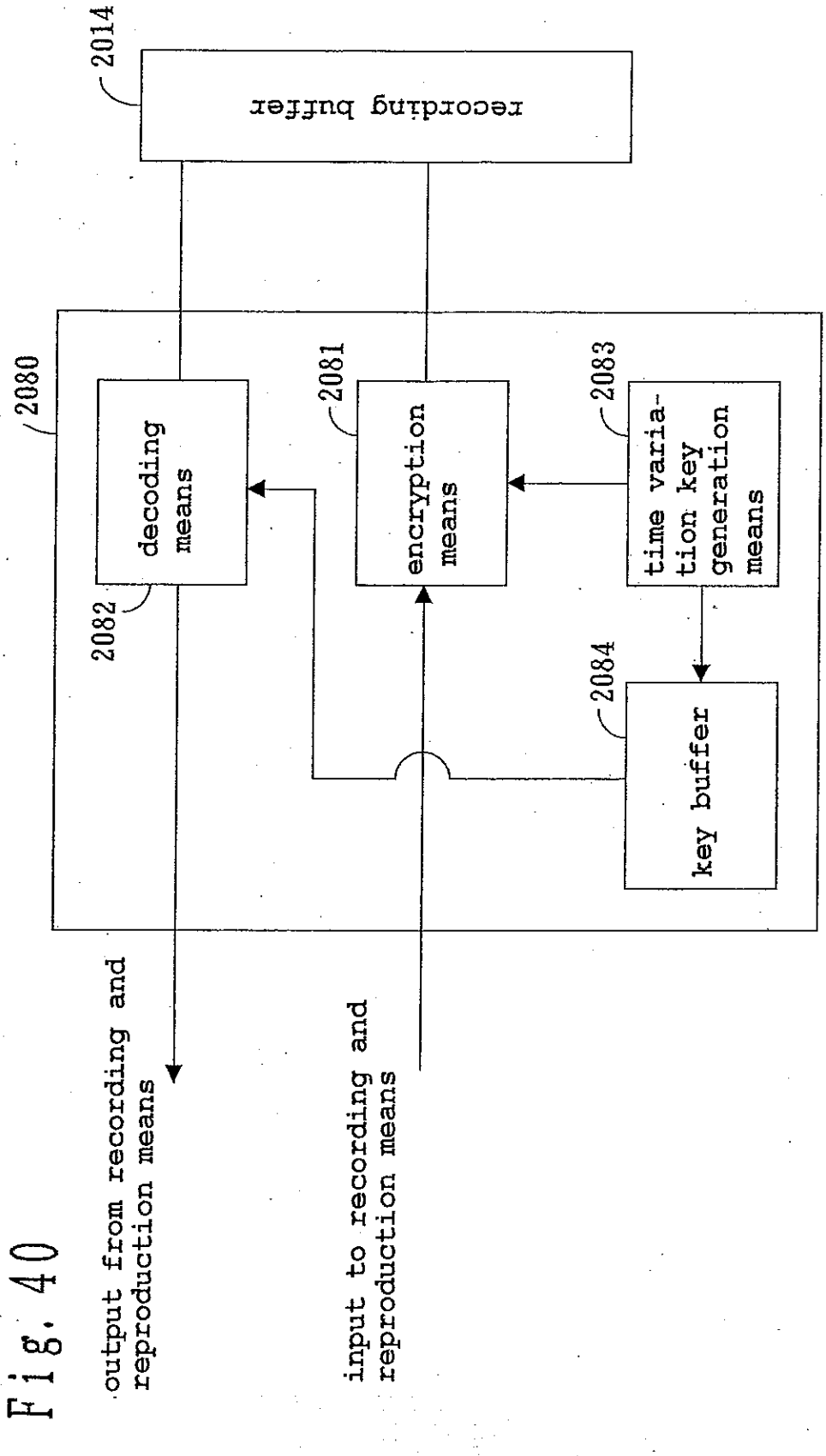

2014
recording buffer
2080
2081
2083
decoding means
encryption means
time variation key generation means
2082
2084
key buffer
output from recording and reproduction means
input to recording and reproduction means

Fig. 40

Fig. 41

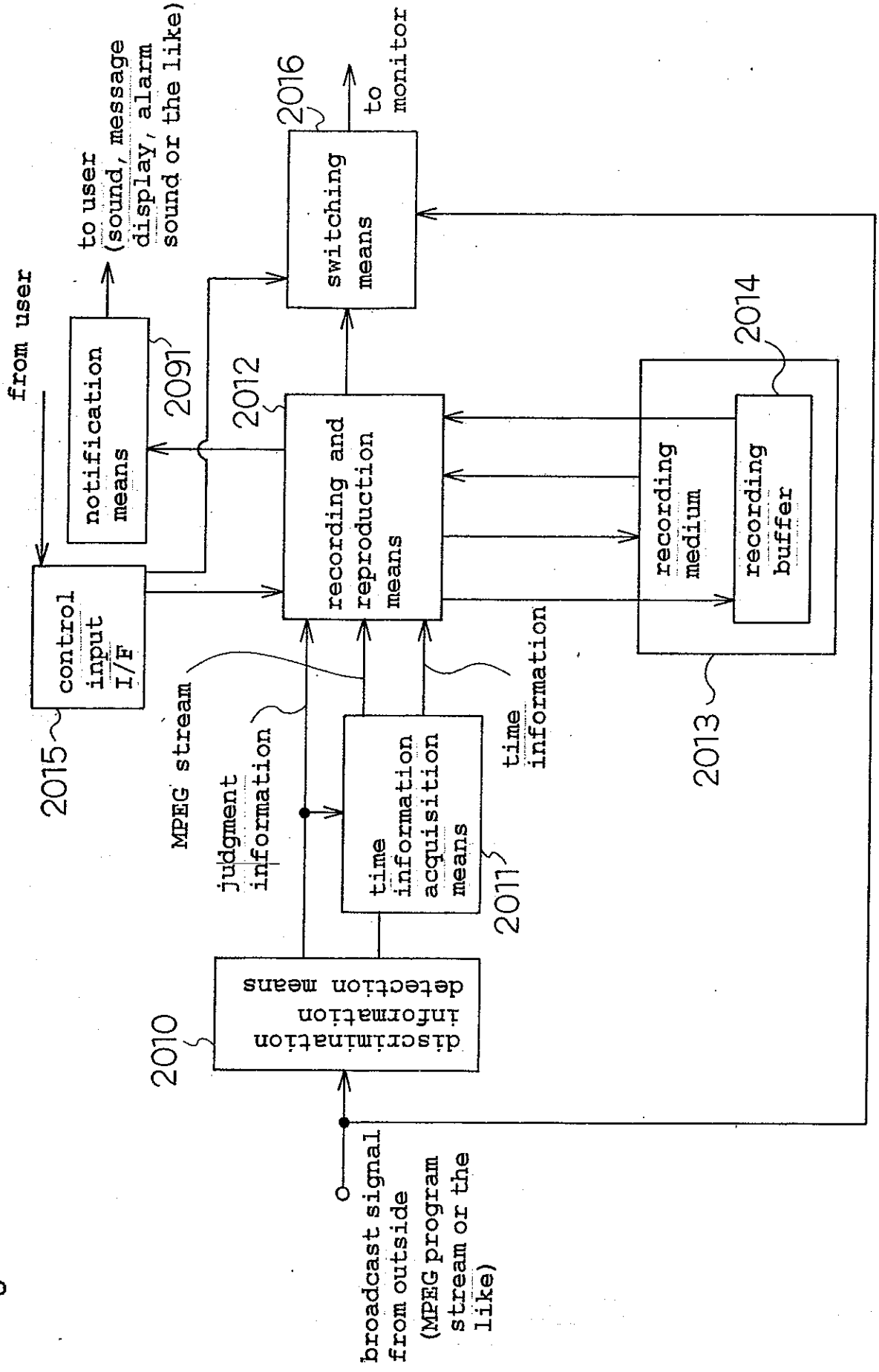

broadcast signal from outside (MPEG program stream or the like)
discrimination information detection means
2010
time information acquisition means
2017
judgment information
MPEG stream
time information
control input I/F
2015
notification means
2091
recording and reproduction means
2012
switching means
2016
to monitor
to user (sound, message display, alarm sound or the like)
from user
recording medium
recording buffer
2014
2013

Fig. 42

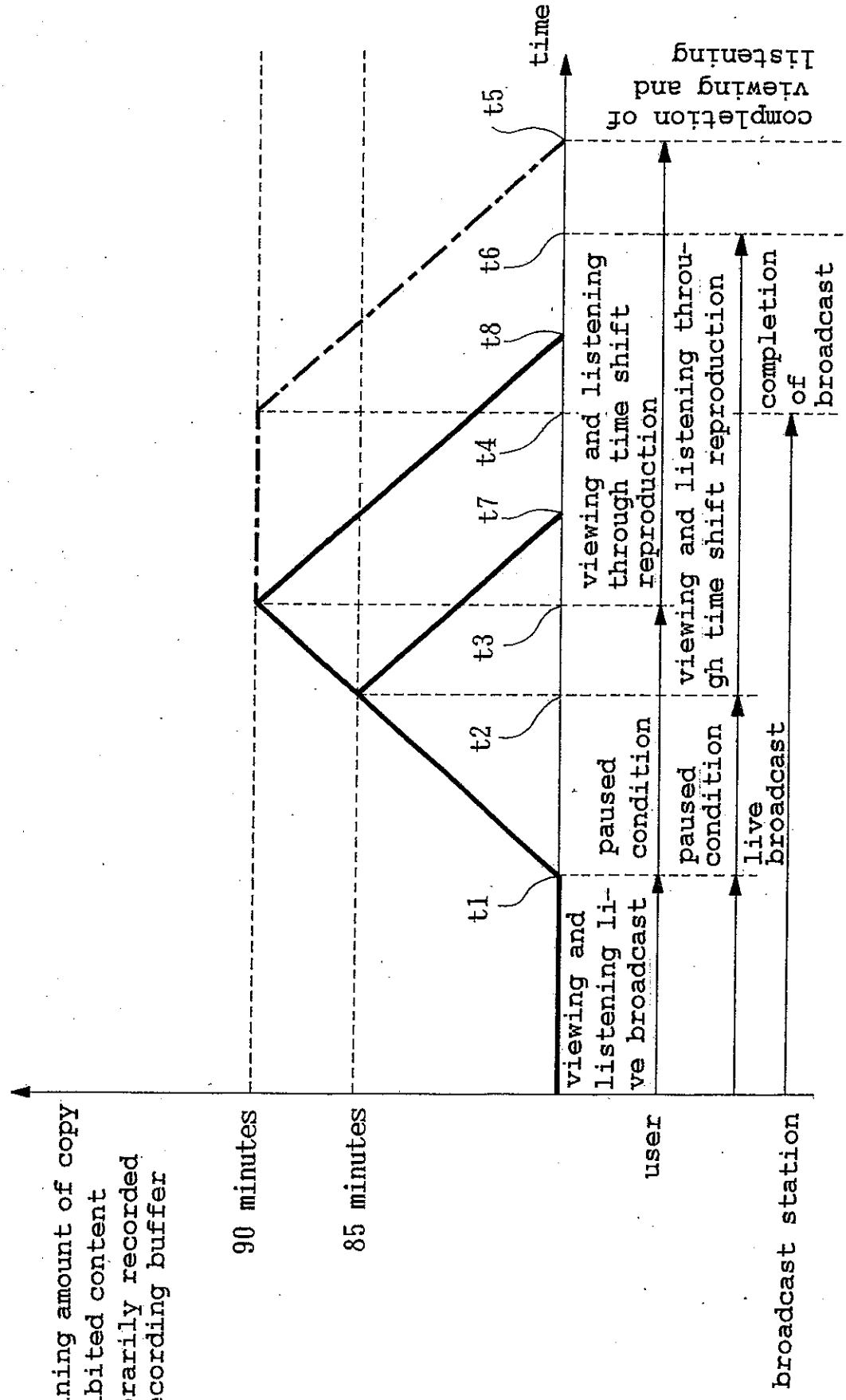
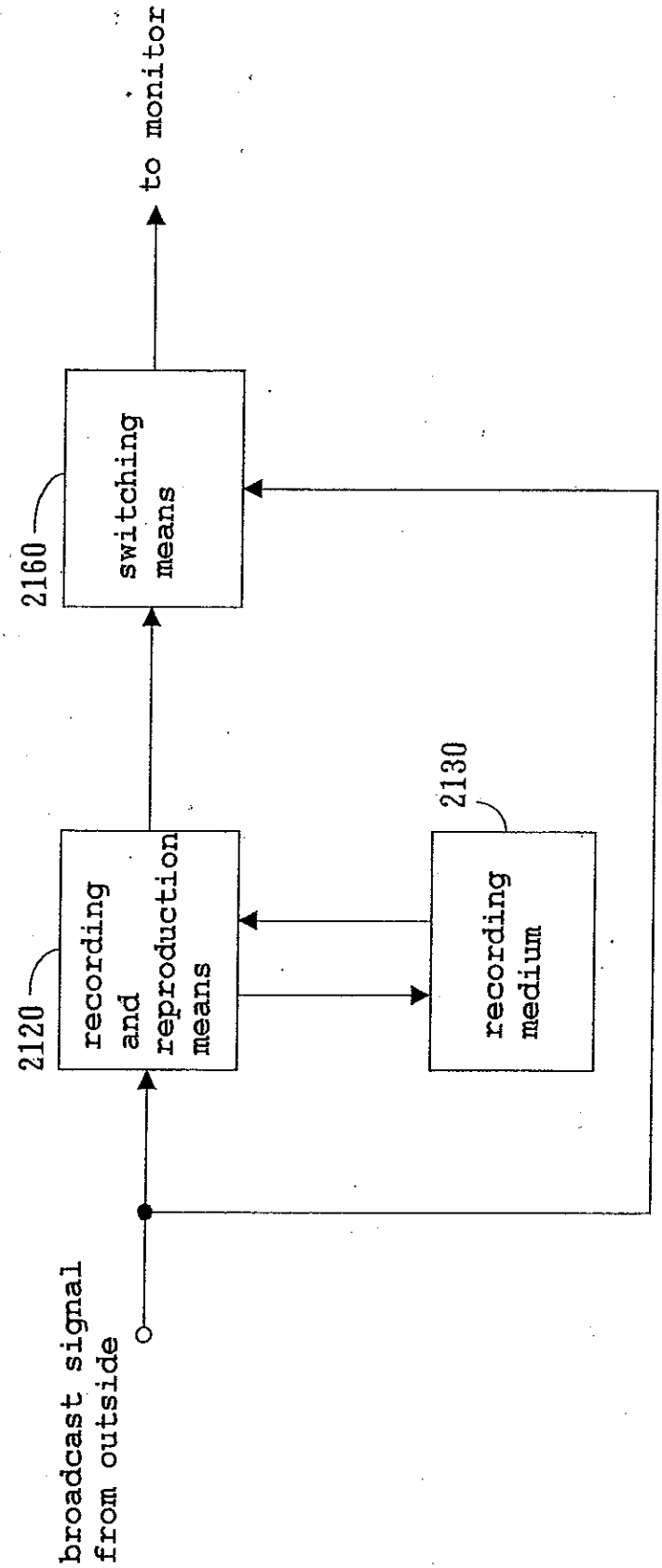

remaining amount of copy prohibited content temporarily recorded in recording buffer
90 minutes
85 minutes
user
broadcast station
time
t1
t2
t3
t4
t5
t6
t7
t8
viewing and listening live broadcast
paused condition
paused condition
live broadcast
viewing and listening through time shift reproduction
viewing and listening through time shift reproduction
completion of broadcast
completion of viewing and listening

Fig. 43


broadcast signal
from outside
2120
recording
and
reproduction
means
2130
recording
medium
2160
switching
means
to monitor