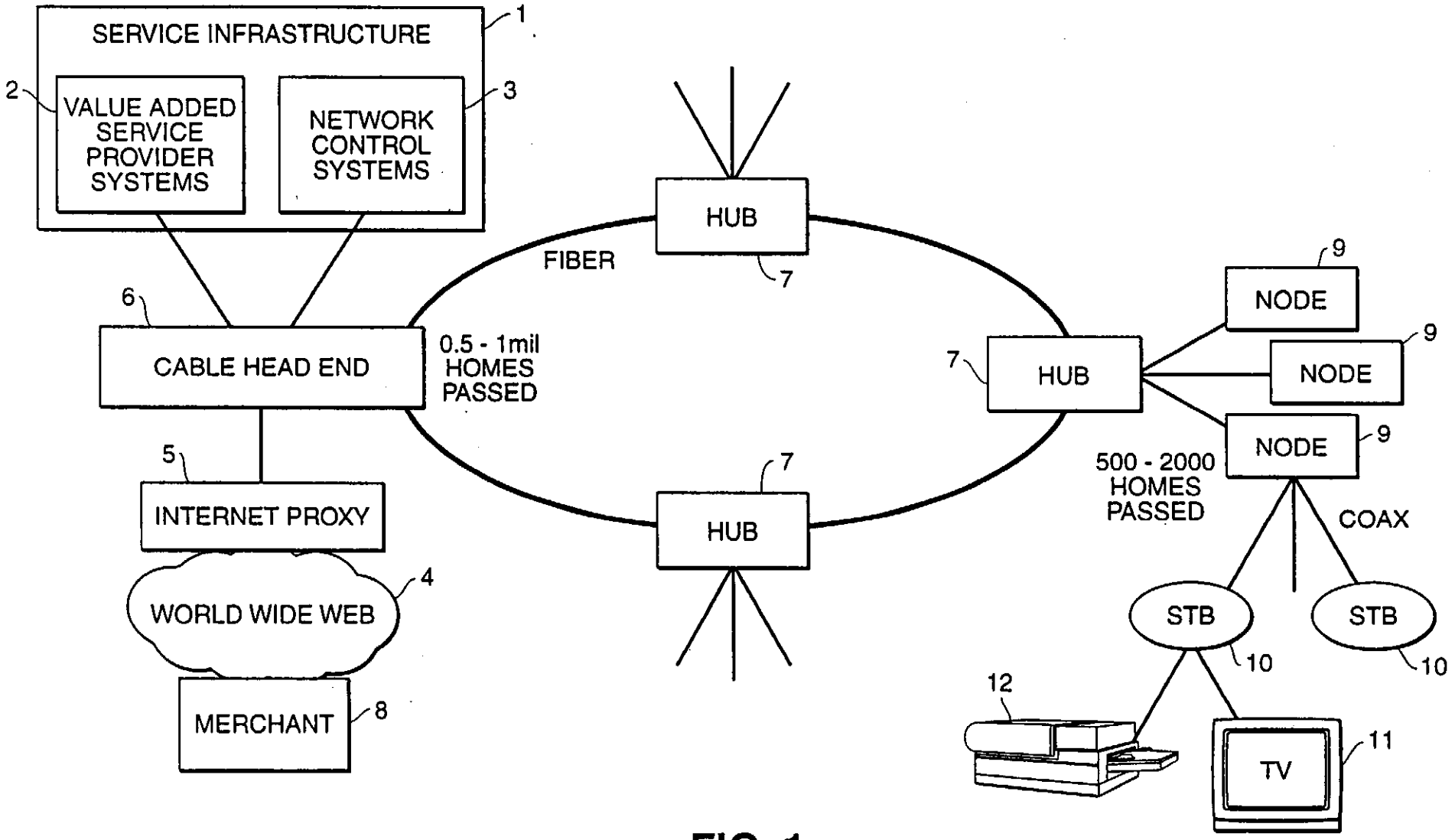


FIG. 1

20 JAN 2004

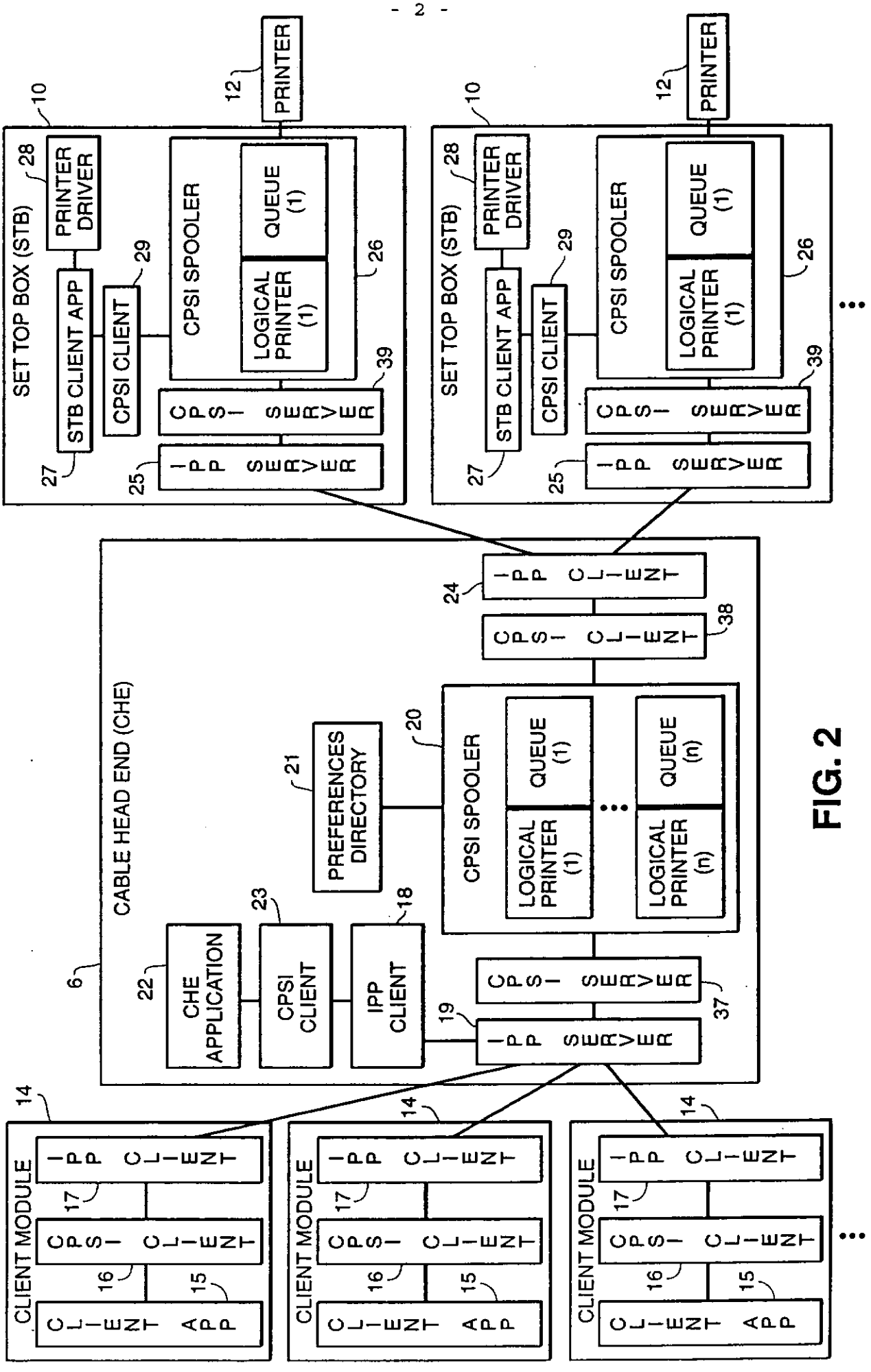

SET TOP BOX (STB)
10
PRINTER DRIVER
28
STB CLIENT APP
27
CPSI CLIENT
29
CPSI SPOOLER
26
QUEUE (1)
LOGICAL PRINTER (1)
PRINTER
12
CPSI SERVER
39
IPP SERVER
25
CABLE HEAD END (CHE)
6
CHE APPLICATION
22
CPSI CLIENT
23
IPP CLIENT
18
PREFERENCES DIRECTORY
21
CPSI SPOOLER
20
QUEUE (1)
QUEUE (n)
LOGICAL PRINTER (1)
LOGICAL PRINTER (n)
IPP SERVER
19
CPSI SERVER
37
IPP CLIENT
24
CPSI CLIENT
38
CLIENT MODULE
14
IPP CLIENT
17
CPSI CLIENT
16
CLIENT APP
15

FIG. 2

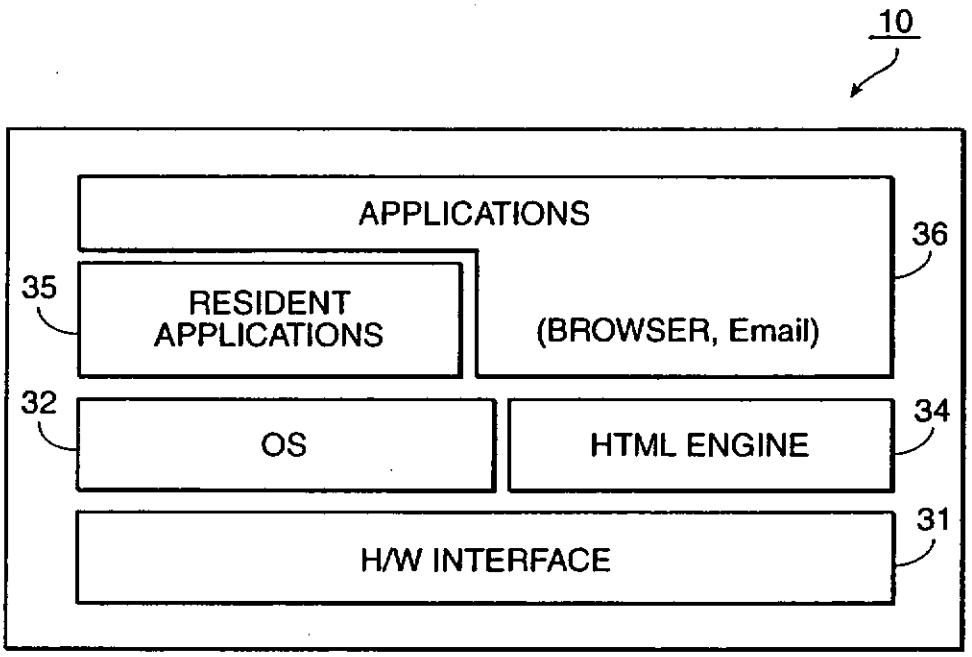

10
APPLICATIONS
36
35
RESIDENT APPLICATIONS
(BROWSER, Email)
32
OS
HTML ENGINE
34
31
H/W INTERFACE

FIG. 3

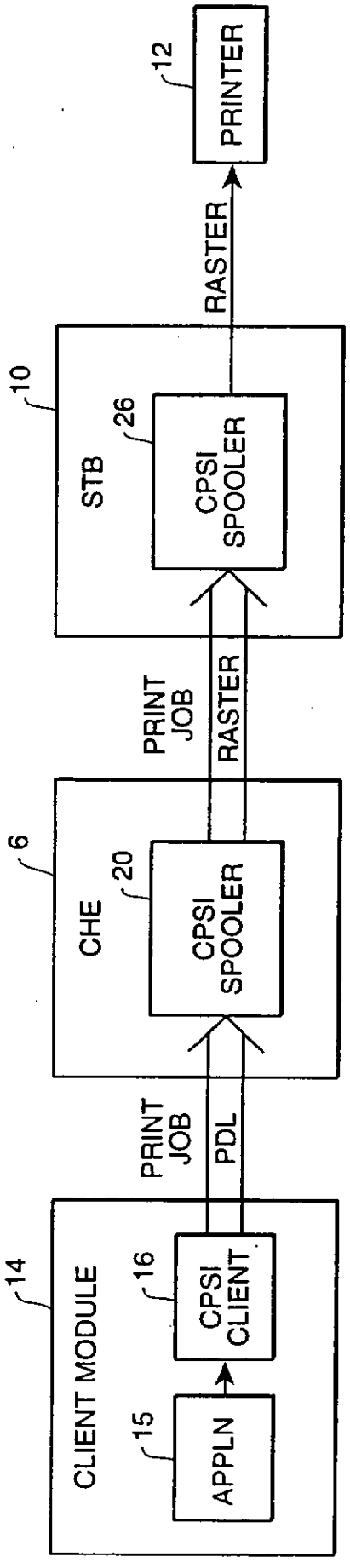

CLIENT MODULE
14
APPLN
15
CPSI CLIENT
16
PRINT JOB
PDL
CHE
6
CPSI SPOOLER
20
PRINT JOB
RASTER
STB
10
CPSI SPOOLER
26
RASTER
PRINTER
12

FIG. 4

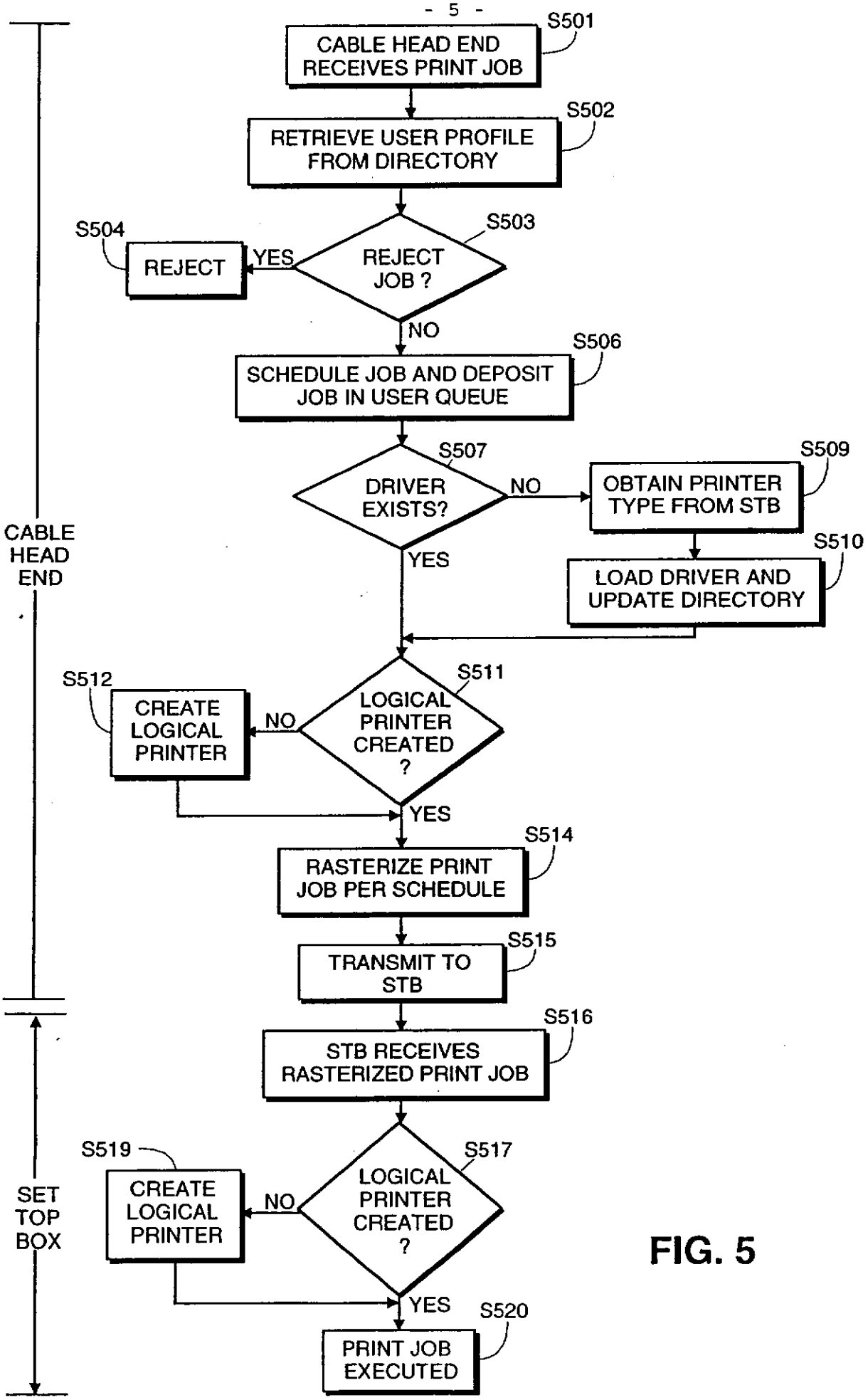

CABLE HEAD END RECEIVES PRINT JOB
S501
RETRIEVE USER PROFILE FROM DIRECTORY
S502
REJECT JOB ?
S503
YES
REJECT
S504
NO
SCHEDULE JOB AND DEPOSIT JOB IN USER QUEUE
S506
DRIVER EXISTS?
S507
NO
OBTAIN PRINTER TYPE FROM STB
S509
LOAD DRIVER AND UPDATE DIRECTORY
S510
YES
LOGICAL PRINTER CREATED ?
S511
NO
CREATE LOGICAL PRINTER
S512
YES
RASTERIZE PRINT JOB PER SCHEDULE
S514
TRANSMIT TO STB
S515
STB RECEIVES RASTERIZED PRINT JOB
S516
LOGICAL PRINTER CREATED ?
S517
NO
CREATE LOGICAL PRINTER
S519
YES
PRINT JOB EXECUTED
S520
CABLE HEAD END
SET TOP BOX

FIG. 5

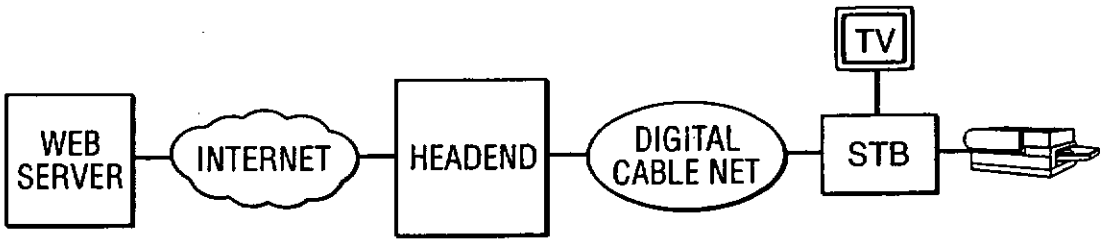


FIG. 6A

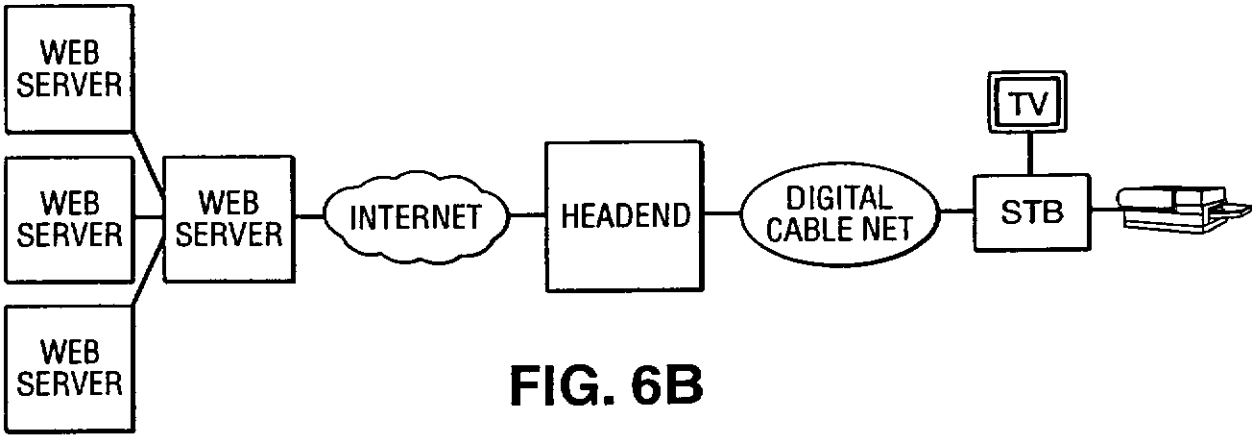


FIG. 6B

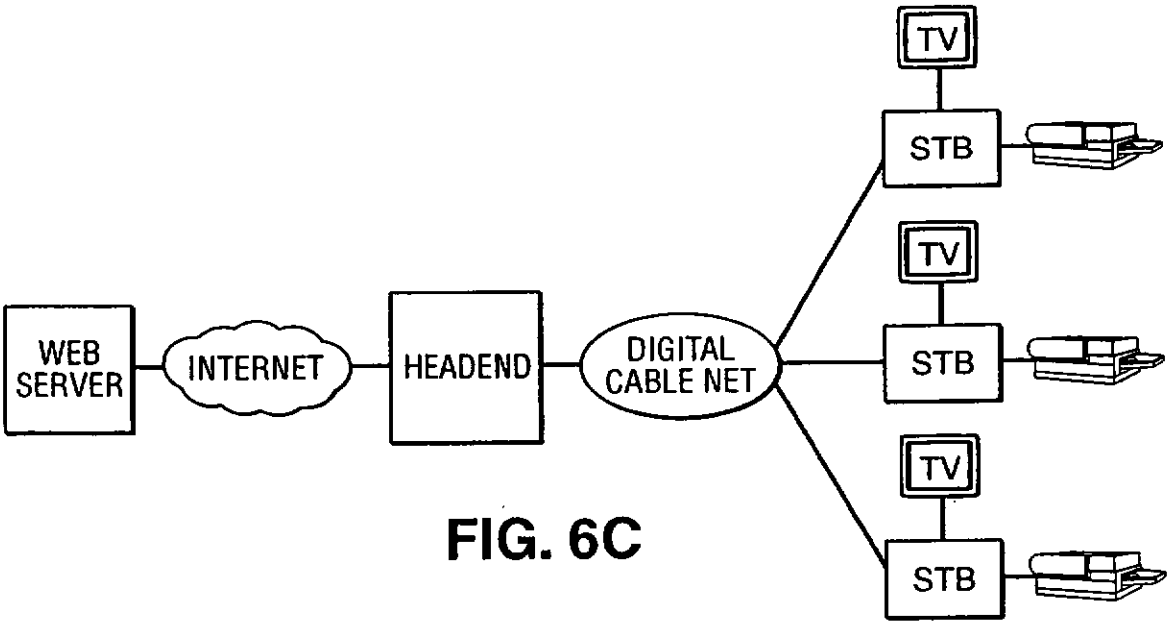


FIG. 6C

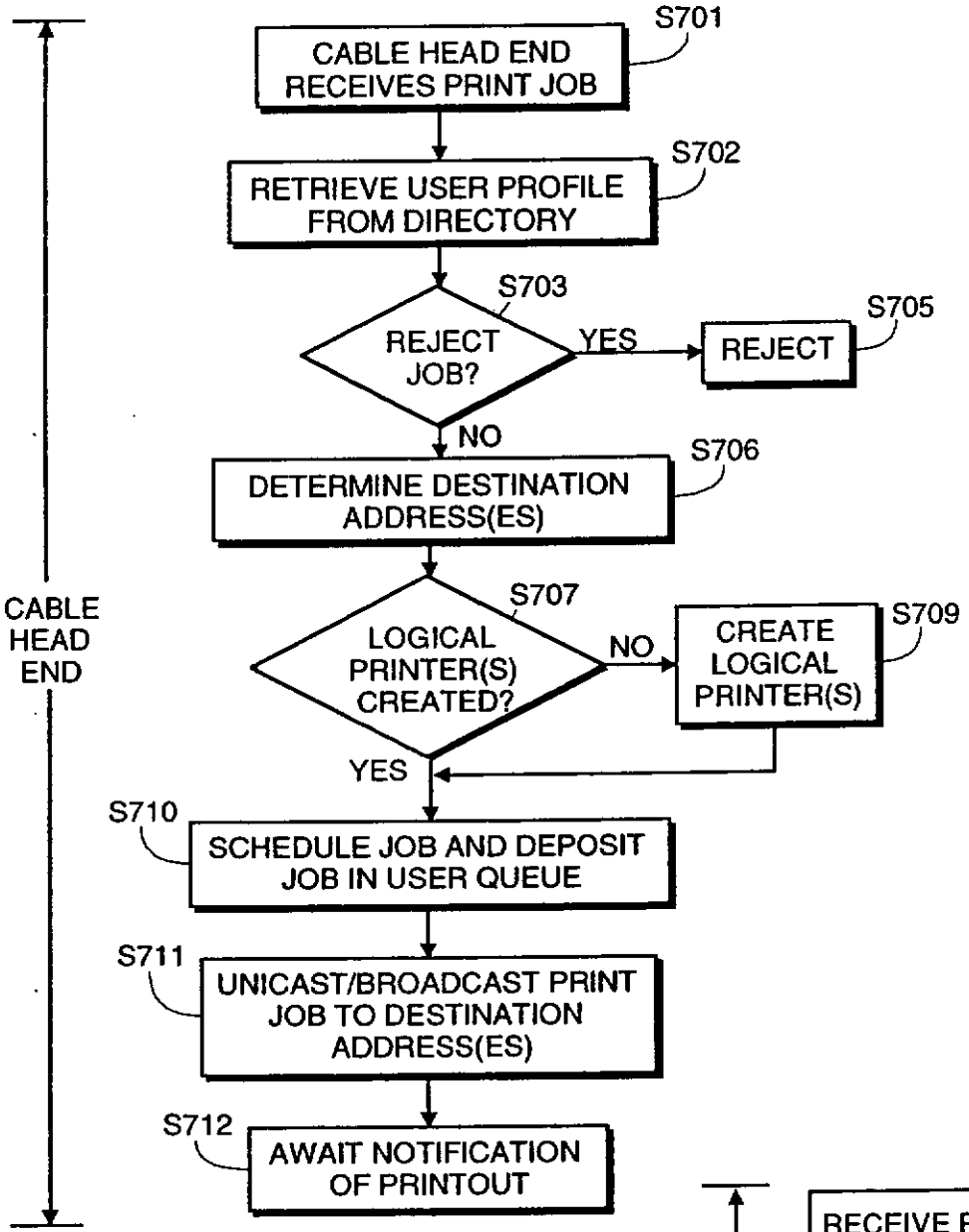

CABLE HEAD END
CABLE HEAD END RECEIVES PRINT JOB
S701
RETRIEVE USER PROFILE FROM DIRECTORY
S702
REJECT JOB?
S703
YES
REJECT
S705
NO
DETERMINE DESTINATION ADDRESS(ES)
S706
LOGICAL PRINTER(S) CREATED?
S707
NO
CREATE LOGICAL PRINTER(S)
S709
YES
SCHEDULE JOB AND DEPOSIT JOB IN USER QUEUE
S710
UNICAST/BROADCAST PRINT JOB TO DESTINATION ADDRESS(ES)
S711
AWAIT NOTIFICATION OF PRINTOUT
S712

FIG. 7A

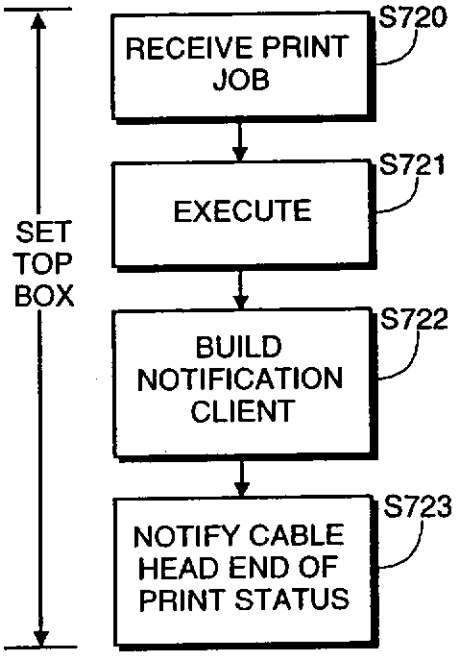

SET TOP BOX
RECEIVE PRINT JOB
S720
EXECUTE
S721
BUILD NOTIFICATION CLIENT
S722
NOTIFY CABLE HEAD END OF PRINT STATUS
S723

FIG. 7B

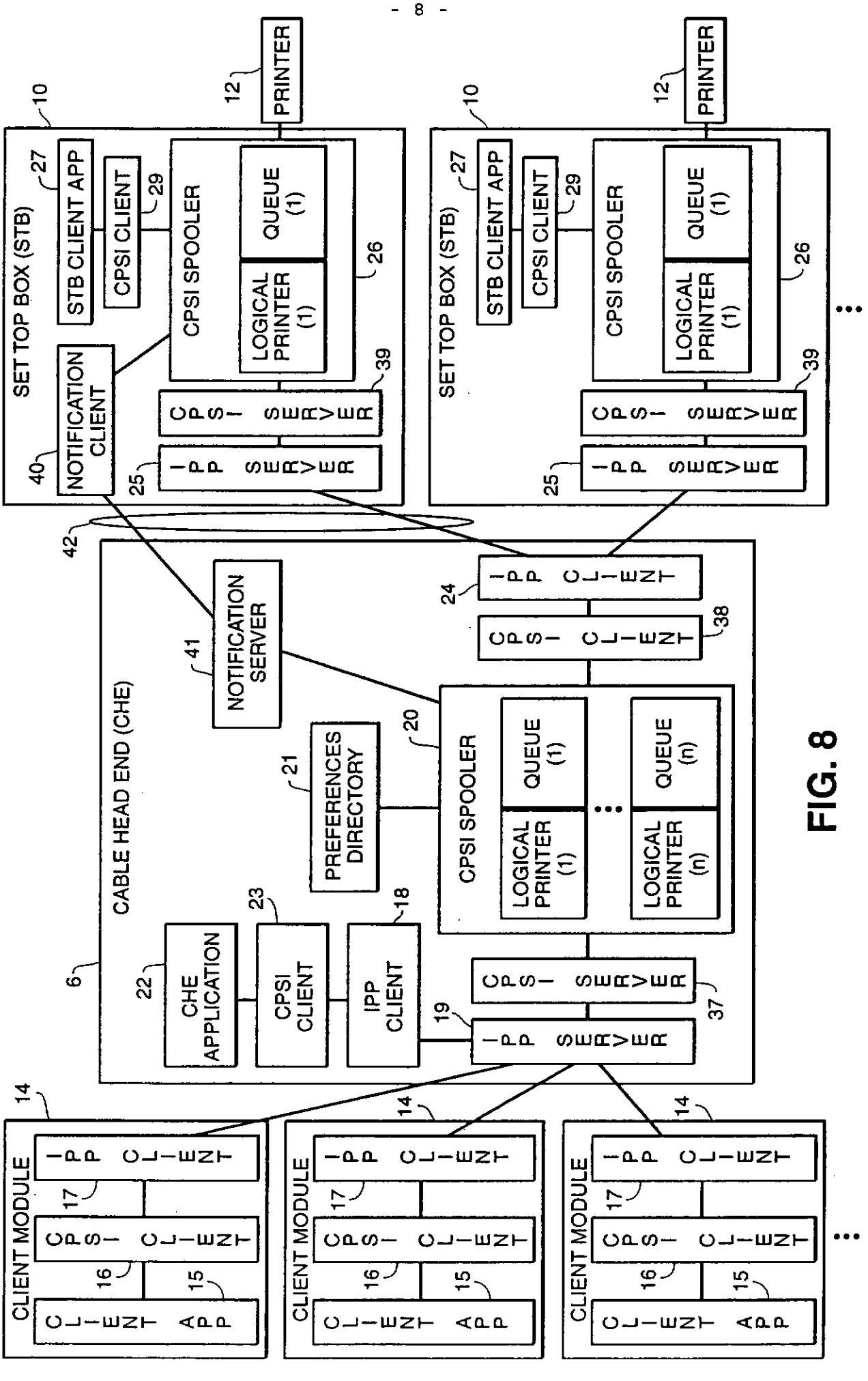

SET TOP BOX (STB)
10
STB CLIENT APP
27
CPSI CLIENT
29
CPSI SPOOLER
26
QUEUE (1)
LOGICAL PRINTER (1)
PRINTER
12
NOTIFICATION CLIENT
40
CPSI SERVER
39
IPP SERVER
25
42
CABLE HEAD END (CHE)
6
NOTIFICATION SERVER
41
PREFERENCES DIRECTORY
21
20
QUEUE (n)
LOGICAL PRINTER (n)
IPP CLIENT
24
CPSI CLIENT
38
CHE APPLICATION
22
23
18
19
37
CLIENT MODULE
14
17
16
15
CLIENT APP

FIG. 8

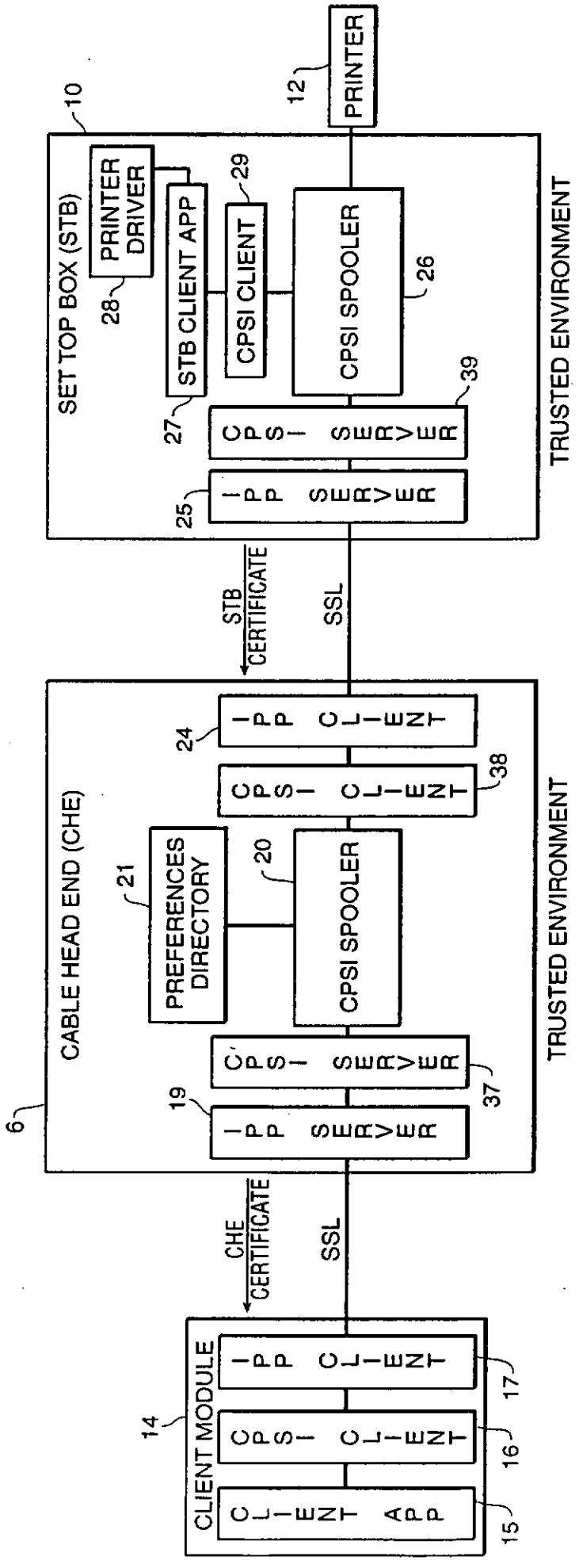

CLIENT MODULE
14
CLIENT APP
15
CPSI CLIENT
16
IPP CLIENT
17
CHE CERTIFICATE
SSL
CABLE HEAD END (CHE)
6
IPP SERVER
19
CPSI SERVER
37
CPSI SPOOLER
20
PREFERENCES DIRECTORY
21
CPSI CLIENT
38
IPP CLIENT
24
TRUSTED ENVIRONMENT
STB CERTIFICATE
SSL
SET TOP BOX (STB)
10
IPP SERVER
25
CPSI SERVER
39
CPSI SPOOLER
26
CPSI CLIENT
29
STB CLIENT APP
27
PRINTER DRIVER
28
PRINTER
12
TRUSTED ENVIRONMENT

FIG. 9

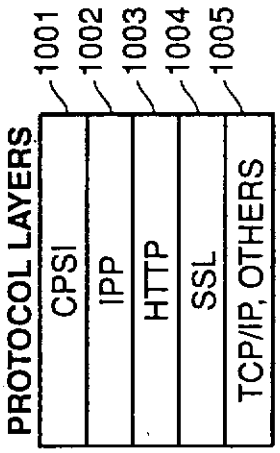

PROTOCOL LAYERS
CPSI
IPP
HTTP
SSL
TCP/IP, OTHERS
1001
1002
1003
1004
1005

FIG. 10

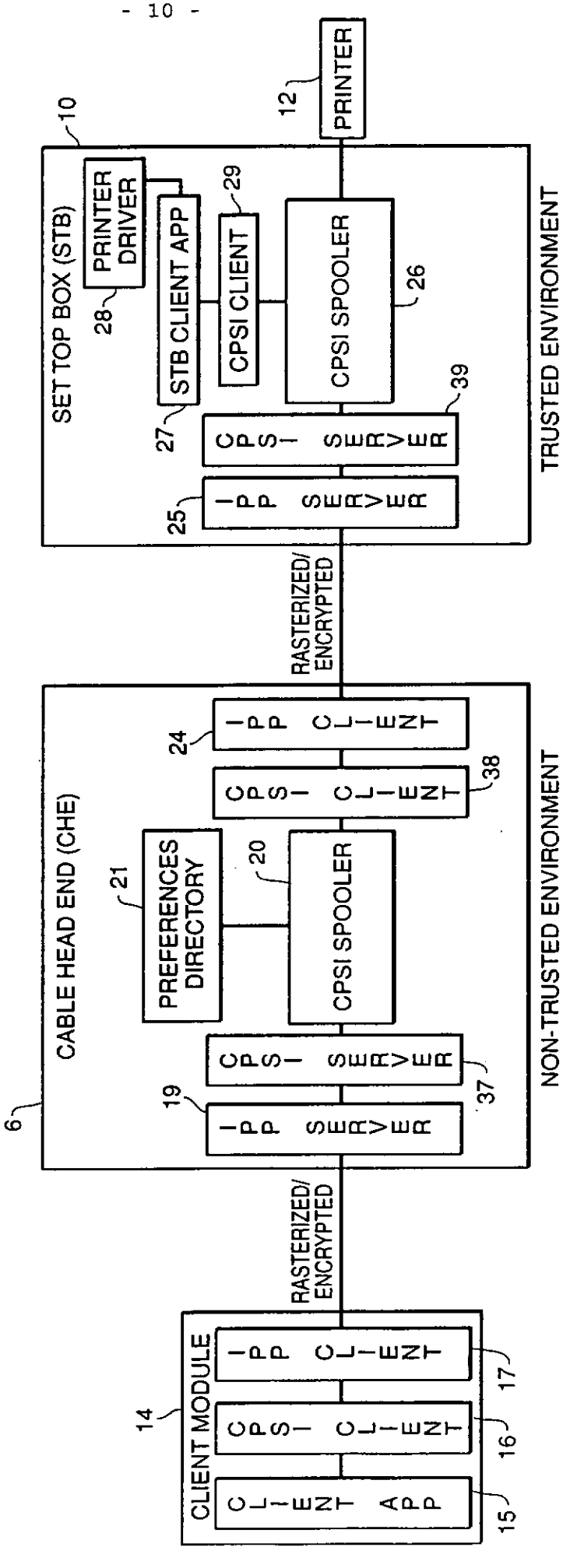

SET TOP BOX (STB)
10
PRINTER
12
PRINTER DRIVER
28
STB CLIENT APP
27
CPSI CLIENT
29
CPSI SPOOLER
26
CPSI SERVER
39
IPP SERVER
25
TRUSTED ENVIRONMENT
RASTERIZED/ ENCRYPTED
CABLE HEAD END (CHE)
6
IPP CLIENT
24
CPSI CLIENT
38
PREFERENCES DIRECTORY
21
CPSI SPOOLER
20
CPSI SERVER
37
IPP SERVER
19
NON-TRUSTED ENVIRONMENT
RASTERIZED/ ENCRYPTED
CLIENT MODULE
14
IPP CLIENT
17
CPSI CLIENT
16
CLIENT APP
15

FIG. 11

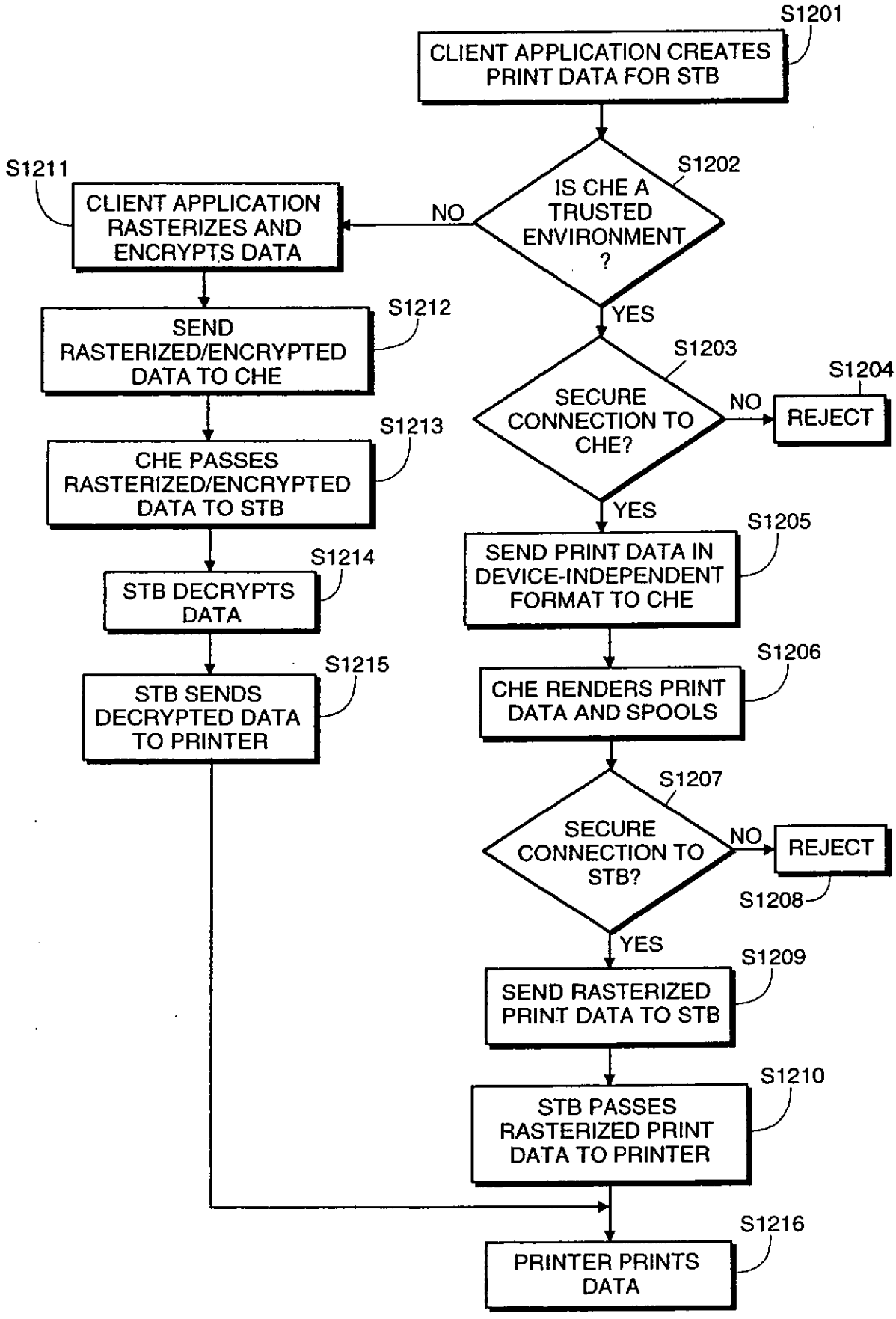

S1201
CLIENT APPLICATION CREATES PRINT DATA FOR STB
S1202
IS CHE A TRUSTED ENVIRONMENT ?
NO
S1211
CLIENT APPLICATION RASTERIZES AND ENCRYPTS DATA
YES
S1203
SECURE CONNECTION TO CHE?
NO
S1204
REJECT
YES
S1205
SEND PRINT DATA IN DEVICE-INDEPENDENT FORMAT TO CHE
S1206
CHE RENDERS PRINT DATA AND SPOOLS
S1207
SECURE CONNECTION TO STB?
NO
REJECT
S1208
YES
S1209
SEND RASTERIZED PRINT DATA TO STB
S1210
STB PASSES RASTERIZED PRINT DATA TO PRINTER
S1212
SEND RASTERIZED/ENCRYPTED DATA TO CHE
S1213
CHE PASSES RASTERIZED/ENCRYPTED DATA TO STB
S1214
STB DECRYPTS DATA
S1215
STB SENDS DECRYPTED DATA TO PRINTER
S1216
PRINTER PRINTS DATA

FIG. 12

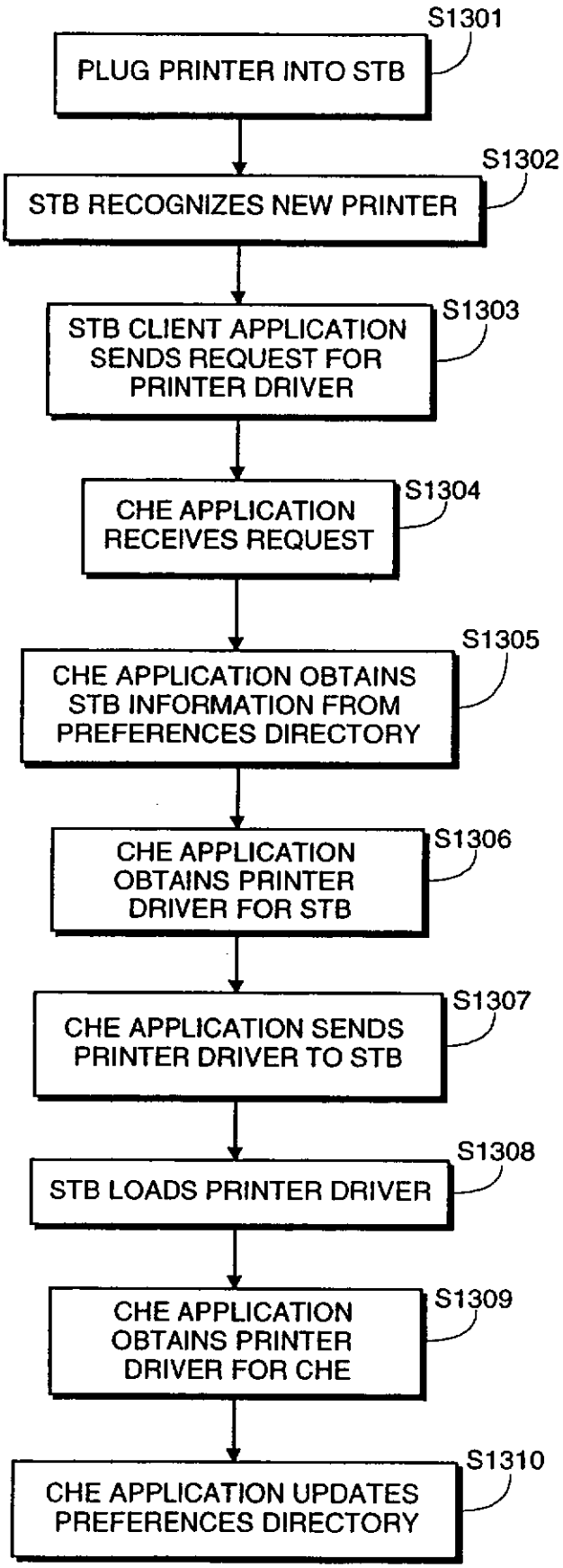

S1301
PLUG PRINTER INTO STB
S1302
STB RECOGNIZES NEW PRINTER
S1303
STB CLIENT APPLICATION SENDS REQUEST FOR PRINTER DRIVER
S1304
CHE APPLICATION RECEIVES REQUEST
S1305
CHE APPLICATION OBTAINS STB INFORMATION FROM PREFERENCES DIRECTORY
S1306
CHE APPLICATION OBTAINS PRINTER DRIVER FOR STB
S1307
CHE APPLICATION SENDS PRINTER DRIVER TO STB
S1308
STB LOADS PRINTER DRIVER
S1309
CHE APPLICATION OBTAINS PRINTER DRIVER FOR CHE
S1310
CHE APPLICATION UPDATES PREFERENCES DIRECTORY

FIG. 13