FIG. 1

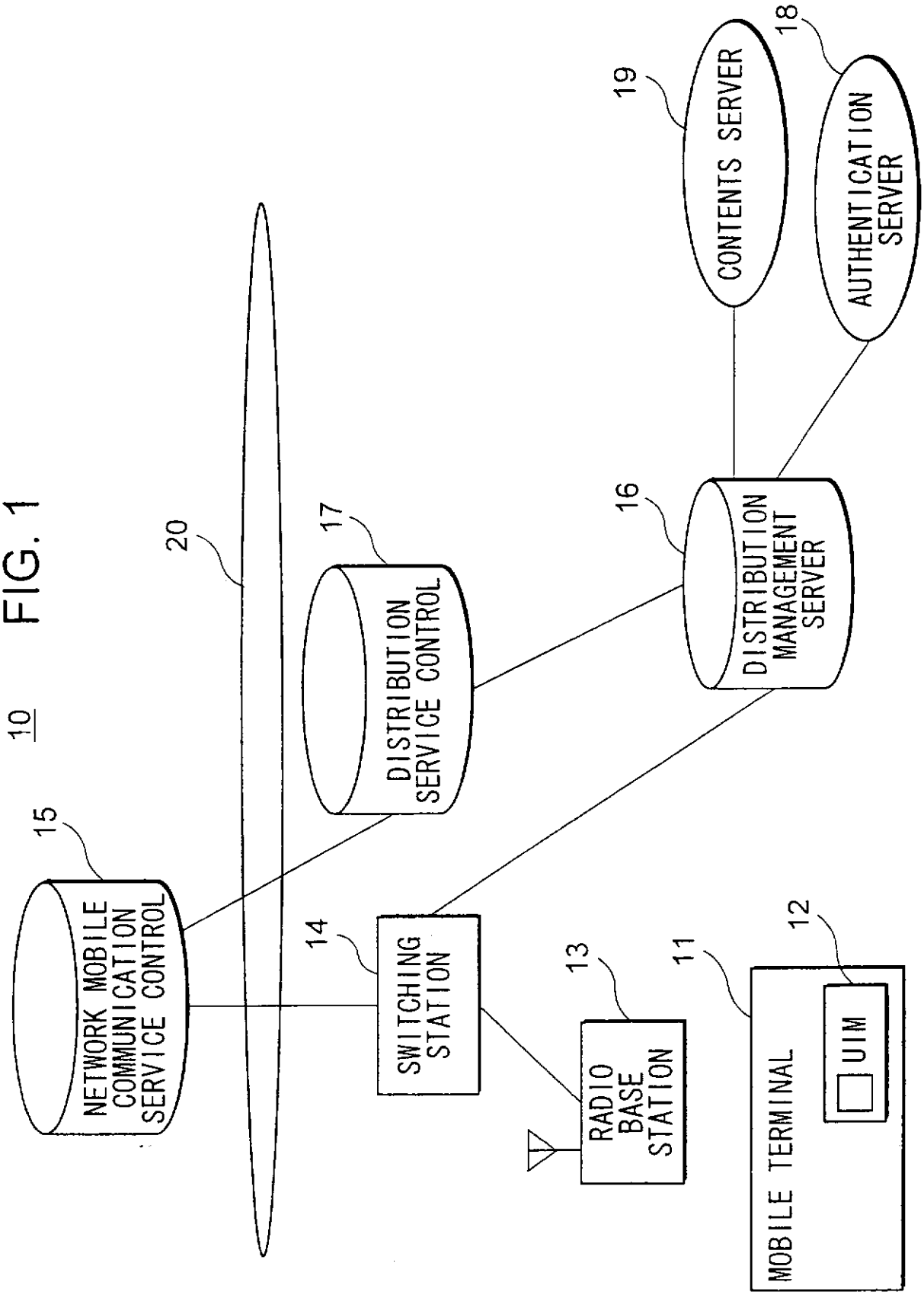

10
NETWORK MOBILE COMMUNICATION SERVICE CONTROL
15
SWITCHING STATION
14
RADIO BASE STATION
13
MOBILE TERMINAL
11
UIM
12
20
DISTRIBUTION SERVICE CONTROL
17
DISTRIBUTION MANAGEMENT SERVER
16
CONTENTS SERVER
19
AUTHENTICATION SERVER
18

FIG. 2

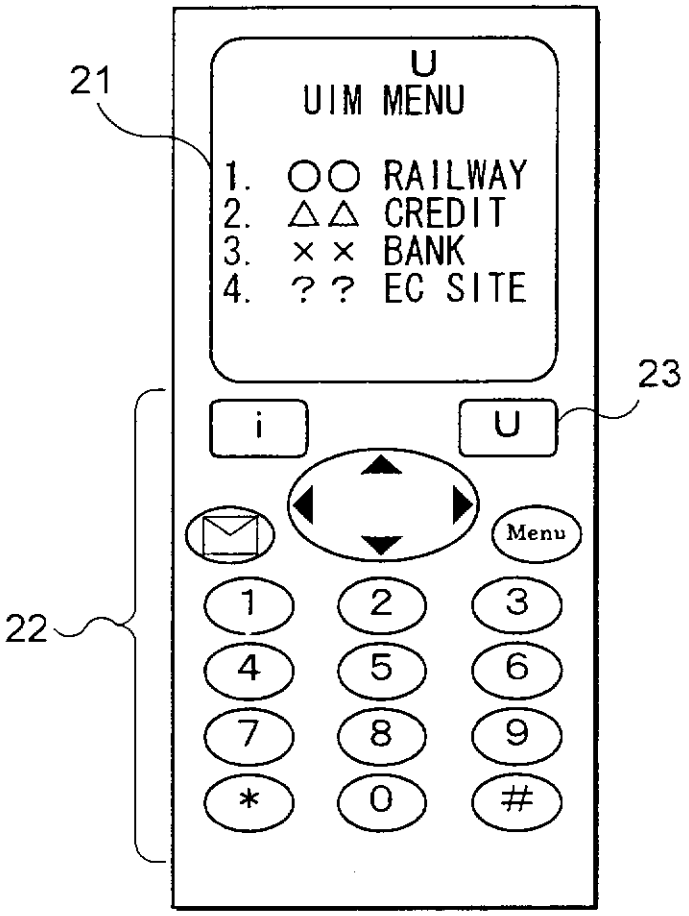

11
21
U
UIM MENU
1. ○○ RAILWAY
2. △△ CREDIT
3. × × BANK
4. ? ? EC SITE
23
i
U
Menu
22
1
2
3
4
5
6
7
8
9
*
0
#

FIG. 3

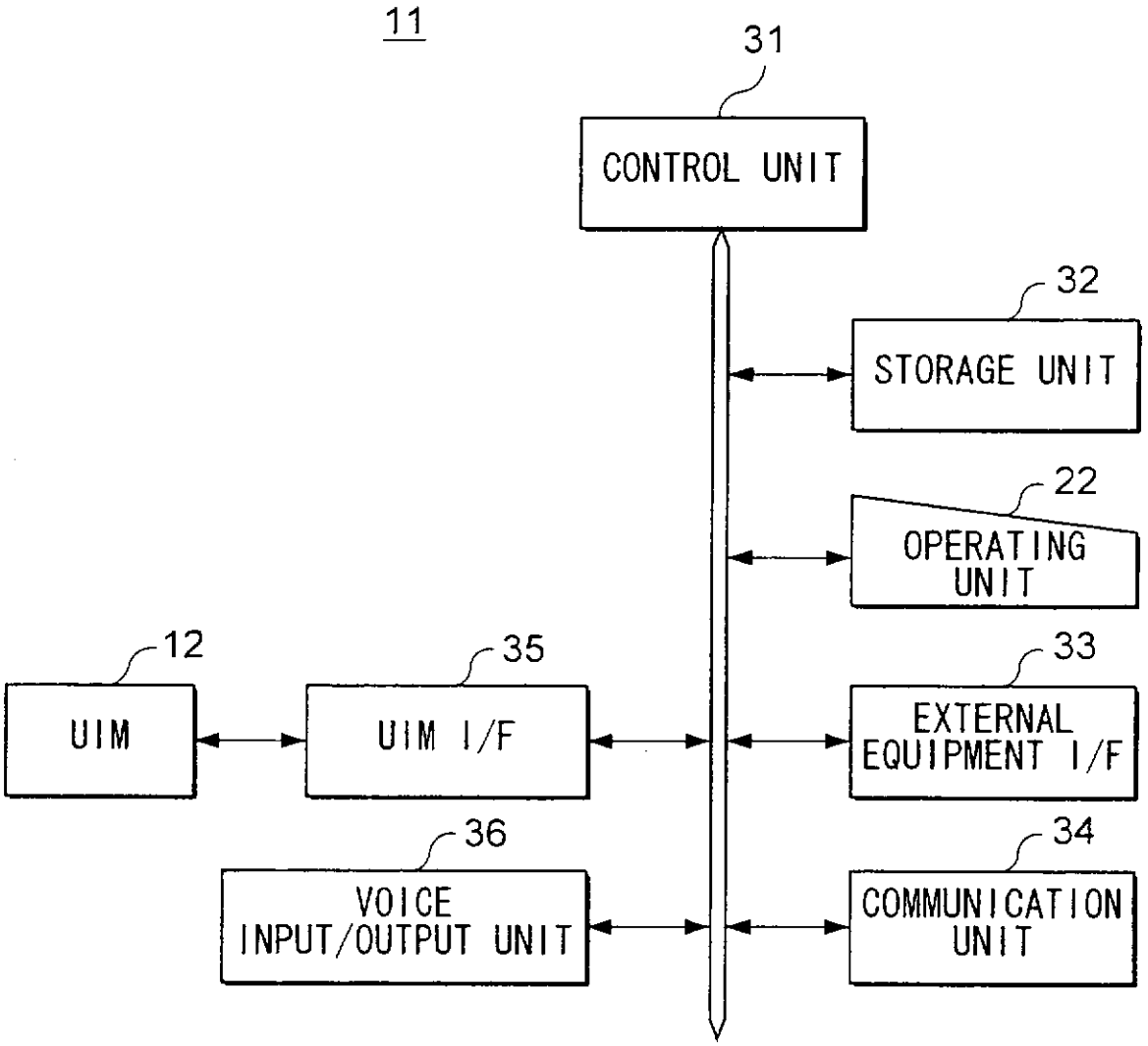

11
31
CONTROL UNIT
32
STORAGE UNIT
22
OPERATING UNIT
12
UIM
35
UIM I/F
33
EXTERNAL EQUIPMENT I/F
36
VOICE INPUT/OUTPUT UNIT
34
COMMUNICATION UNIT

FIG. 4

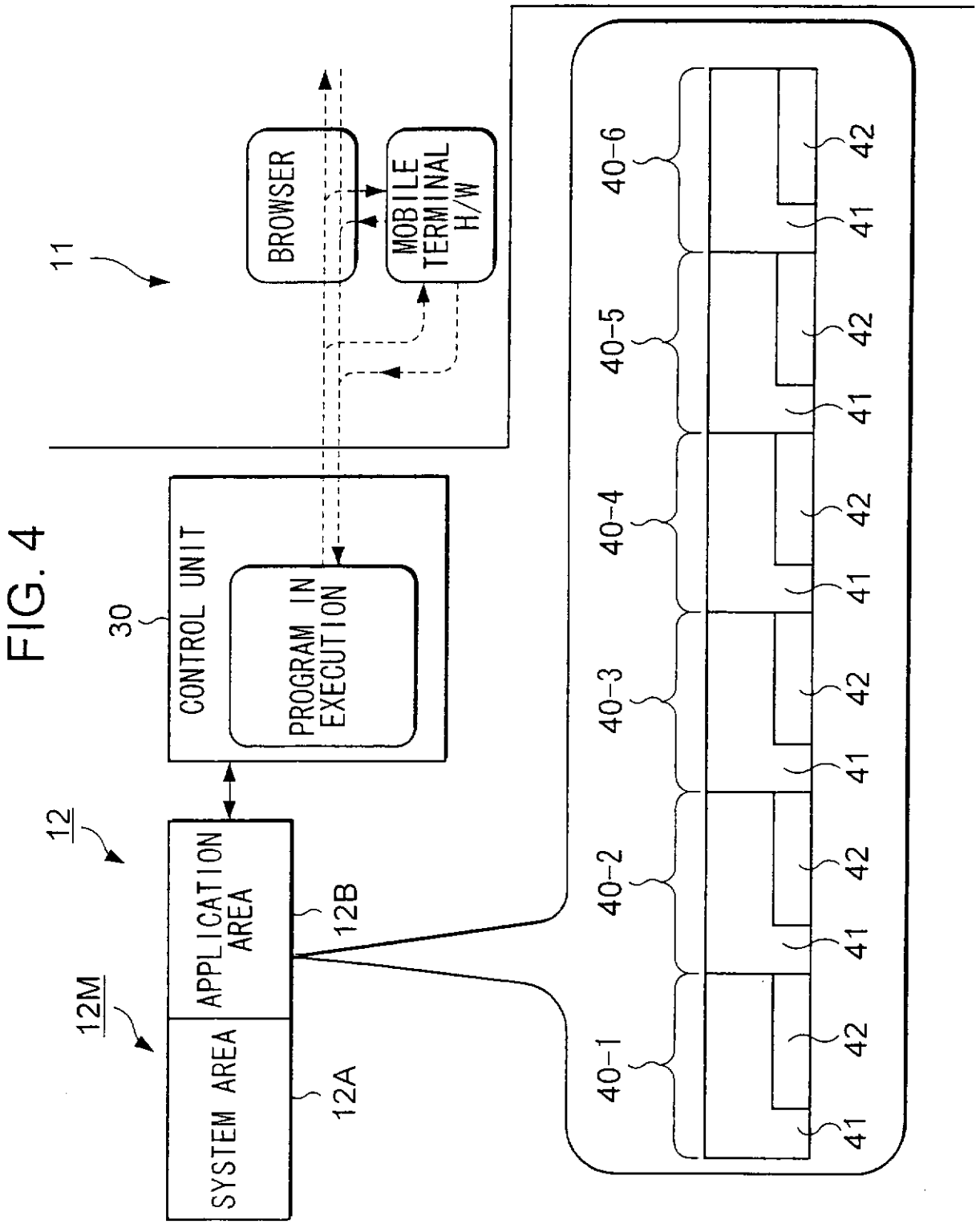

11
BROWSER
MOBILE TERMINAL H/W
CONTROL UNIT
30
PROGRAM IN EXECUTION
12
12M
APPLICATION AREA
12B
SYSTEM AREA
12A
40-1
40-2
40-3
40-4
40-5
40-6
41
42

FIG. 5

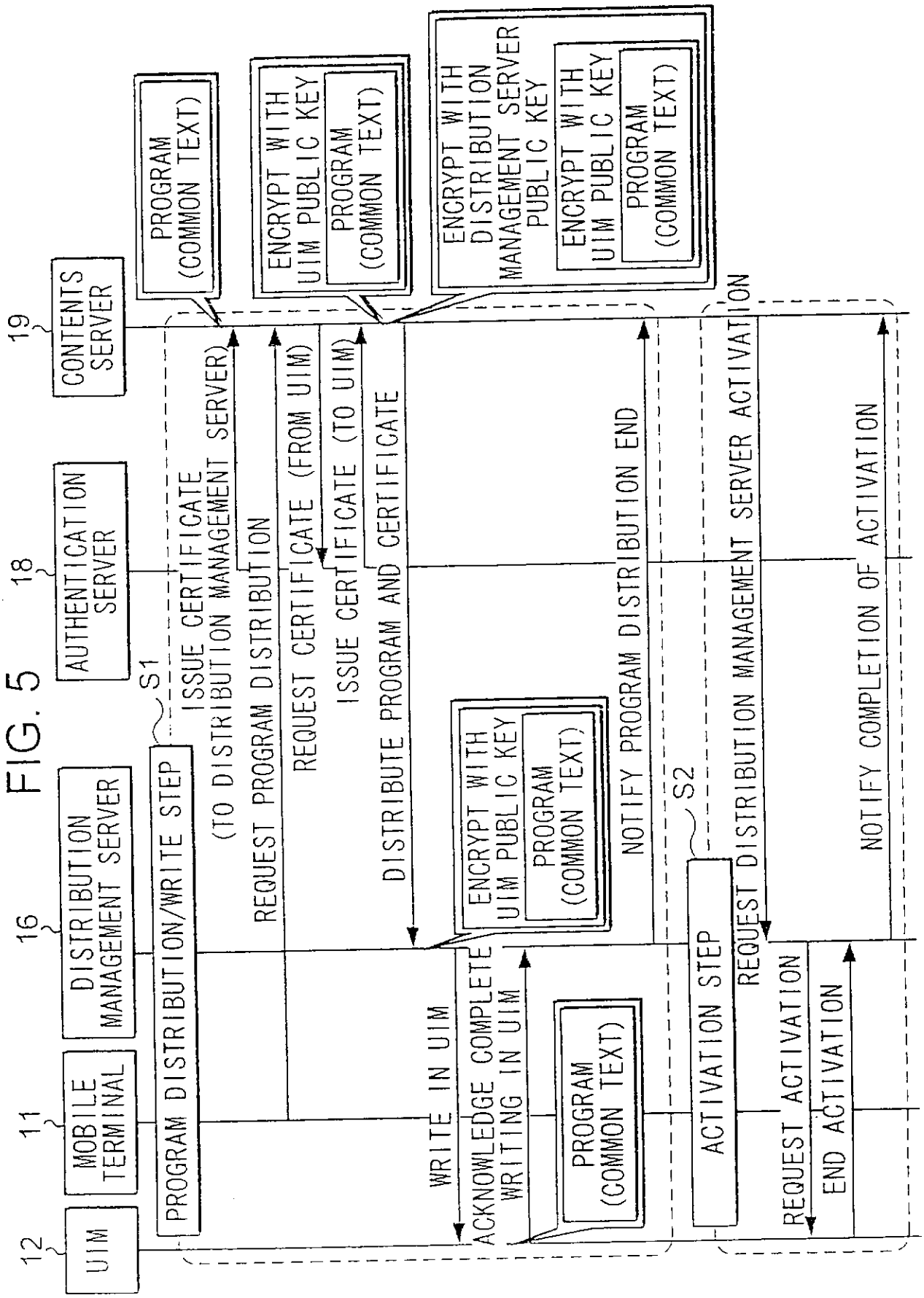

12 UIM
11 MOBILE TERMINAL
16 DISTRIBUTION MANAGEMENT SERVER
18 AUTHENTICATION SERVER
19 CONTENTS SERVER
PROGRAM DISTRIBUTION/WRITE STEP
S1
ISSUE CERTIFICATE (TO DISTRIBUTION MANAGEMENT SERVER)
REQUEST PROGRAM DISTRIBUTION
REQUEST CERTIFICATE (FROM UIM)
ISSUE CERTIFICATE (TO UIM)
DISTRIBUTE PROGRAM AND CERTIFICATE
PROGRAM (COMMON TEXT)
ENCRYPT WITH UIM PUBLIC KEY
PROGRAM (COMMON TEXT)
ENCRYPT WITH DISTRIBUTION MANAGEMENT SERVER PUBLIC KEY
ENCRYPT WITH UIM PUBLIC KEY
PROGRAM (COMMON TEXT)
WRITE IN UIM
ACKNOWLEDGE COMPLETE WRITING IN UIM
PROGRAM (COMMON TEXT)
NOTIFY PROGRAM DISTRIBUTION END
S2
ACTIVATION STEP
REQUEST DISTRIBUTION MANAGEMENT SERVER ACTIVATION
REQUEST ACTIVATION
END ACTIVATION
NOTIFY COMPLETION OF ACTIVATION

FIG. 6

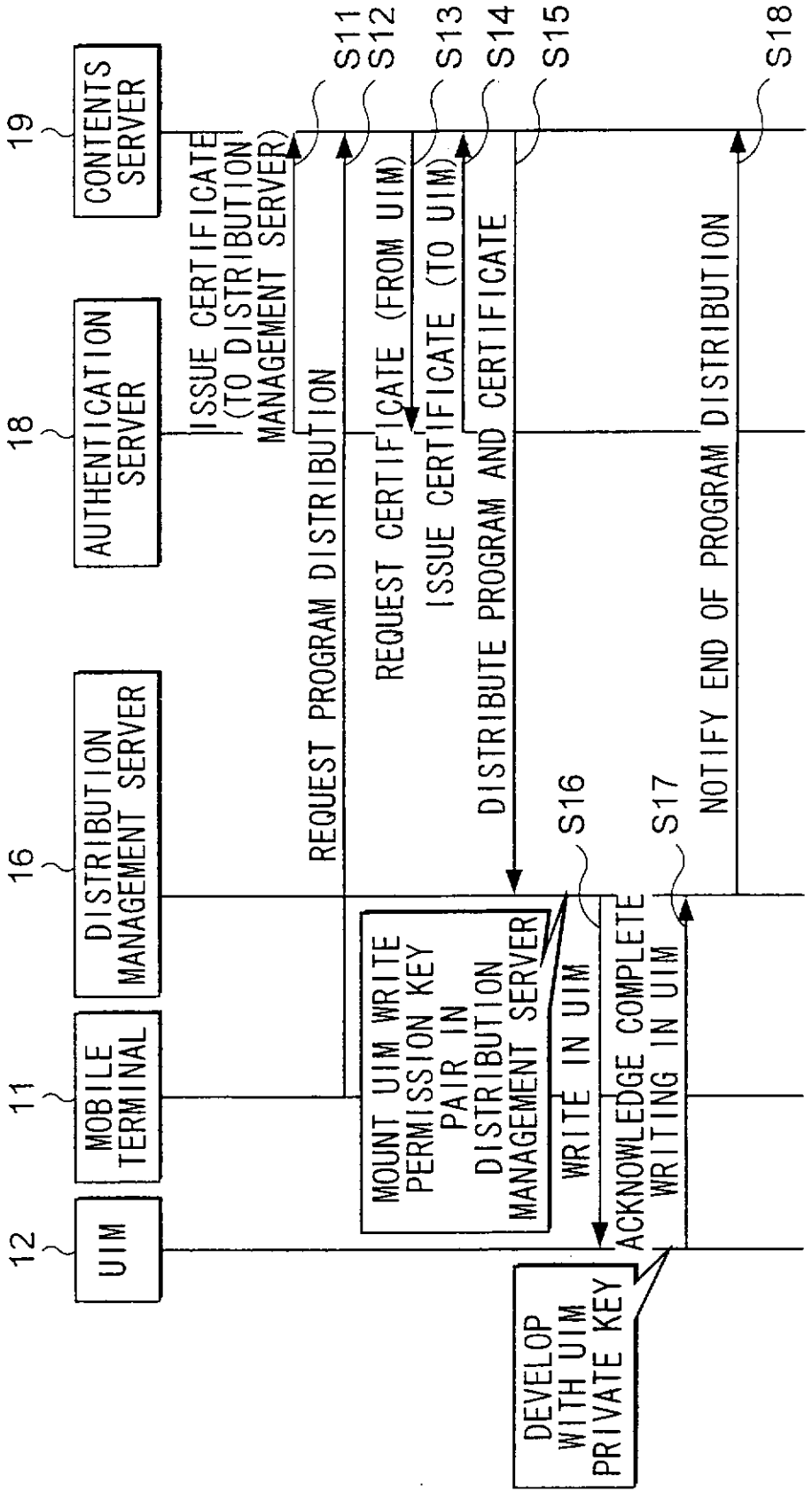

12
UIM
11
MOBILE TERMINAL
16
DISTRIBUTION MANAGEMENT SERVER
18
AUTHENTICATION SERVER
19
CONTENTS SERVER
ISSUE CERTIFICATE (TO DISTRIBUTION MANAGEMENT SERVER)
S11
S12
S13
S14
S15
S16
S17
S18
REQUEST PROGRAM DISTRIBUTION
REQUEST CERTIFICATE (FROM UIM)
ISSUE CERTIFICATE (TO UIM)
DISTRIBUTE PROGRAM AND CERTIFICATE
NOTIFY END OF PROGRAM DISTRIBUTION
MOUNT UIM WRITE PERMISSION KEY PAIR IN DISTRIBUTION MANAGEMENT SERVER
WRITE IN UIM
ACKNOWLEDGE COMPLETE WRITING IN UIM
DEVELOP WITH UIM PRIVATE KEY

FIG. 7

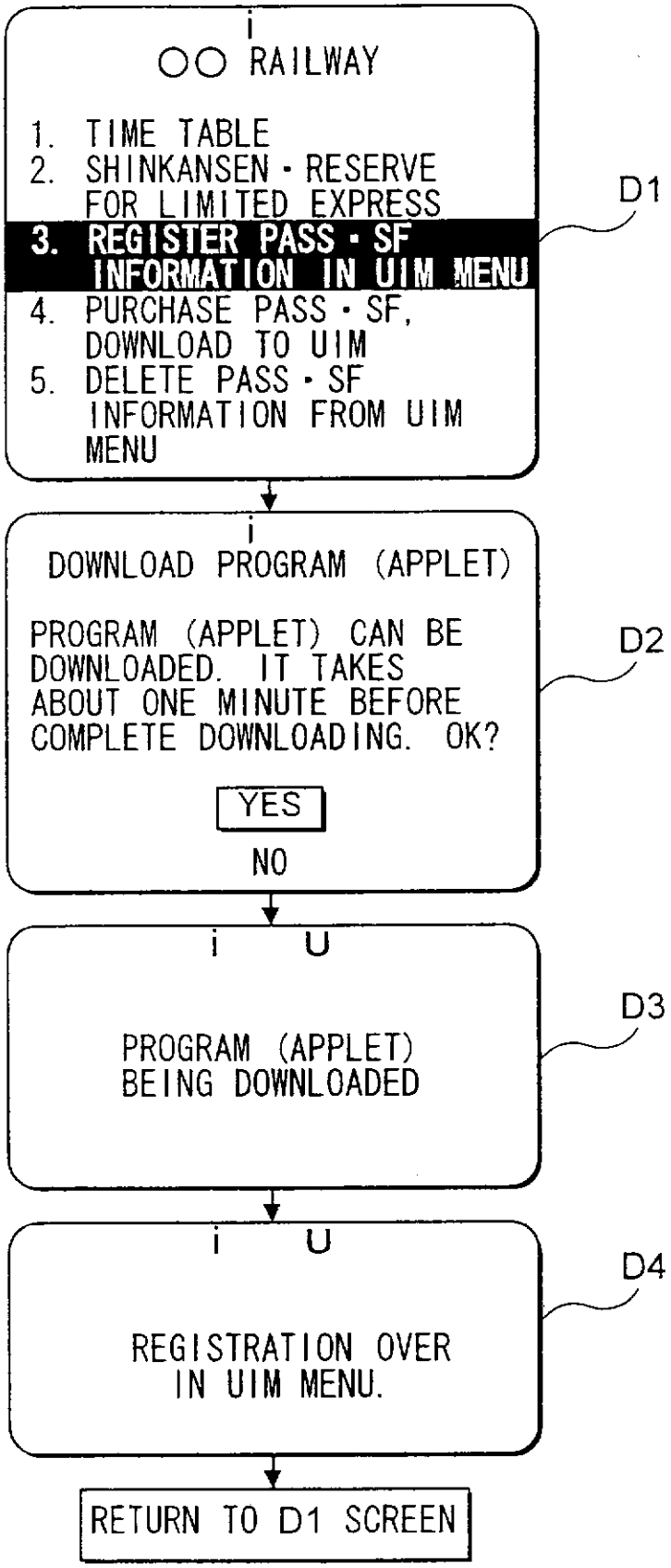

○○ RAILWAY
1. TIME TABLE
2. SHINKANSEN・RESERVE FOR LIMITED EXPRESS
3. REGISTER PASS・SF INFORMATION IN UIM MENU
4. PURCHASE PASS・SF, DOWNLOAD TO UIM
5. DELETE PASS・SF INFORMATION FROM UIM MENU
D1
DOWNLOAD PROGRAM (APPLET)
PROGRAM (APPLET) CAN BE DOWNLOADED. IT TAKES ABOUT ONE MINUTE BEFORE COMPLETE DOWNLOADING. OK?
YES
NO
D2
PROGRAM (APPLET) BEING DOWNLOADED
D3
REGISTRATION OVER IN UIM MENU.
D4
RETURN TO D1 SCREEN

FIG. 8

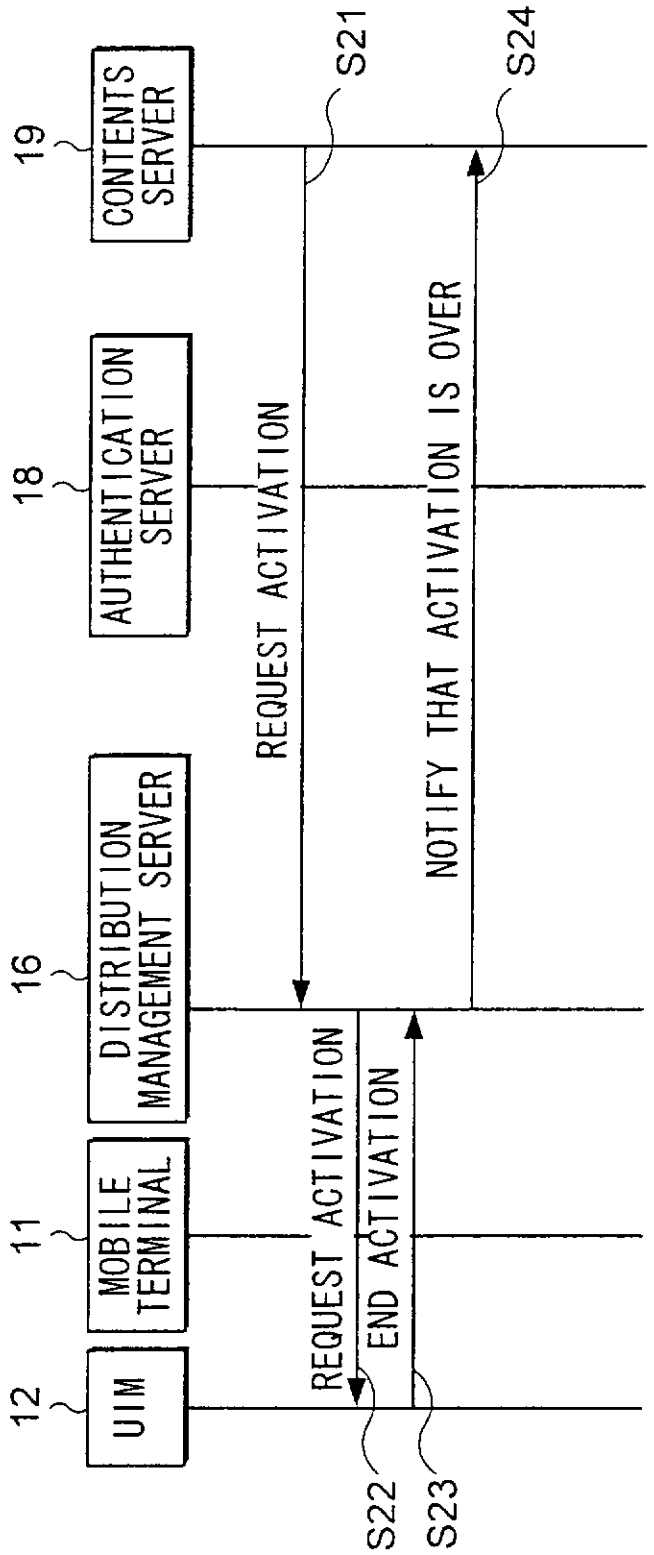

12
UIM
11
MOBILE TERMINAL
16
DISTRIBUTION MANAGEMENT SERVER
18
AUTHENTICATION SERVER
19
CONTENTS SERVER
REQUEST ACTIVATION
END ACTIVATION
REQUEST ACTIVATION
NOTIFY THAT ACTIVATION IS OVER
S21
S22
S23
S24

FIG. 9

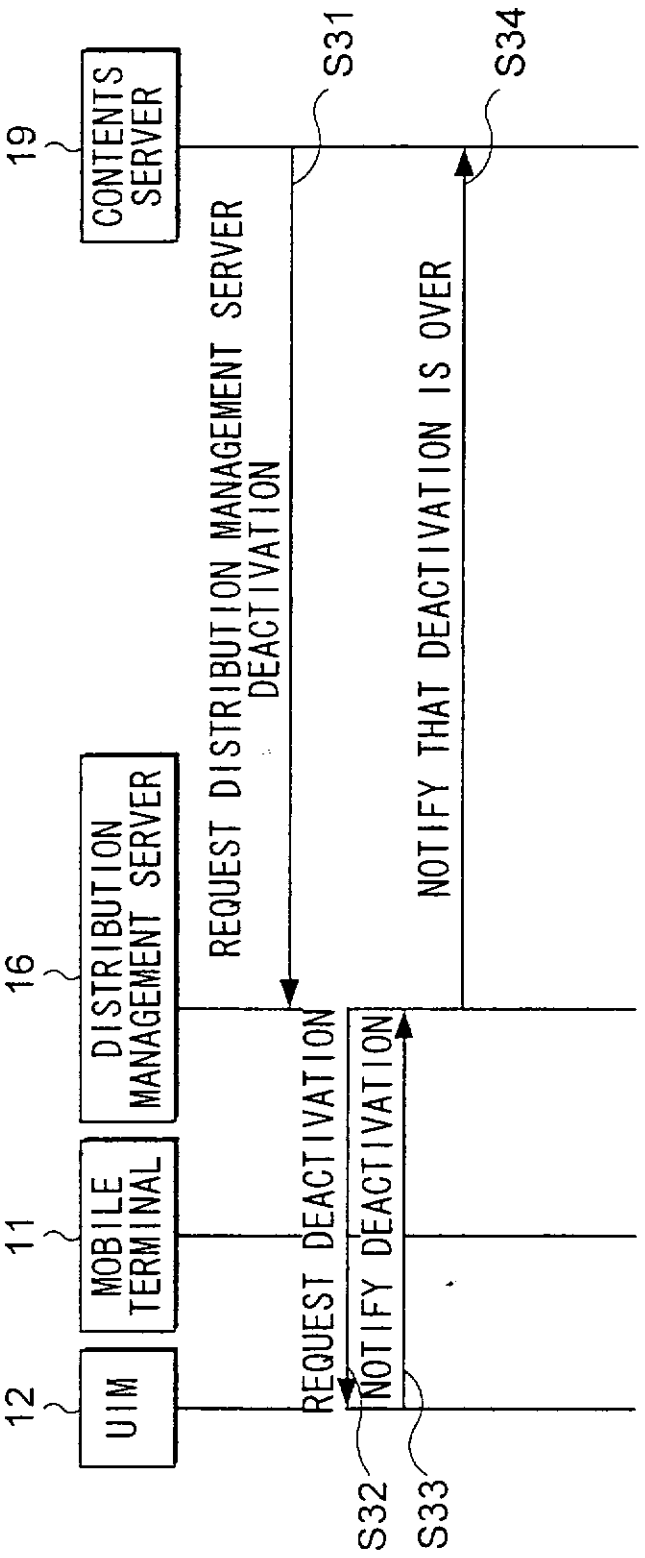

19
CONTENTS SERVER
S31
S34
REQUEST DISTRIBUTION MANAGEMENT SERVER DEACTIVATION
NOTIFY THAT DEACTIVATION IS OVER
16
DISTRIBUTION MANAGEMENT SERVER
11
MOBILE TERMINAL
12
UIM
REQUEST DEACTIVATION
NOTIFY DEACTIVATION
S32
S33

FIG. 10

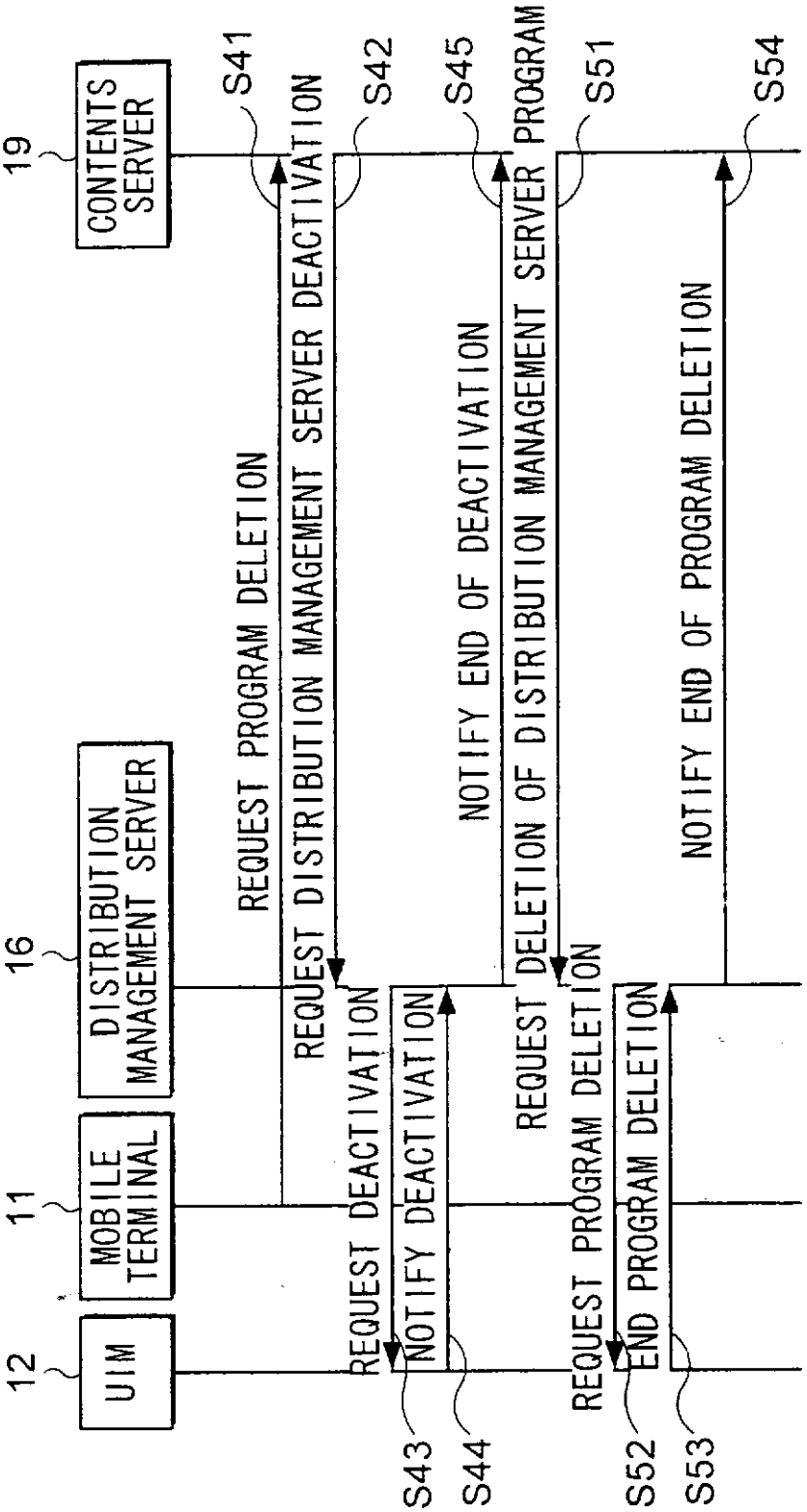

12
UIM
11
MOBILE TERMINAL
16
DISTRIBUTION MANAGEMENT SERVER
19
CONTENTS SERVER
REQUEST PROGRAM DELETION
S41
REQUEST DISTRIBUTION MANAGEMENT SERVER DEACTIVATION
S42
REQUEST DEACTIVATION
NOTIFY DEACTIVATION
S43
S44
NOTIFY END OF DEACTIVATION
S45
REQUEST DELETION OF DISTRIBUTION MANAGEMENT SERVER PROGRAM
S51
REQUEST PROGRAM DELETION
END PROGRAM DELETION
S52
S53
NOTIFY END OF PROGRAM DELETION
S54

FIG. 11

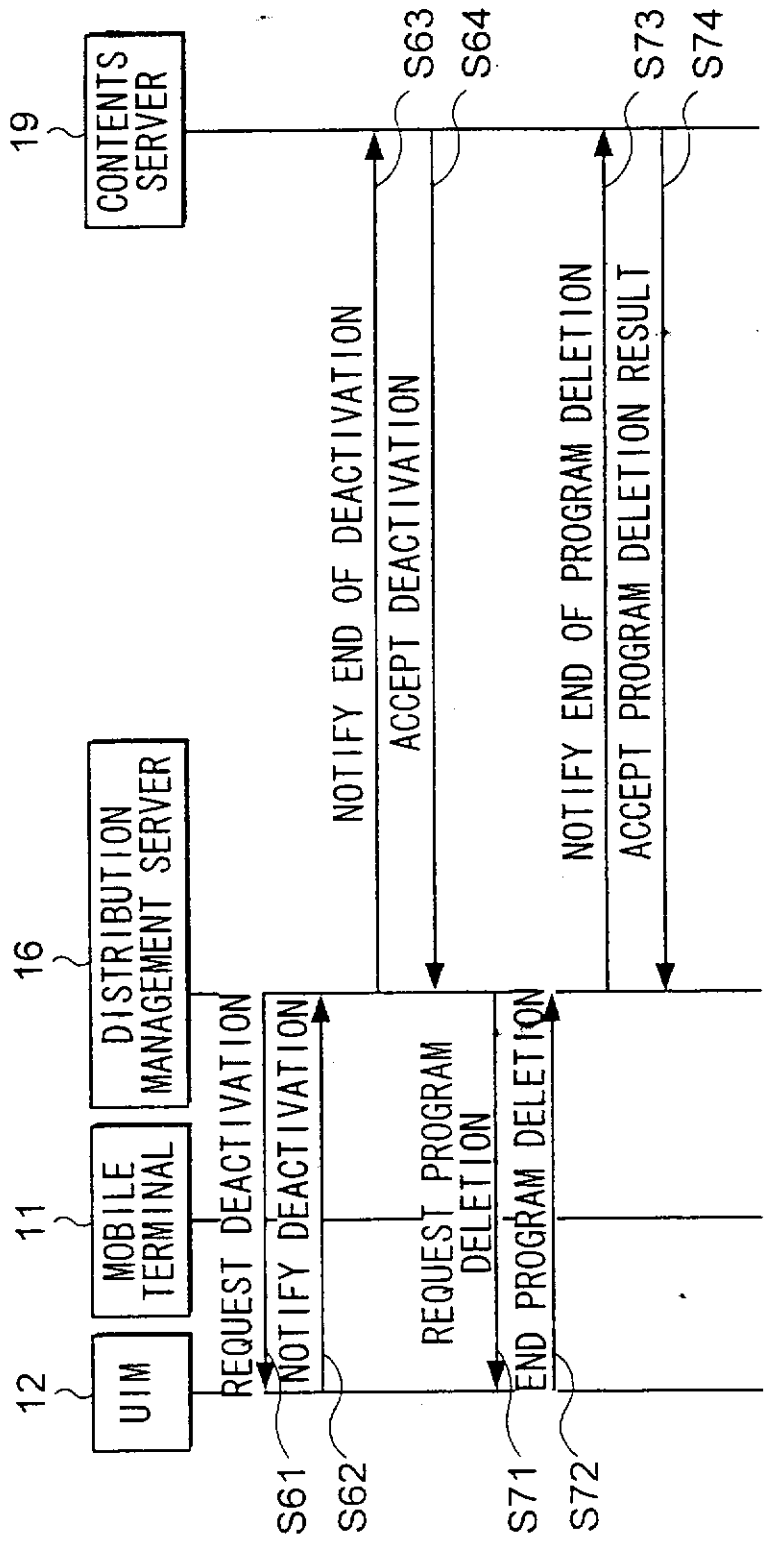

12
UIM
11
MOBILE TERMINAL
16
DISTRIBUTION MANAGEMENT SERVER
19
CONTENTS SERVER
REQUEST DEACTIVATION
NOTIFY DEACTIVATION
NOTIFY END OF DEACTIVATION
ACCEPT DEACTIVATION
REQUEST PROGRAM DELETION
END PROGRAM DELETION
NOTIFY END OF PROGRAM DELETION
ACCEPT PROGRAM DELETION RESULT
S61
S62
S63
S64
S71
S72
S73
S74

FIG. 12

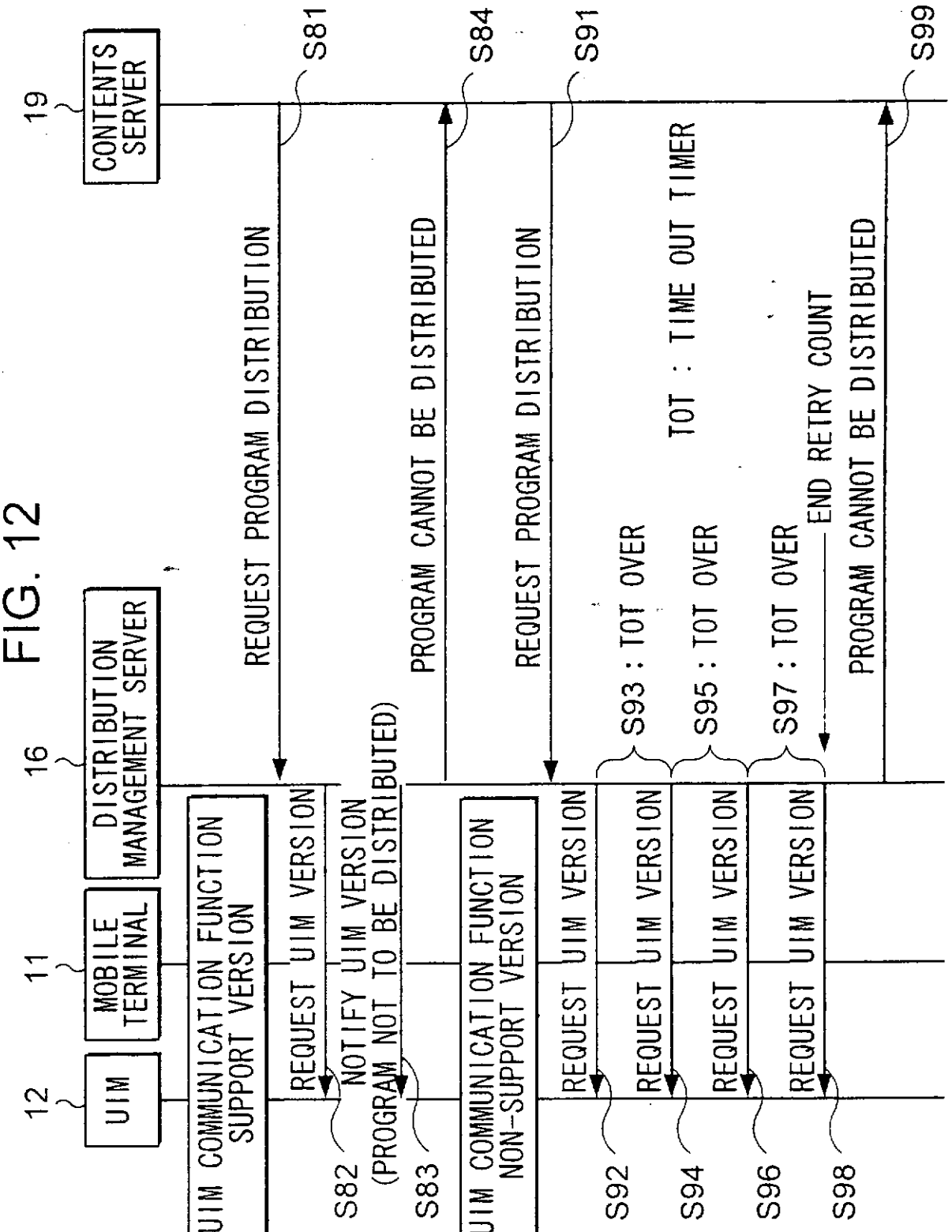

12
UIM
11
MOBILE TERMINAL
16
DISTRIBUTION MANAGEMENT SERVER
19
CONTENTS SERVER
UIM COMMUNICATION FUNCTION SUPPORT VERSION
UIM COMMUNICATION FUNCTION NON-SUPPORT VERSION
REQUEST PROGRAM DISTRIBUTION
S81
REQUEST UIM VERSION
S82
NOTIFY UIM VERSION (PROGRAM NOT TO BE DISTRIBUTED)
S83
PROGRAM CANNOT BE DISTRIBUTED
S84
REQUEST PROGRAM DISTRIBUTION
S91
REQUEST UIM VERSION
S92
S93 : TOT OVER
REQUEST UIM VERSION
S94
S95 : TOT OVER
TOT : TIME OUT TIMER
REQUEST UIM VERSION
S96
S97 : TOT OVER
END RETRY COUNT
REQUEST UIM VERSION
S98
PROGRAM CANNOT BE DISTRIBUTED
S99

FIG. 13

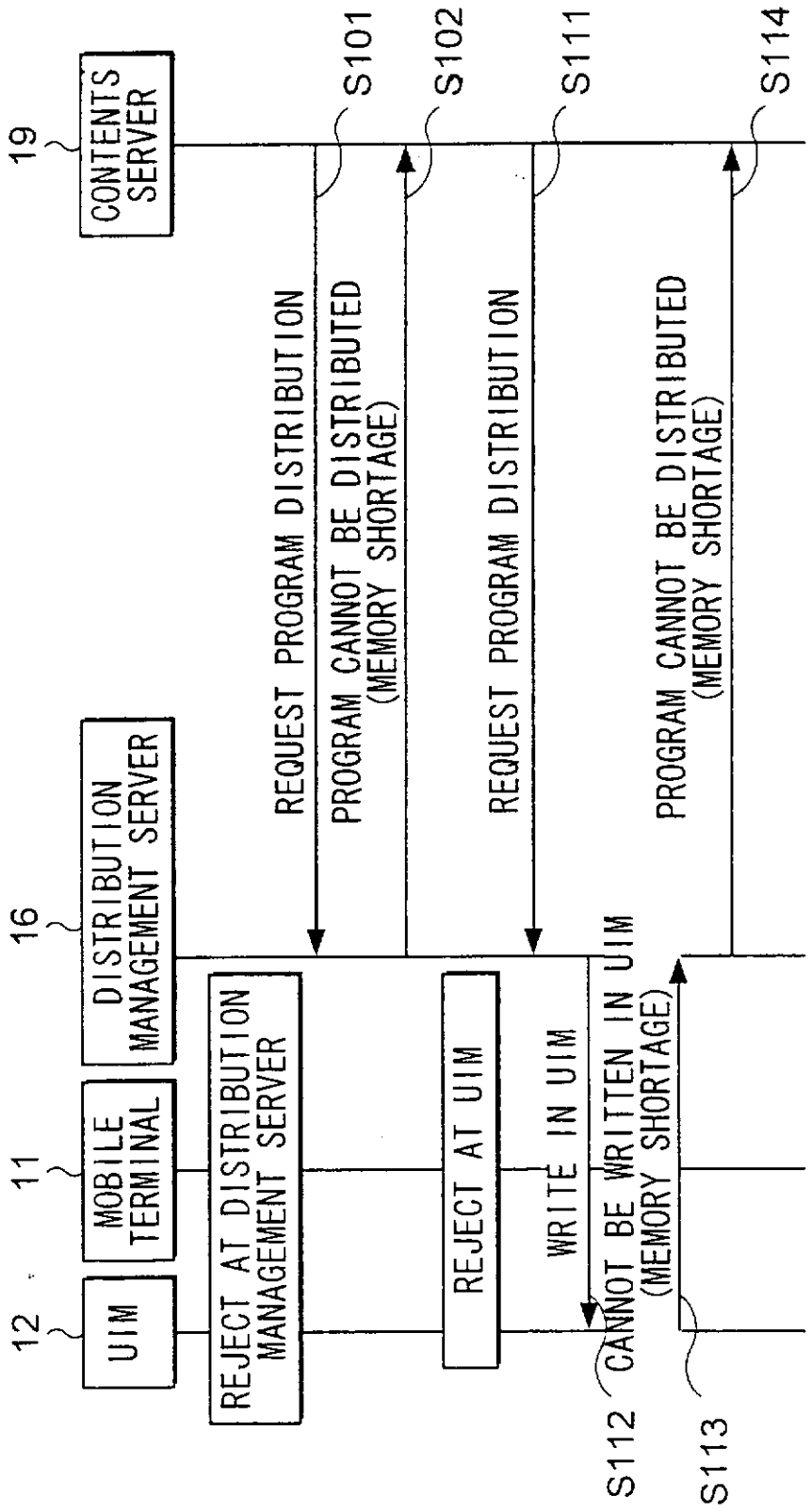

12
UIM
11
MOBILE TERMINAL
16
DISTRIBUTION MANAGEMENT SERVER
19
CONTENTS SERVER
REJECT AT DISTRIBUTION MANAGEMENT SERVER
REJECT AT UIM
WRITE IN UIM
REQUEST PROGRAM DISTRIBUTION
PROGRAM CANNOT BE DISTRIBUTED (MEMORY SHORTAGE)
REQUEST PROGRAM DISTRIBUTION
PROGRAM CANNOT BE DISTRIBUTED (MEMORY SHORTAGE)
CANNOT BE WRITTEN IN UIM (MEMORY SHORTAGE)
S101
S102
S111
S112
S113
S114

FIG. 14

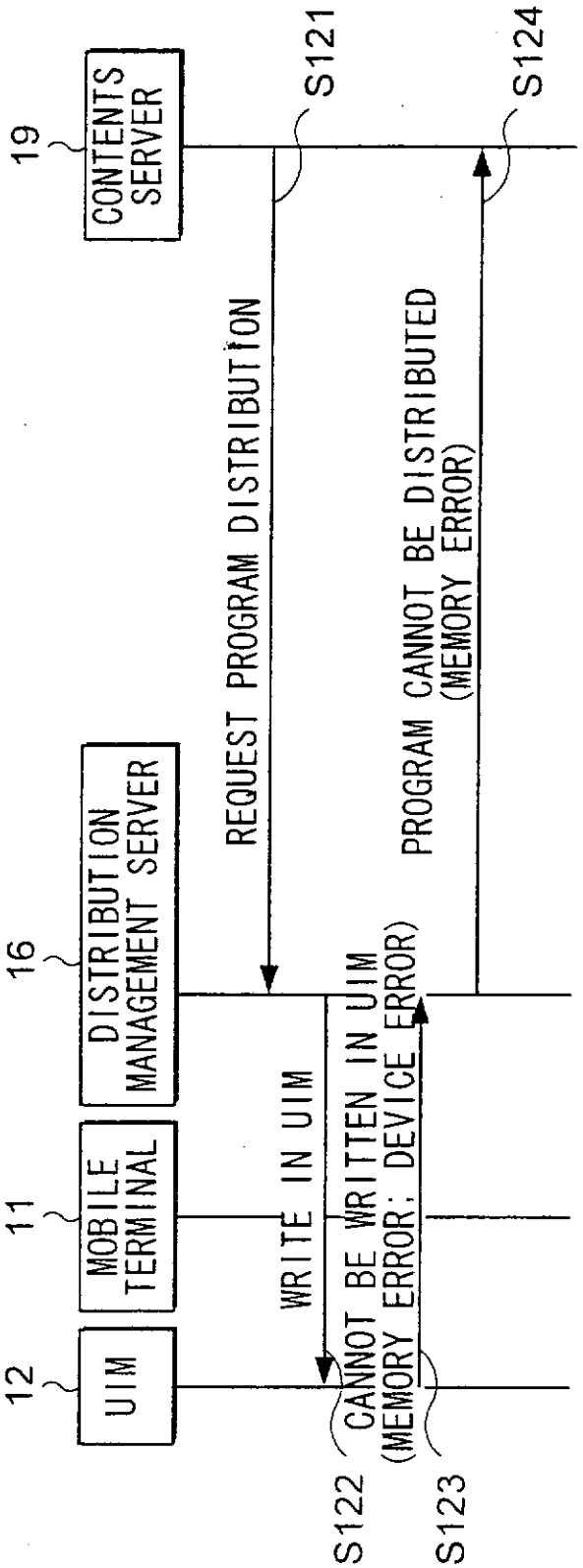

19
CONTENTS SERVER
S121
S124
REQUEST PROGRAM DISTRIBUTION
PROGRAM CANNOT BE DISTRIBUTED (MEMORY ERROR)
16
DISTRIBUTION MANAGEMENT SERVER
11
MOBILE TERMINAL
WRITE IN UIM
CANNOT BE WRITTEN IN UIM (MEMORY ERROR; DEVICE ERROR)
12
UIM
S122
S123

FIG. 15

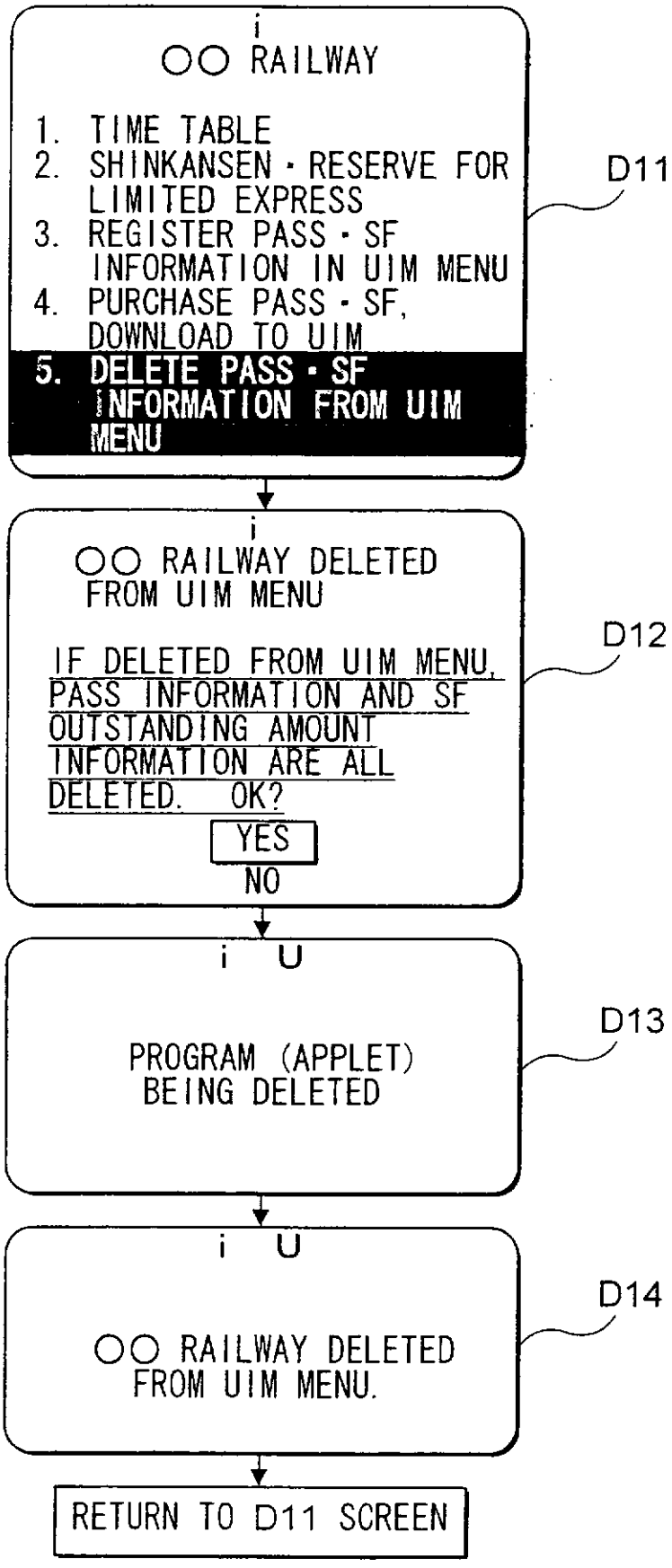

OO RAILWAY
1. TIME TABLE
2. SHINKANSEN・RESERVE FOR LIMITED EXPRESS
3. REGISTER PASS・SF INFORMATION IN UIM MENU
4. PURCHASE PASS・SF, DOWNLOAD TO UIM
5. DELETE PASS・SF INFORMATION FROM UIM MENU
D11
OO RAILWAY DELETED FROM UIM MENU
IF DELETED FROM UIM MENU, PASS INFORMATION AND SF OUTSTANDING AMOUNT INFORMATION ARE ALL DELETED. OK?
YES
NO
D12
PROGRAM (APPLET) BEING DELETED
D13
OO RAILWAY DELETED FROM UIM MENU.
D14
RETURN TO D11 SCREEN

FIG. 16

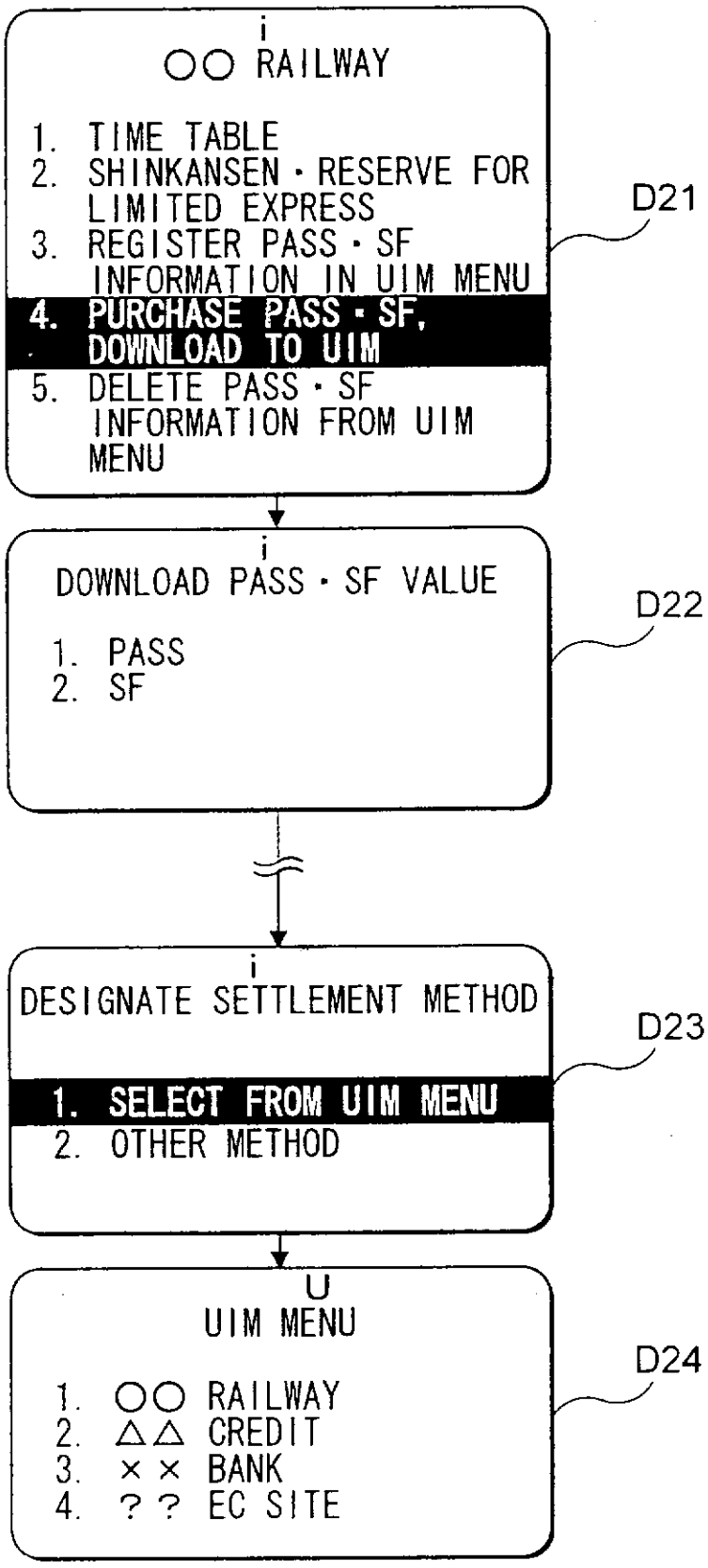

i
○○ RAILWAY
1. TIME TABLE
2. SHINKANSEN・RESERVE FOR LIMITED EXPRESS
3. REGISTER PASS・SF INFORMATION IN UIM MENU
4. PURCHASE PASS・SF, DOWNLOAD TO UIM
5. DELETE PASS・SF INFORMATION FROM UIM MENU
D21
i
DOWNLOAD PASS・SF VALUE
1. PASS
2. SF
D22
i
DESIGNATE SETTLEMENT METHOD
1. SELECT FROM UIM MENU
2. OTHER METHOD
D23
U
UIM MENU
1. ○○ RAILWAY
2. △△ CREDIT
3. ×× BANK
4. ?? EC SITE
D24

FIG. 17

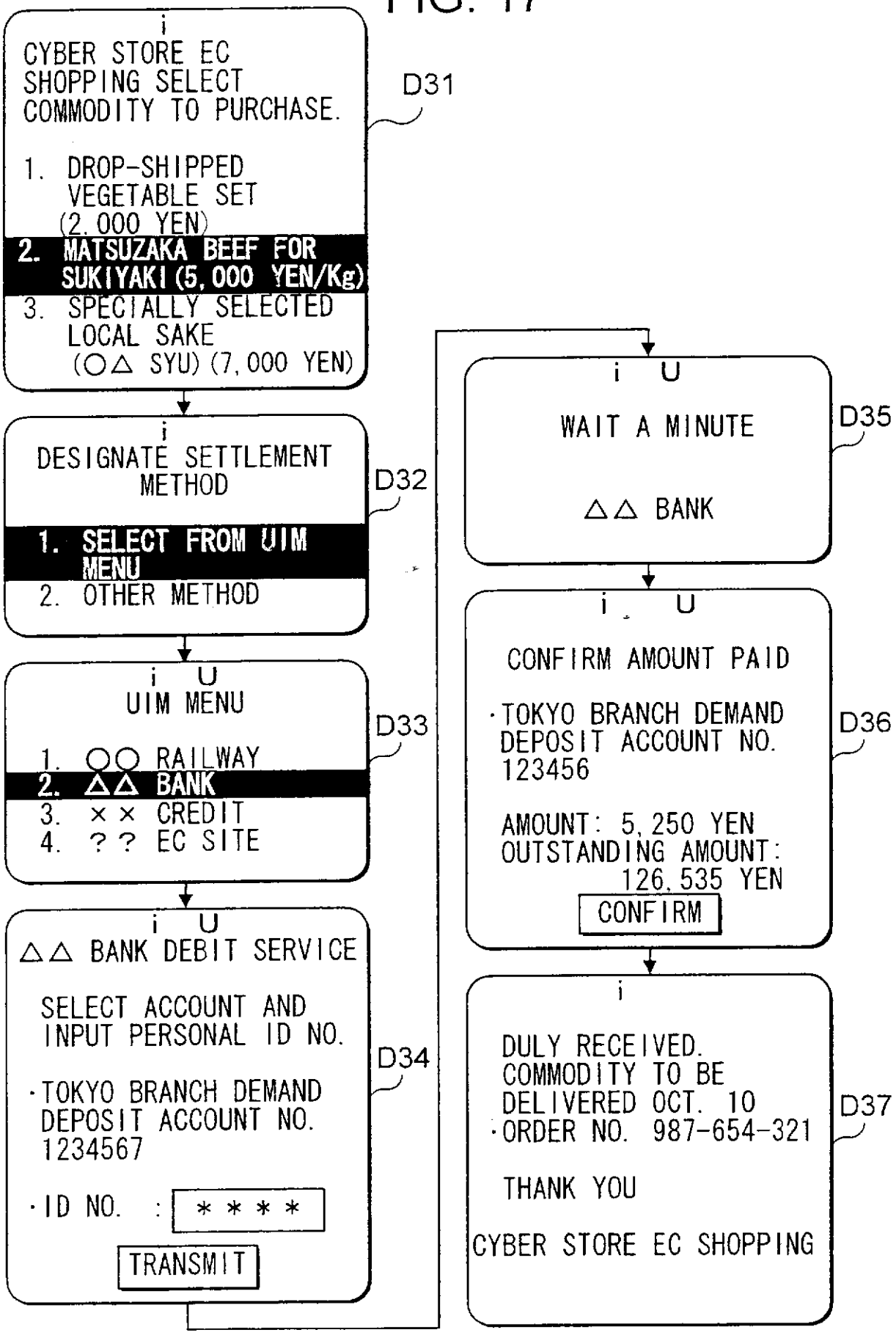

i
CYBER STORE EC
SHOPPING SELECT
COMMODITY TO PURCHASE.
1. DROP-SHIPPED VEGETABLE SET (2,000 YEN)
2. MATSUZAKA BEEF FOR SUKIYAKI (5,000 YEN/Kg)
3. SPECIALLY SELECTED LOCAL SAKE (○△ SYU) (7,000 YEN)
D31
i
DESIGNATE SETTLEMENT METHOD
1. SELECT FROM UIM MENU
2. OTHER METHOD
D32
i U
UIM MENU
1. ○○ RAILWAY
2. △△ BANK
3. ×× CREDIT
4. ?? EC SITE
D33
i U
△△ BANK DEBIT SERVICE
SELECT ACCOUNT AND INPUT PERSONAL ID NO.
·TOKYO BRANCH DEMAND DEPOSIT ACCOUNT NO. 1234567
·ID NO. : * * * *
TRANSMIT
D34
i U
WAIT A MINUTE
△△ BANK
D35
i U
CONFIRM AMOUNT PAID
·TOKYO BRANCH DEMAND DEPOSIT ACCOUNT NO. 123456
AMOUNT: 5,250 YEN
OUTSTANDING AMOUNT: 126,535 YEN
CONFIRM
D36
i
DULY RECEIVED.
COMMODITY TO BE DELIVERED OCT. 10
·ORDER NO. 987-654-321
THANK YOU
CYBER STORE EC SHOPPING
D37

FIG. 18

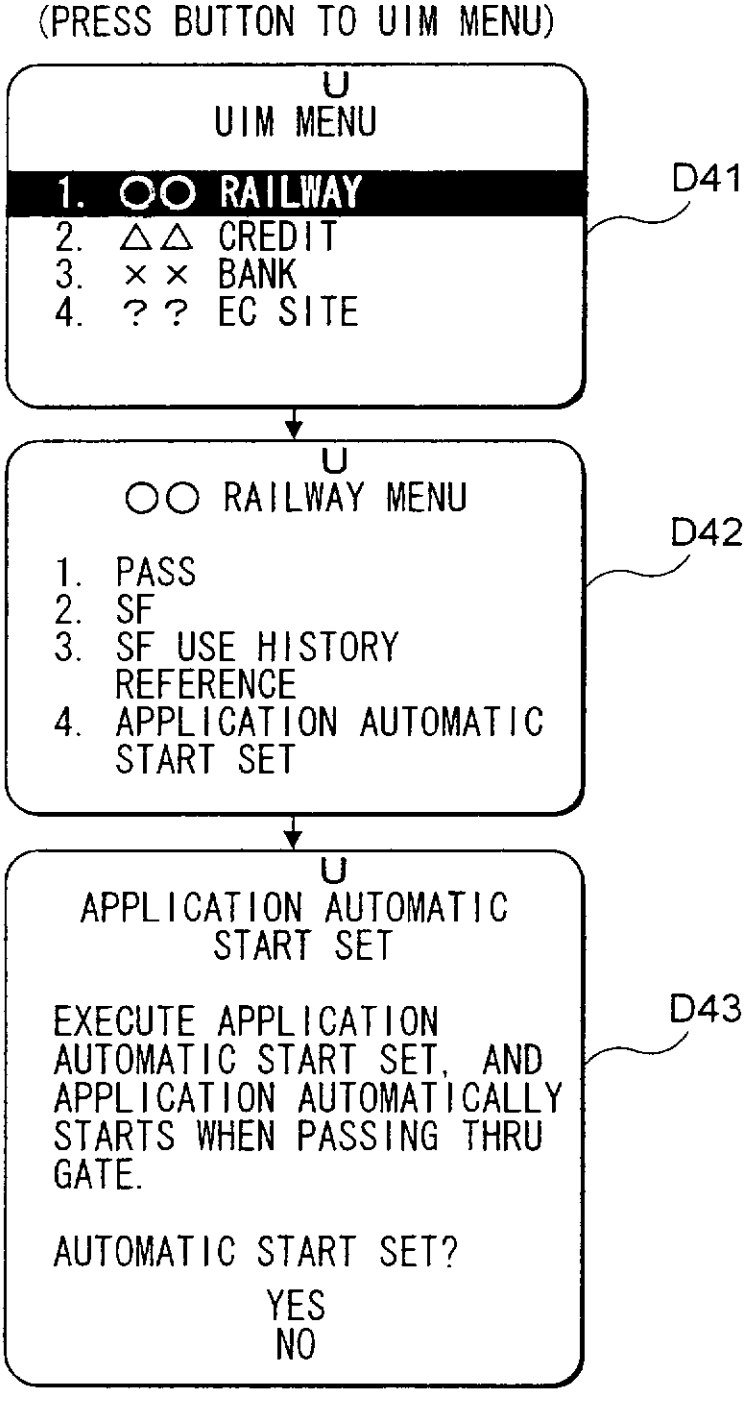

(PRESS BUTTON TO UIM MENU)
UIM MENU
1. ○○ RAILWAY
2. △△ CREDIT
3. ×× BANK
4. ?? EC SITE
D41
○○ RAILWAY MENU
1. PASS
2. SF
3. SF USE HISTORY REFERENCE
4. APPLICATION AUTOMATIC START SET
D42
APPLICATION AUTOMATIC START SET
EXECUTE APPLICATION AUTOMATIC START SET, AND APPLICATION AUTOMATICALLY STARTS WHEN PASSING THRU GATE.
AUTOMATIC START SET?
YES
NO
D43

FIG. 19

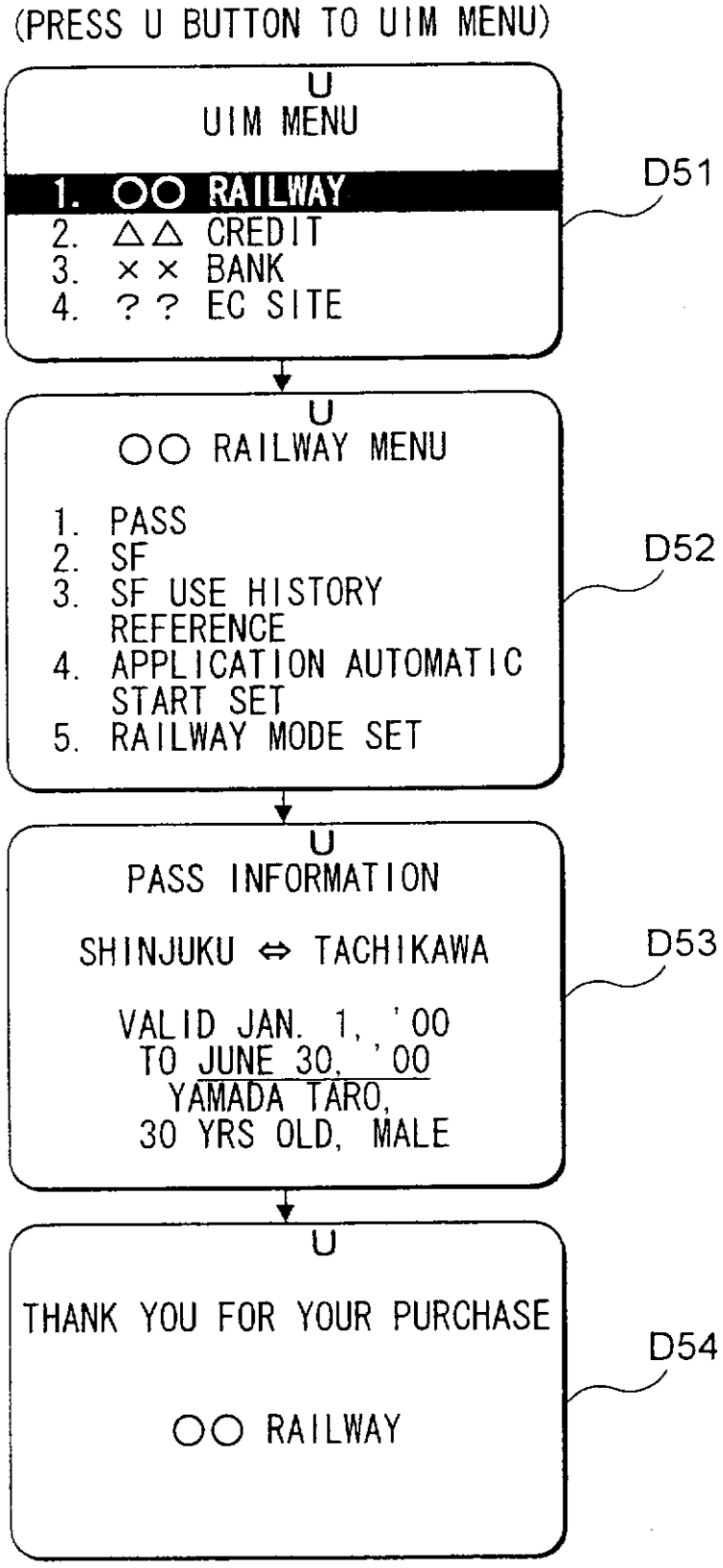

(PRESS U BUTTON TO UIM MENU)
U
UIM MENU
1. ○○ RAILWAY
2. △△ CREDIT
3. × × BANK
4. ? ? EC SITE
D51
U
○○ RAILWAY MENU
1. PASS
2. SF
3. SF USE HISTORY REFERENCE
4. APPLICATION AUTOMATIC START SET
5. RAILWAY MODE SET
D52
U
PASS INFORMATION
SHINJUKU ⇔ TACHIKAWA
VALID JAN. 1, '00
TO JUNE 30, '00
YAMADA TARO,
30 YRS OLD, MALE
D53
U
THANK YOU FOR YOUR PURCHASE
○○ RAILWAY
D54

FIG. 20

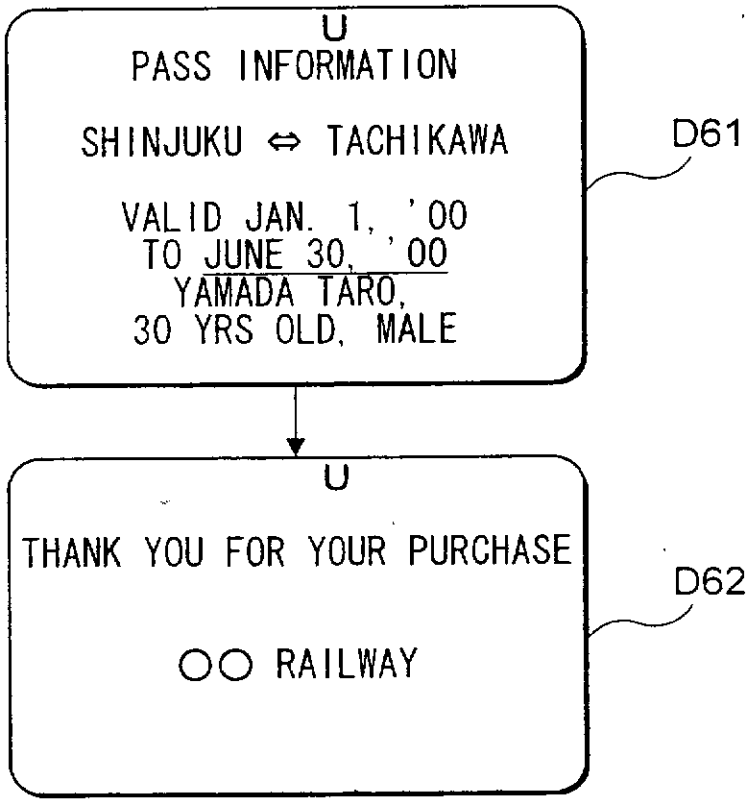

U
PASS INFORMATION
SHINJUKU ⇔ TACHIKAWA
VALID JAN. 1, '00
TO JUNE 30, '00
YAMADA TARO,
30 YRS OLD, MALE
D61
U
THANK YOU FOR YOUR PURCHASE
○○ RAILWAY
D62

FIG. 21

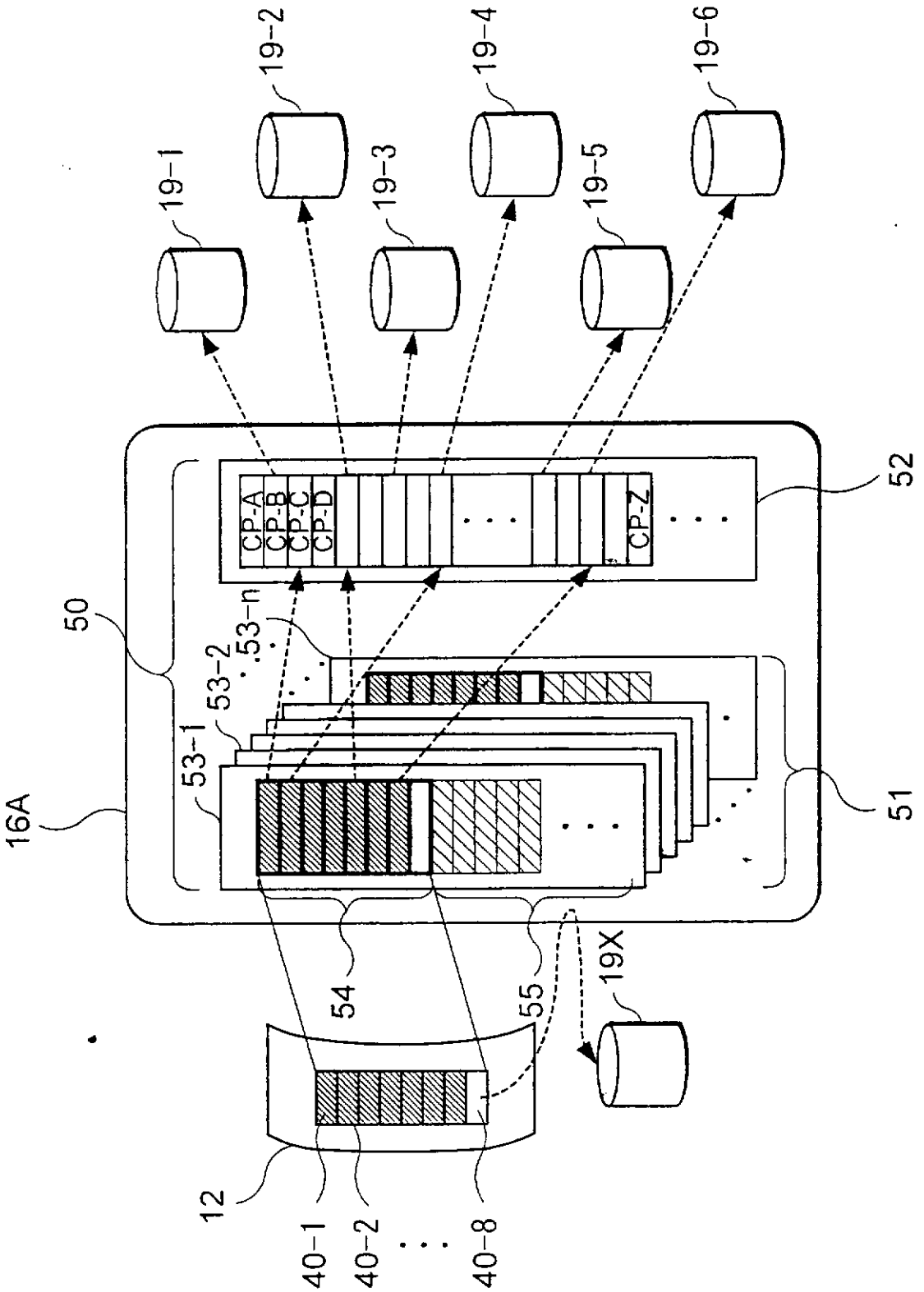

19-1
19-2
19-3
19-4
19-5
19-6
CP-A
CP-B
CP-C
CP-D
CP-Z
52
50
53-n
53-2
53-1
16A
51
54
55
19X
12
40-1
40-2
40-8

FIG. 22

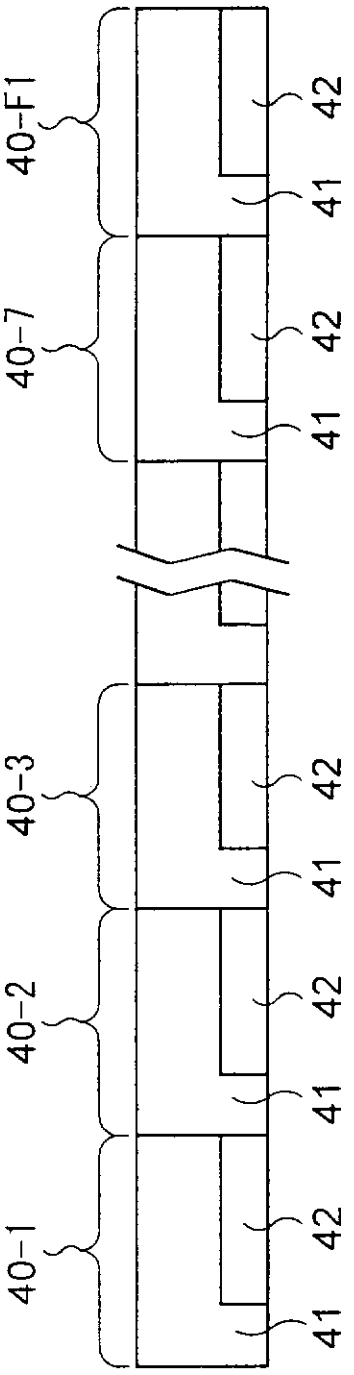


FIG. 23

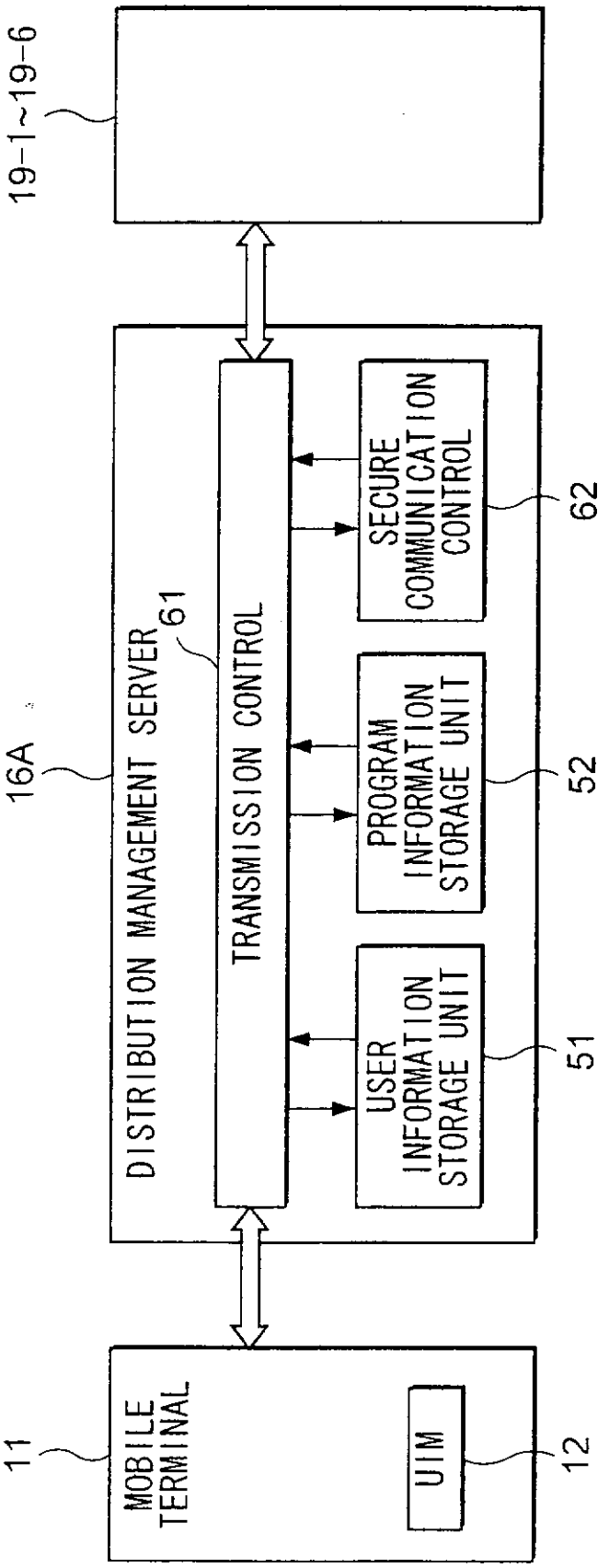

19-1~19-6
16A
DISTRIBUTION MANAGEMENT SERVER
61
TRANSMISSION CONTROL
SECURE COMMUNICATION CONTROL
62
PROGRAM INFORMATION STORAGE UNIT
52
USER INFORMATION STORAGE UNIT
51
11
MOBILE TERMINAL
UIM
12

FIG. 24

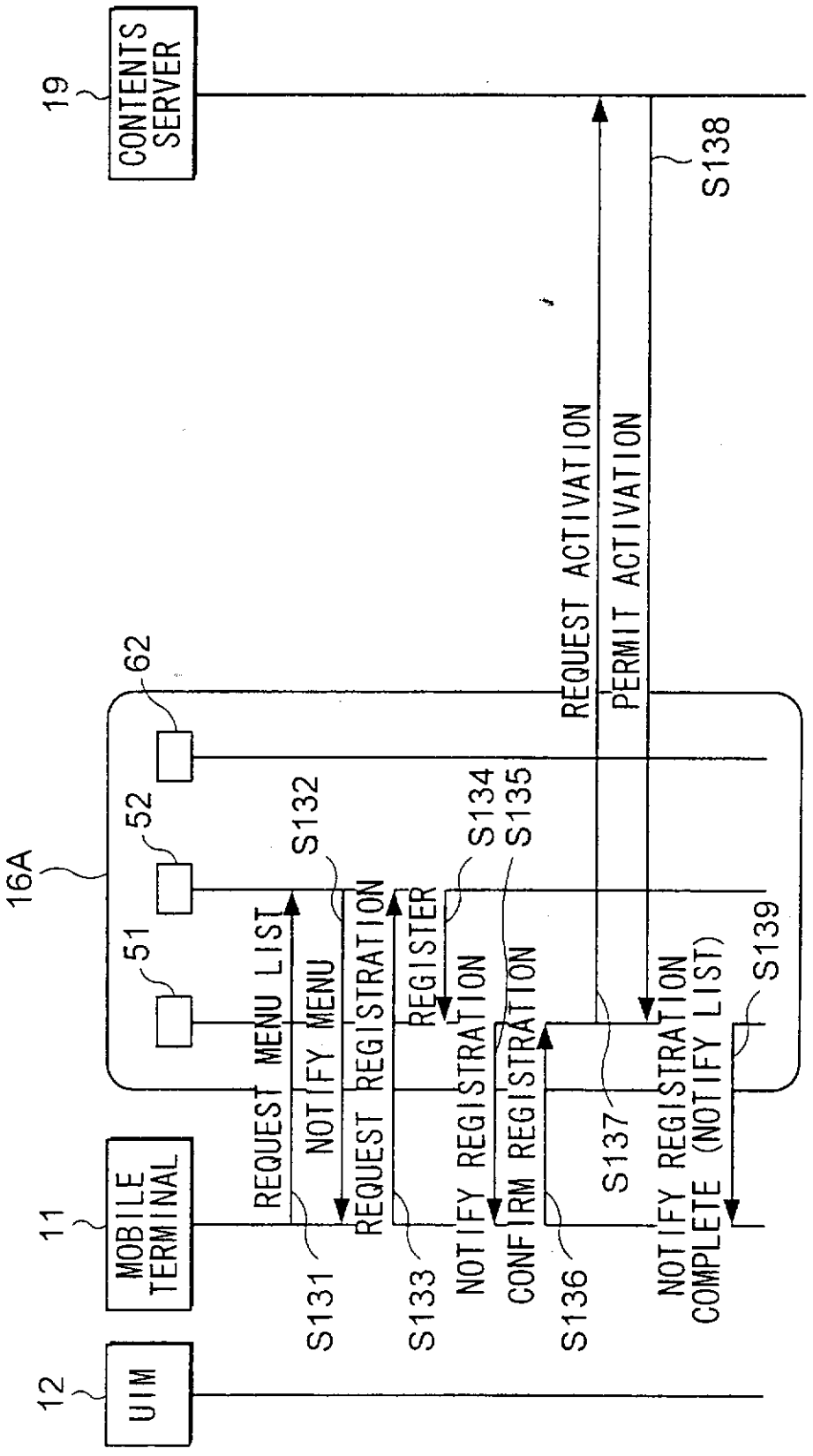

19
CONTENTS SERVER
16A
62
52
51
12
UIM
11
MOBILE TERMINAL
REQUEST ACTIVATION
PERMIT ACTIVATION
S138
S132
S134
S135
REQUEST MENU LIST
NOTIFY MENU
REQUEST REGISTRATION
REGISTER
NOTIFY REGISTRATION
CONFIRM REGISTRATION
NOTIFY REGISTRATION COMPLETE (NOTIFY LIST)
S139
S137
S131
S133
S136

FIG. 25

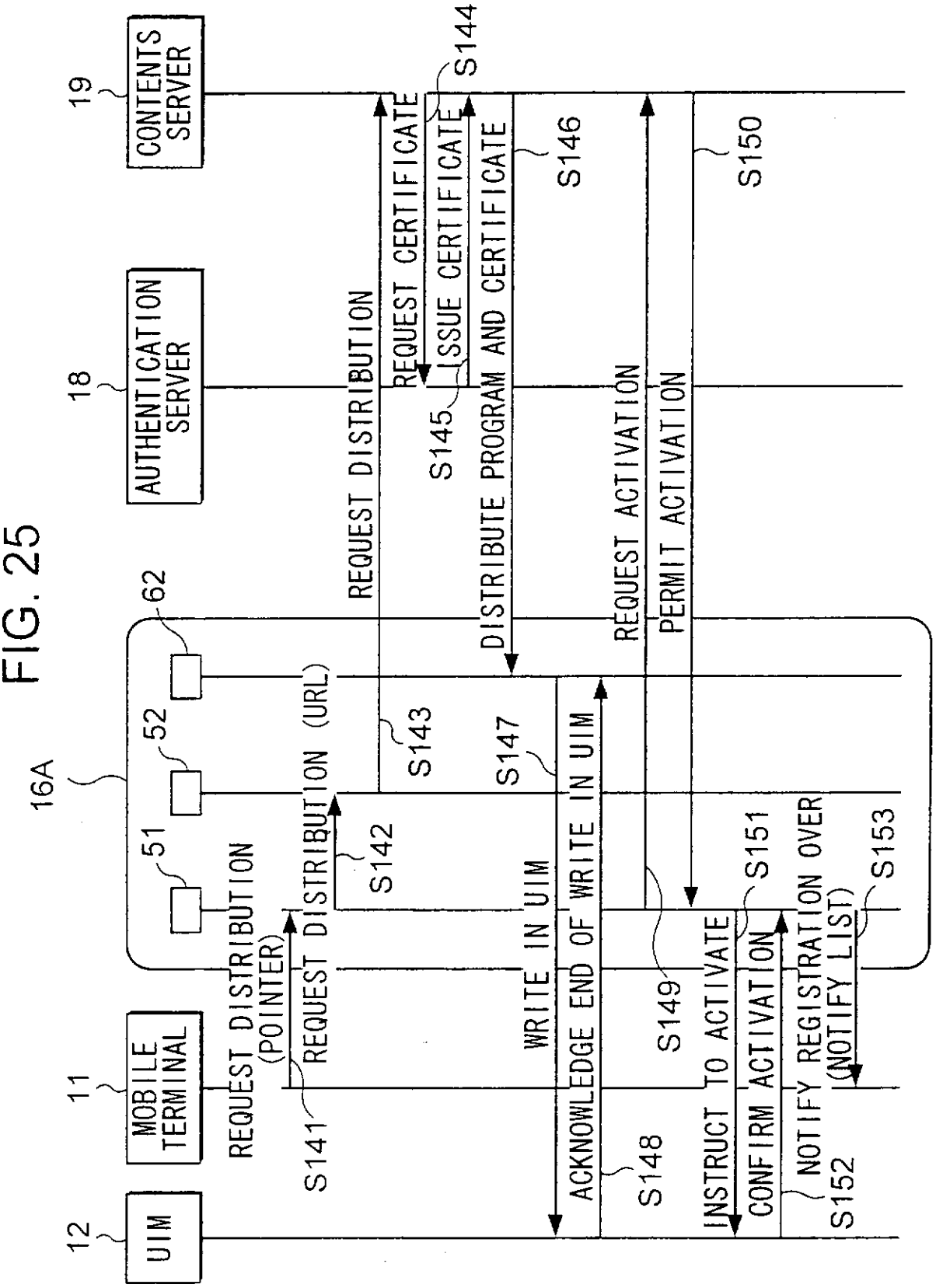

12
UIM
11
MOBILE TERMINAL
16A
51
52
62
18
AUTHENTICATION SERVER
19
CONTENTS SERVER
REQUEST DISTRIBUTION (POINTER)
S141
REQUEST DISTRIBUTION (URL)
S142
REQUEST DISTRIBUTION
S143
REQUEST CERTIFICATE
S144
ISSUE CERTIFICATE
S145
DISTRIBUTE PROGRAM AND CERTIFICATE
S146
WRITE IN UIM
S147
ACKNOWLEDGE END OF WRITE IN UIM
S148
REQUEST ACTIVATION
S149
PERMIT ACTIVATION
S150
INSTRUCT TO ACTIVATE
S151
CONFIRM ACTIVATION
NOTIFY REGISTRATION OVER (NOTIFY LIST)
S152
S153

FIG. 26

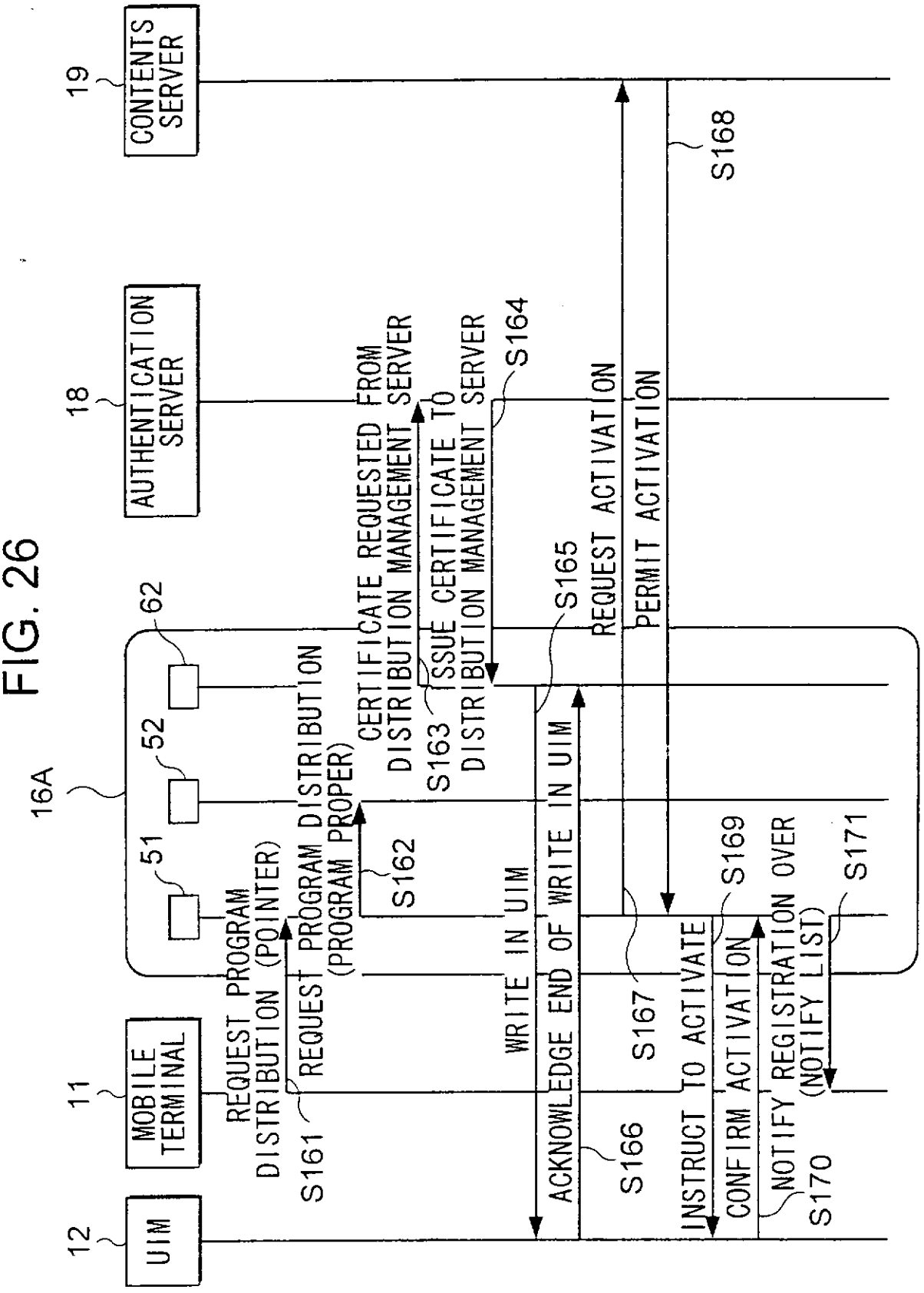

12
UIM
11
MOBILE TERMINAL
16A
51
52
62
18
AUTHENTICATION SERVER
19
CONTENTS SERVER
REQUEST PROGRAM DISTRIBUTION (POINTER)
S161
REQUEST PROGRAM DISTRIBUTION (PROGRAM PROPER)
S162
CERTIFICATE REQUESTED FROM DISTRIBUTION MANAGEMENT SERVER
S163
ISSUE CERTIFICATE TO DISTRIBUTION MANAGEMENT SERVER
S164
S165
REQUEST ACTIVATION
PERMIT ACTIVATION
S168
WRITE IN UIM
ACKNOWLEDGE END OF WRITE IN UIM
S166
S167
INSTRUCT TO ACTIVATE
S169
CONFIRM ACTIVATION
NOTIFY REGISTRATION OVER (NOTIFY LIST)
S170
S171

FIG. 27

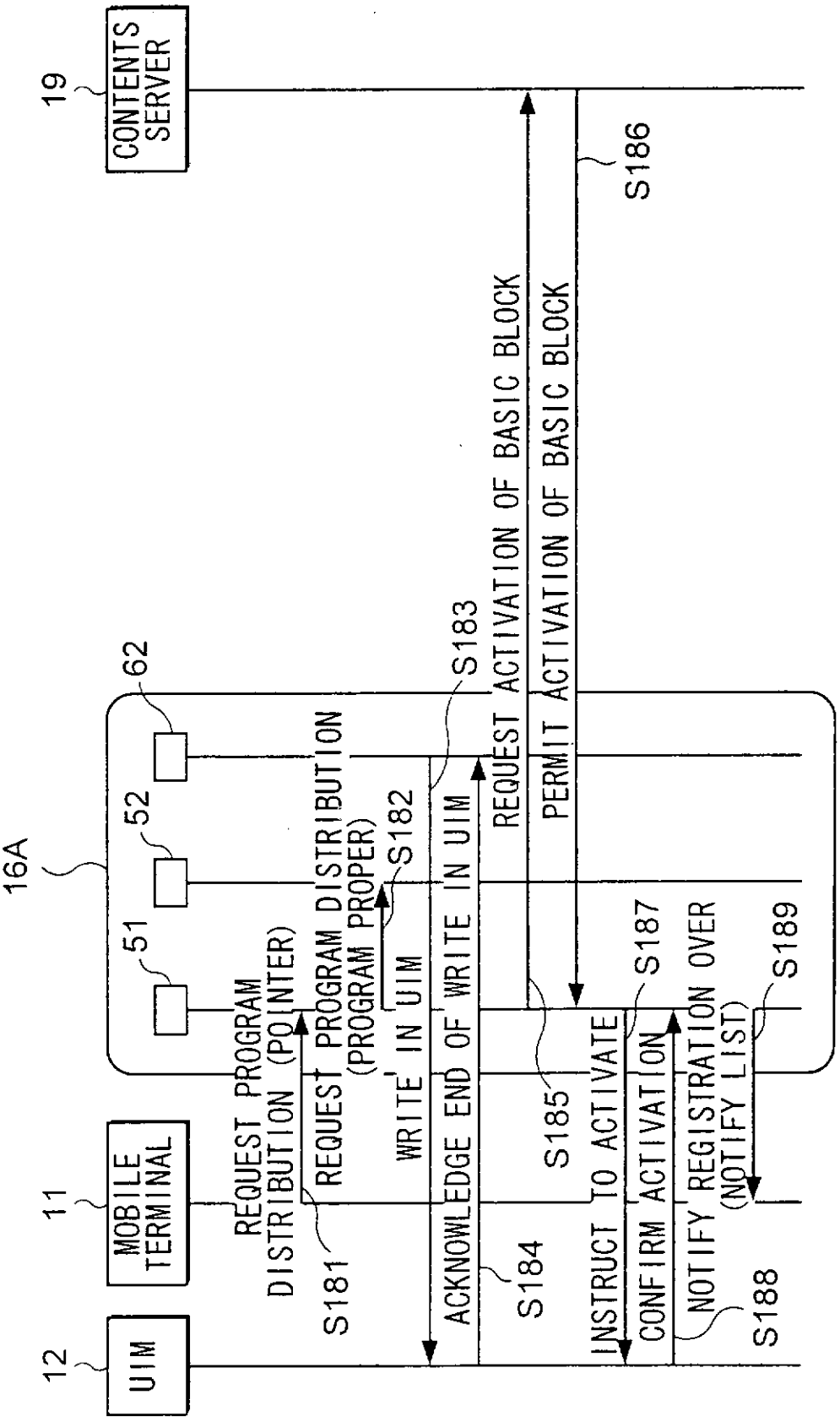

19
CONTENTS SERVER
16A
62
52
51
11
MOBILE TERMINAL
12
UIM
REQUEST PROGRAM DISTRIBUTION (POINTER)
S181
REQUEST PROGRAM DISTRIBUTION (PROGRAM PROPER)
S182
WRITE IN UIM
S183
REQUEST ACTIVATION OF BASIC BLOCK
PERMIT ACTIVATION OF BASIC BLOCK
S186
ACKNOWLEDGE END OF WRITE IN UIM
S184
S185
INSTRUCT TO ACTIVATE
S187
CONFIRM ACTIVATION
NOTIFY REGISTRATION OVER (NOTIFY LIST)
S189
S188

FIG. 28

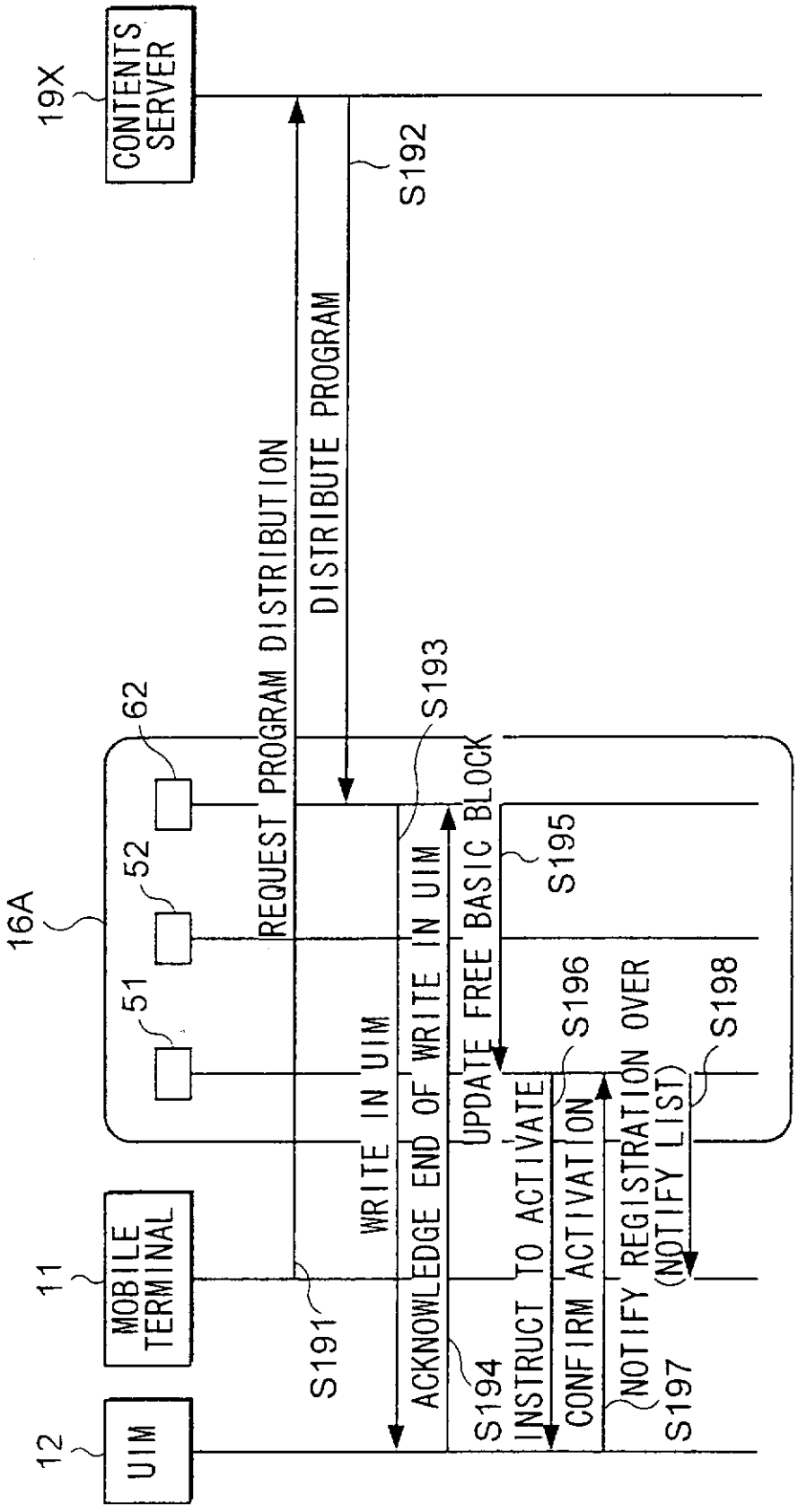

19X
CONTENTS SERVER
S192
DISTRIBUTE PROGRAM
REQUEST PROGRAM DISTRIBUTION
S193
62
52
51
16A
S195
UPDATE FREE BASIC BLOCK
S196
INSTRUCT TO ACTIVATE
CONFIRM ACTIVATION
S198
NOTIFY REGISTRATION OVER (NOTIFY LIST)
S197
WRITE IN UIM
ACKNOWLEDGE END OF WRITE IN UIM
S194
S191
11
MOBILE TERMINAL
12
UIM

FIG. 29

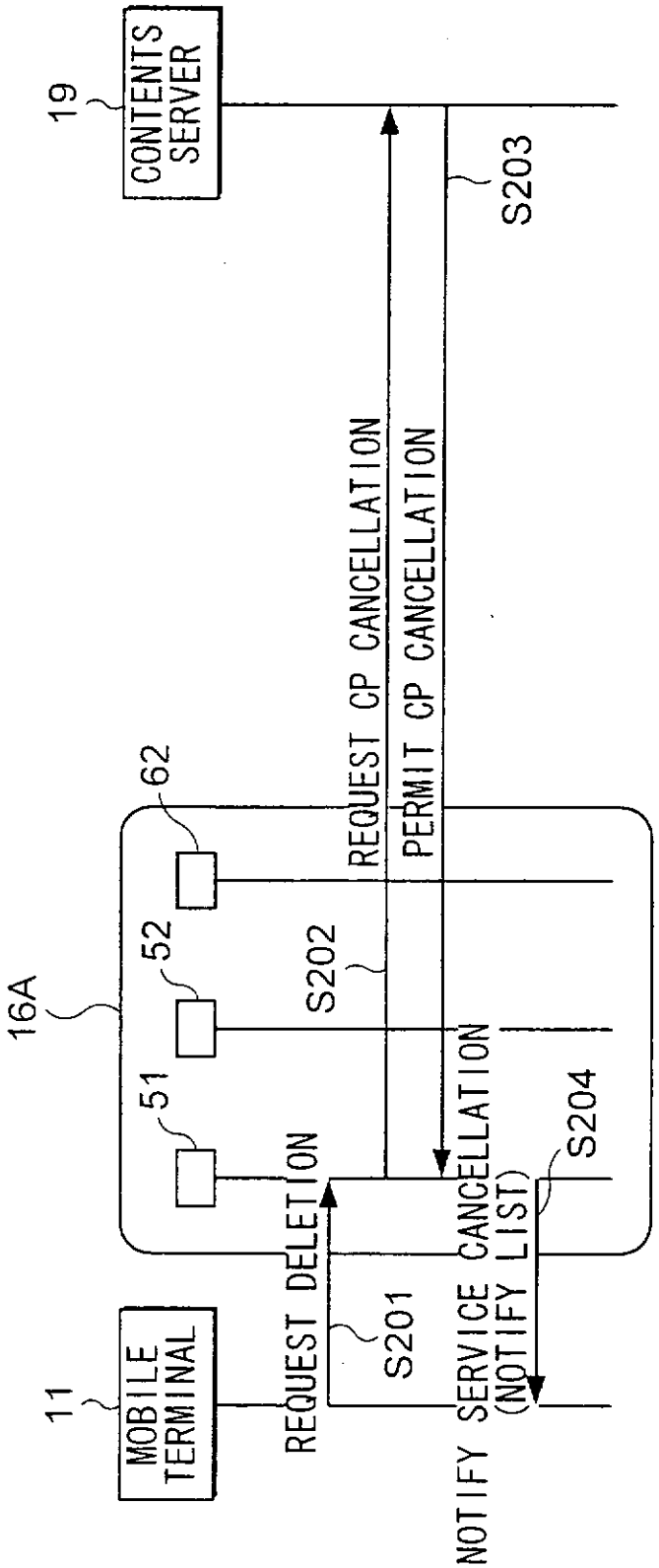

19
CONTENTS SERVER
S203
REQUEST CP CANCELLATION
PERMIT CP CANCELLATION
62
52
S202
16A
51
S204
REQUEST DELETION
S201
SERVICE CANCELLATION (NOTIFY LIST)
11
MOBILE TERMINAL
NOTIFY

FIG. 30

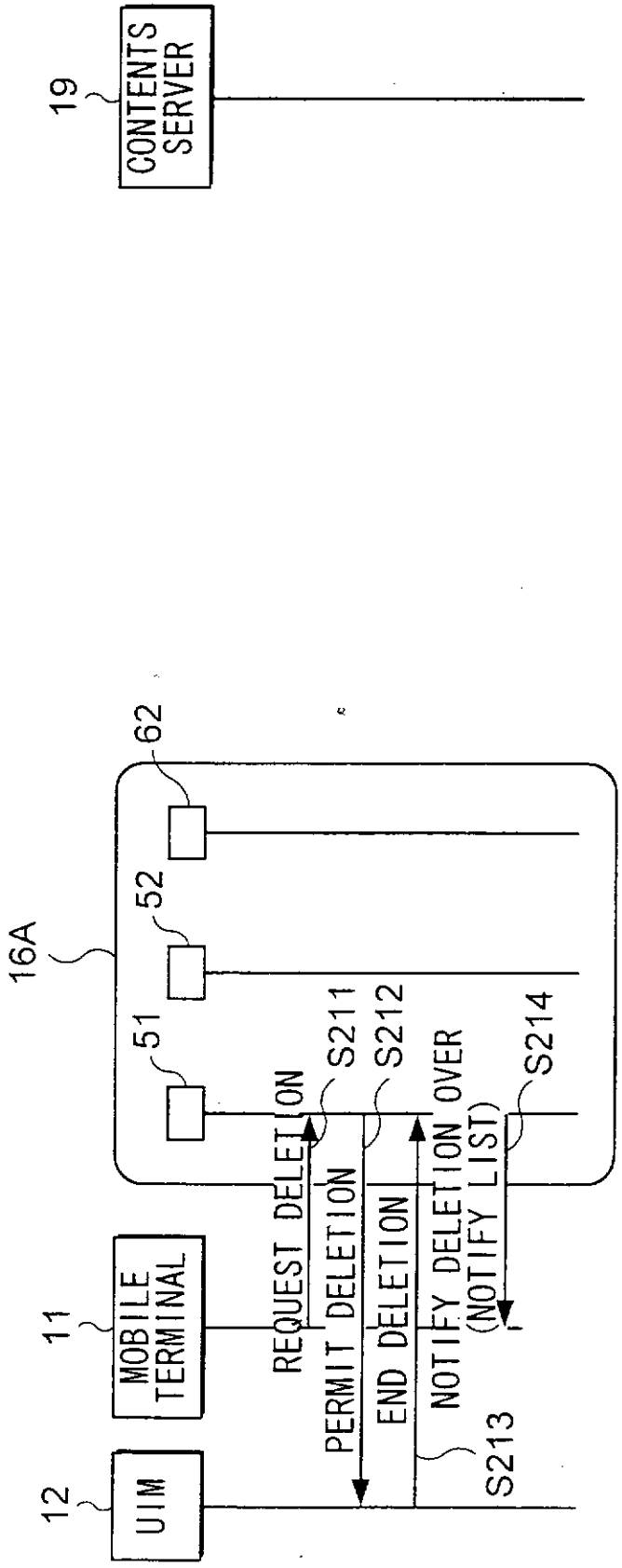

19
CONTENTS SERVER
16A
62
52
51
11
MOBILE TERMINAL
12
UIM
REQUEST DELETION
PERMIT DELETION
END DELETION
NOTIFY DELETION OVER (NOTIFY LIST)
S211
S212
S213
S214

FIG. 31

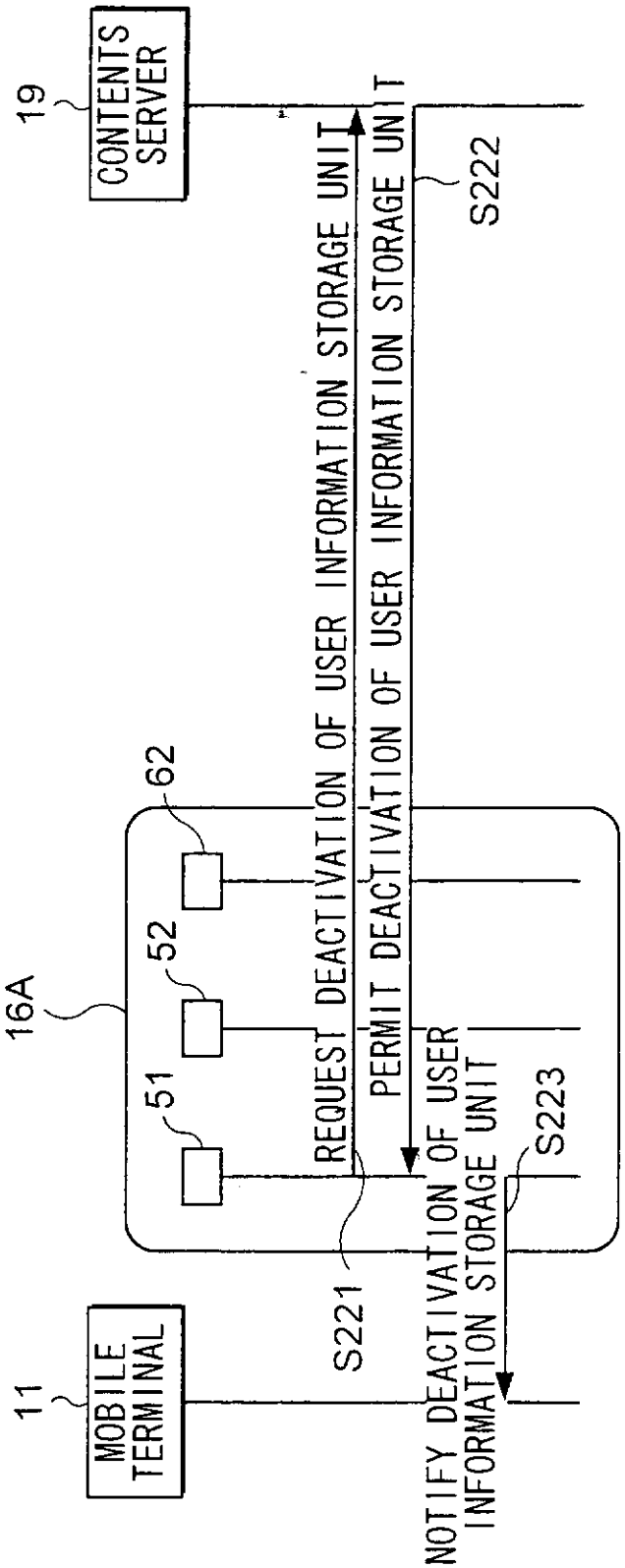
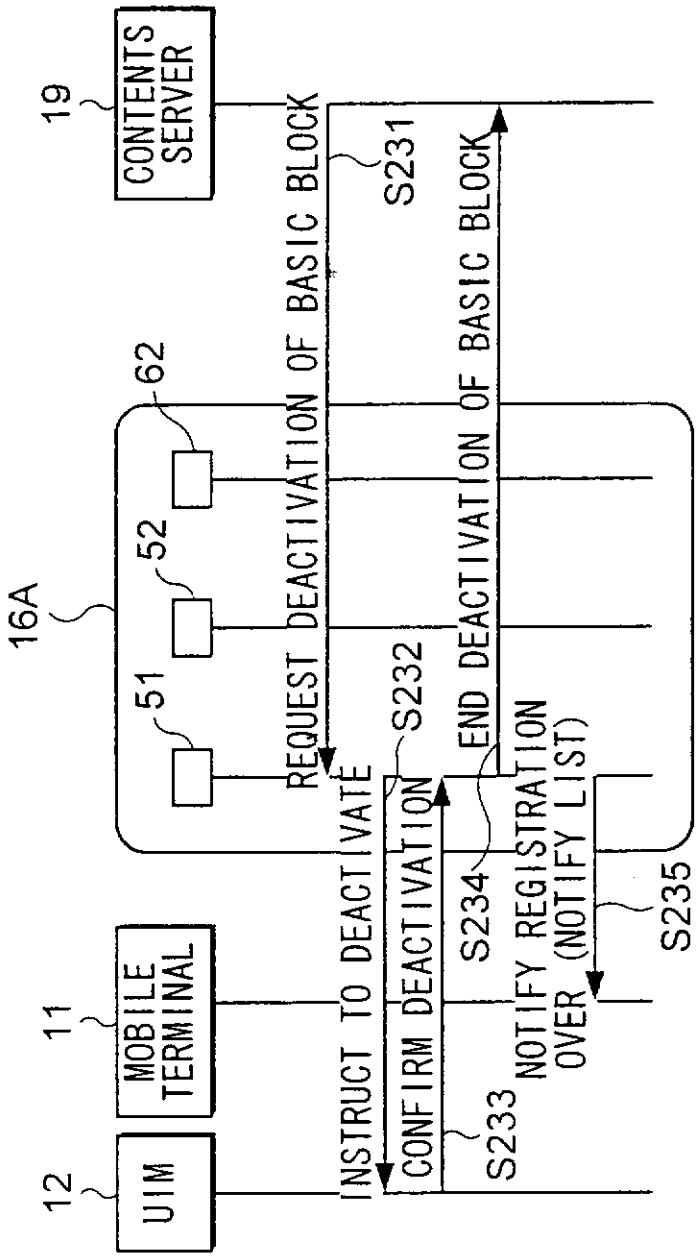

19
CONTENTS SERVER
S222
REQUEST DEACTIVATION OF USER INFORMATION STORAGE UNIT
PERMIT DEACTIVATION OF USER INFORMATION STORAGE UNIT
62
52
51
16A
S223
S221
11
MOBILE TERMINAL
NOTIFY DEACTIVATION OF USER INFORMATION STORAGE UNIT

FIG. 32


19
CONTENTS SERVER
S231
REQUEST DEACTIVATION OF BASIC BLOCK
END DEACTIVATION OF BASIC BLOCK
62
52
16A
51
S232
INSTRUCT TO DEACTIVATE
CONFIRM DEACTIVATION
S234
NOTIFY REGISTRATION OVER (NOTIFY LIST)
S235
S233
11
MOBILE TERMINAL
12
UIM