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(54) **ELECTRONIC BOOK WITH VOICE EMULATION FEATURES**

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(73) Assignee: **ADREA, LLC**, Sunnyvale, CA (US)

(21) Appl. No.: **14/812,539**

(22) Filed: **Jul. 29, 2015**

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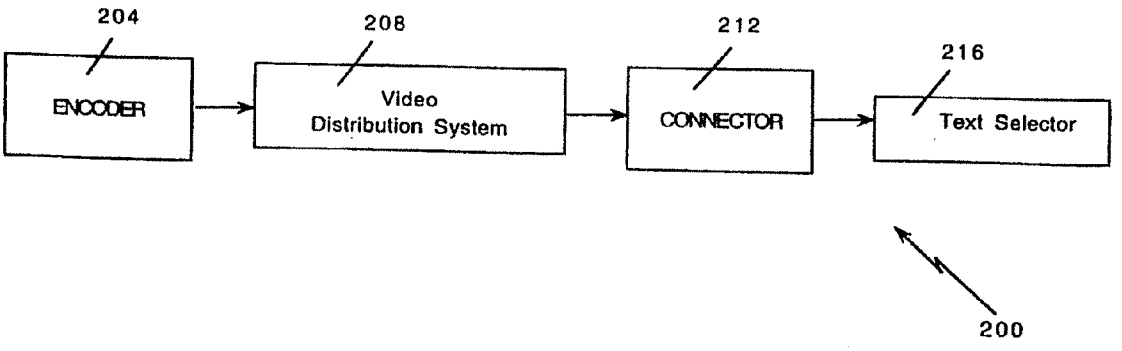
G10L 13/02 (2006.01)

(52) **U.S. Cl.**
CPC *G10L 13/02* (2013.01)

(57) **ABSTRACT**

A method and system for providing text-to-audio conversion of an electronic book displayed on a viewer. A user selects a portion of displayed text and converts it into audio. The text-to-audio conversion may be performed via a header file and pre-recorded audio for each electronic book, via text-to-speech conversion, or other available means. The user may select manual or automatic text-to audio conversion. The automatic text-to-audio conversion may be performed by automatically turning the pages of the electronic book or by the user manually turning the pages. The user may also select to convert the entire electronic book, or portions of it, into audio. The user may also select an option to receive an audio definition of a particular word in the electronic book. The present invention allows a user to control the system by selecting options from a screen or by entering voice commands.



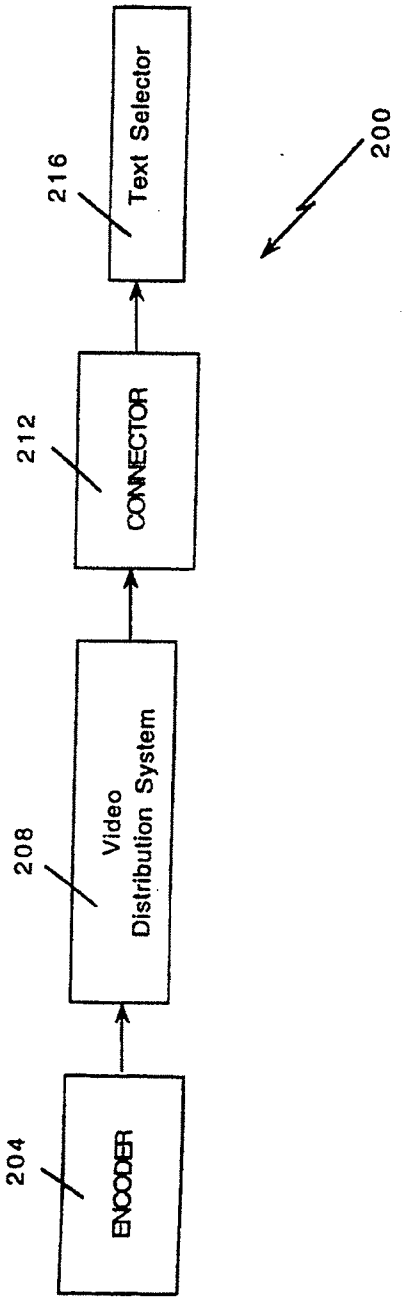

ENCODER
204
Video
Distribution System
208
CONNECTOR
212
Text Selector
216
200

Fig. 1

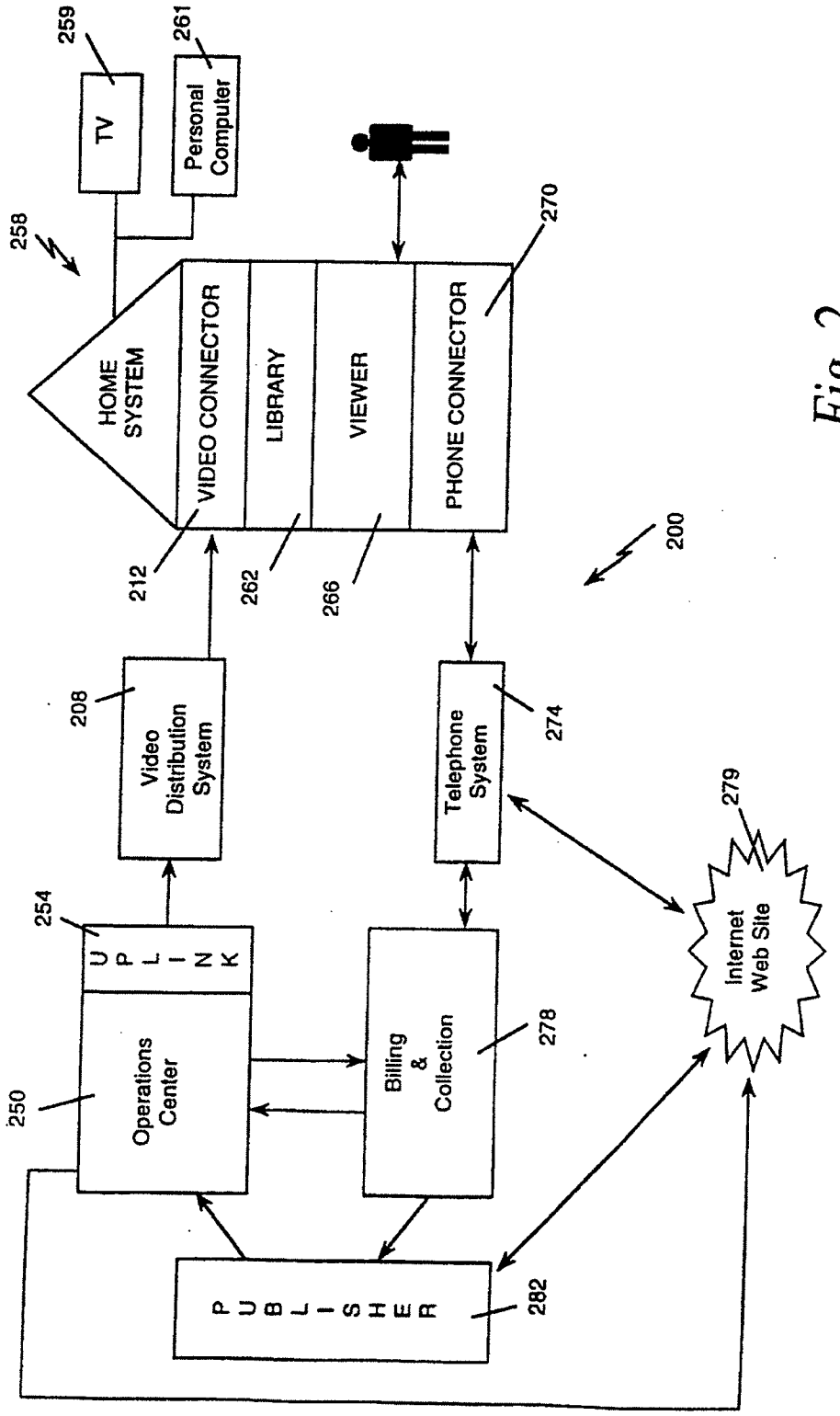

259
TV
261
Personal Computer
258
HOME SYSTEM
VIDEO CONNECTOR
LIBRARY
VIEWER
PHONE CONNECTOR
270
212
262
266
200
208
Video Distribution System
Telephone System
274
279
Internet Web Site
254
U P L I N K
Operations Center
250
Billing & Collection
278
P U B L I S H E R
282

Fig. 2

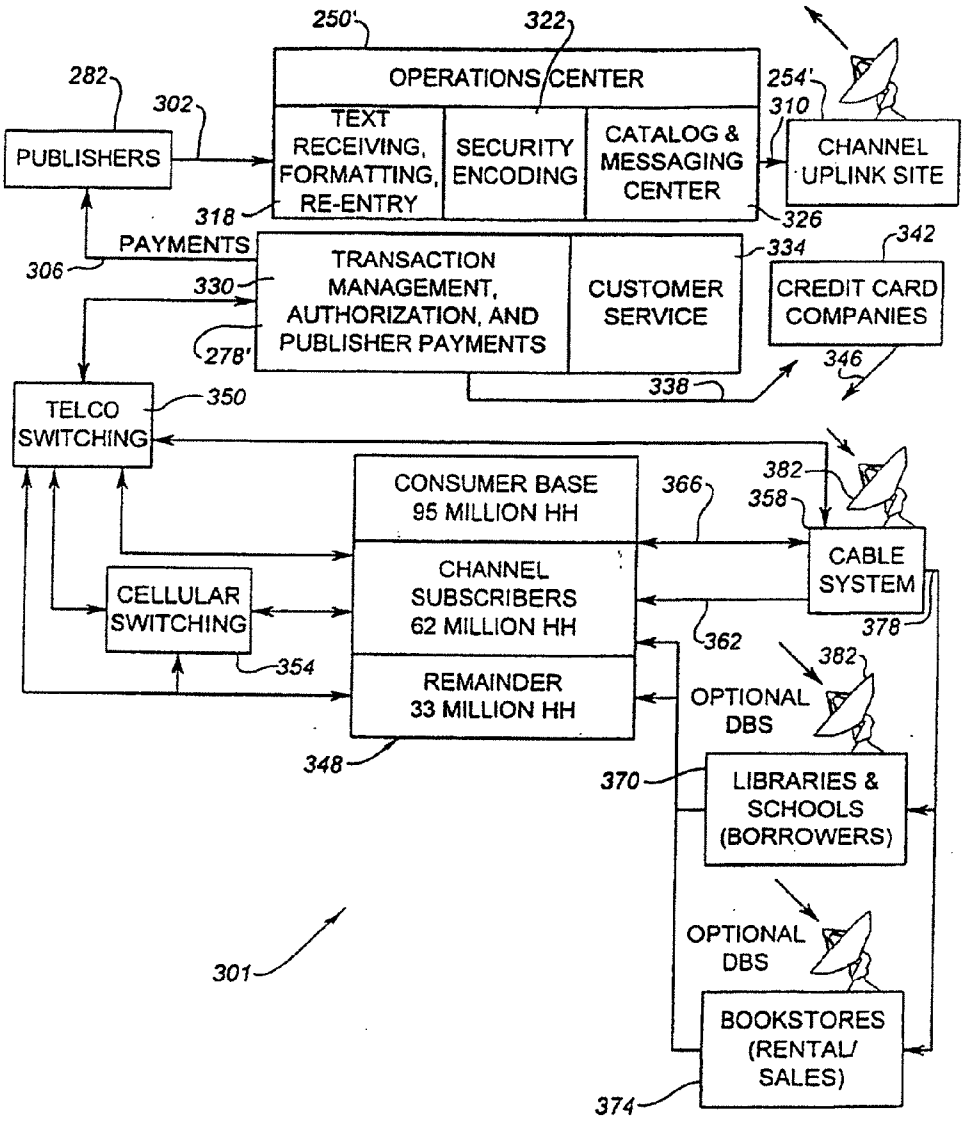

250'
322
OPERATIONS CENTER
282
302
254'
310
PUBLISHERS
TEXT RECEIVING, FORMATTING, RE-ENTRY
SECURITY ENCODING
CATALOG & MESSAGING CENTER
CHANNEL UPLINK SITE
318
326
PAYMENTS
306
330
TRANSACTION MANAGEMENT, AUTHORIZATION, AND PUBLISHER PAYMENTS
CUSTOMER SERVICE
334
342
CREDIT CARD COMPANIES
278'
346
338
TELCO SWITCHING
350
CONSUMER BASE 95 MILLION HH
366
382
358
CABLE SYSTEM
CELLULAR SWITCHING
CHANNEL SUBSCRIBERS 62 MILLION HH
378
362
354
382
REMAINDER 33 MILLION HH
OPTIONAL DBS
348
370
LIBRARIES & SCHOOLS (BORROWERS)
OPTIONAL DBS
301
BOOKSTORES (RENTAL/ SALES)
374

Fig. 3a

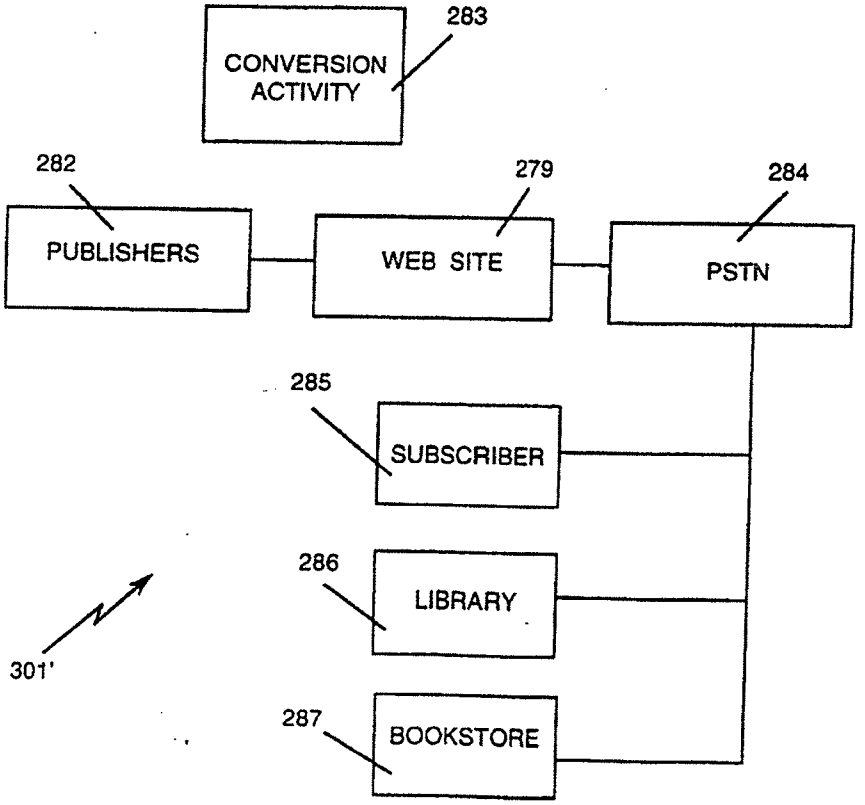

CONVERSION ACTIVITY
283
282
PUBLISHERS
279
WEB SITE
284
PSTN
285
SUBSCRIBER
286
LIBRARY
287
BOOKSTORE
301'

Fig. 3b

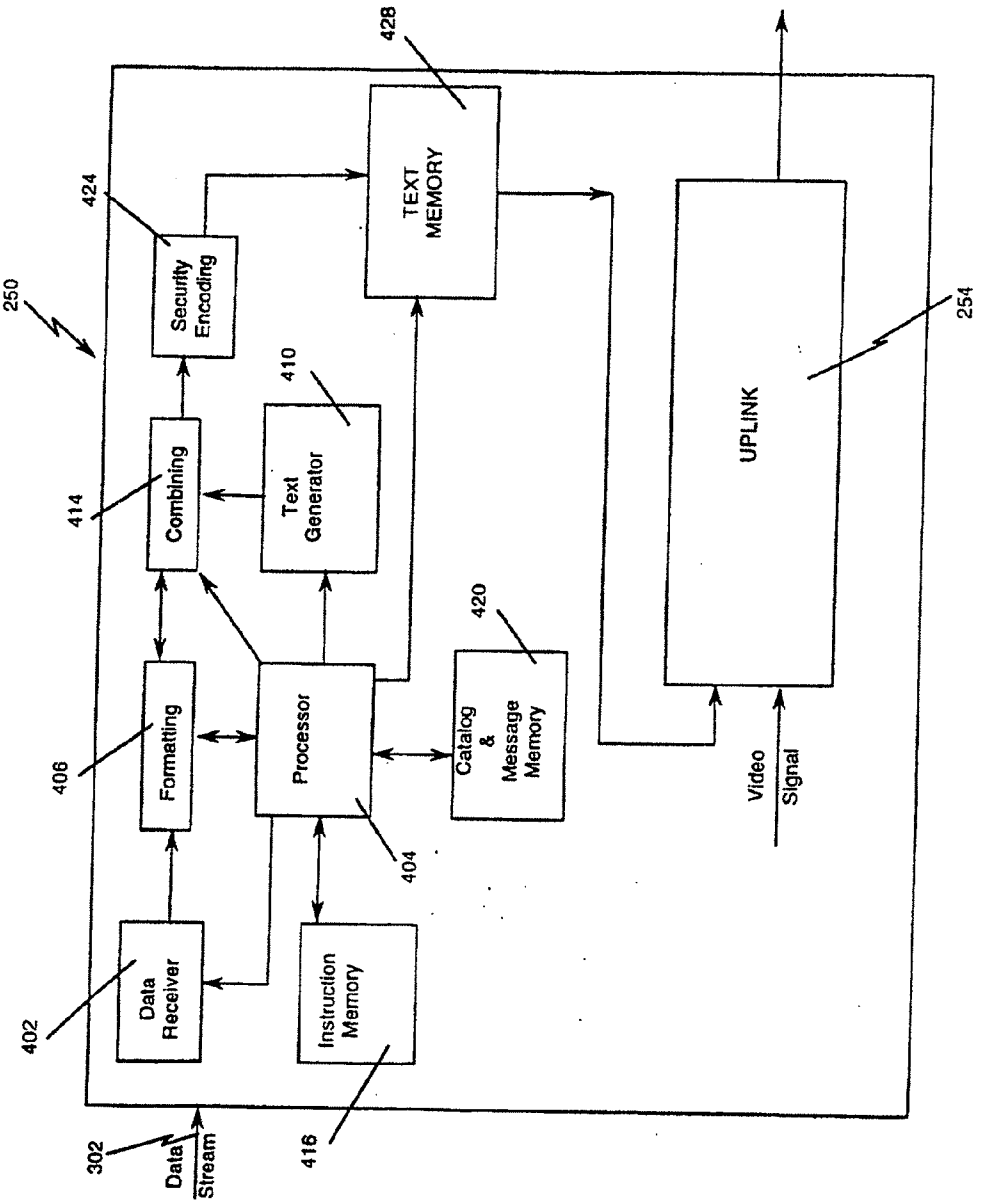

428
TEXT MEMORY
424
Security Encoding
250
410
Text Generator
414
Combining
420
Catalog & Message Memory
406
Formatting
Processor
404
UPLINK
254
Video Signal
402
Data Receiver
Instruction Memory
416
302
Data Stream

Fig. 4

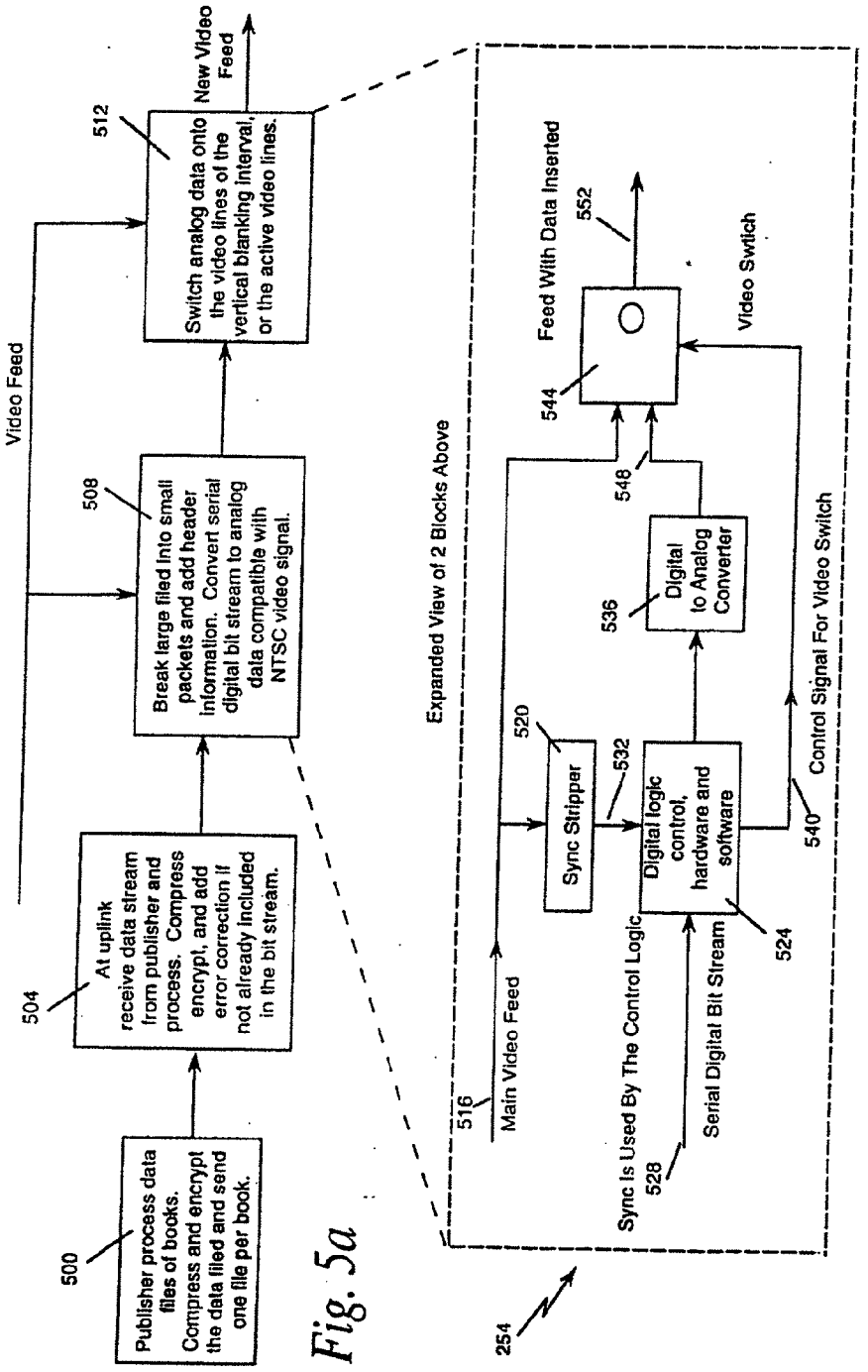

500
Publisher process data files of books. Compress and encrypt the data filed and send one file per book.
504
At uplink receive data stream from publisher and process. Compress encrypt, and add error correction if not already included in the bit stream.
Video Feed
508
Break large filed into small packets and add header information. Convert serial digital bit stream to analog data compatible with NTSC video signal.
512
Switch analog data onto the video lines of the vertical blanking interval, or the active video lines.
New Video Feed

Fig. 5a

Expanded View of 2 Blocks Above
516
Main Video Feed
520
Sync Stripper
532
Digital logic control, hardware and software
524
Sync Is Used By The Control Logic
528
Serial Digital Bit Stream
536
Digital to Analog Converter
548
544
Feed With Data Inserted
552
Video Switch
540
Control Signal For Video Switch
254

Fig. 5b

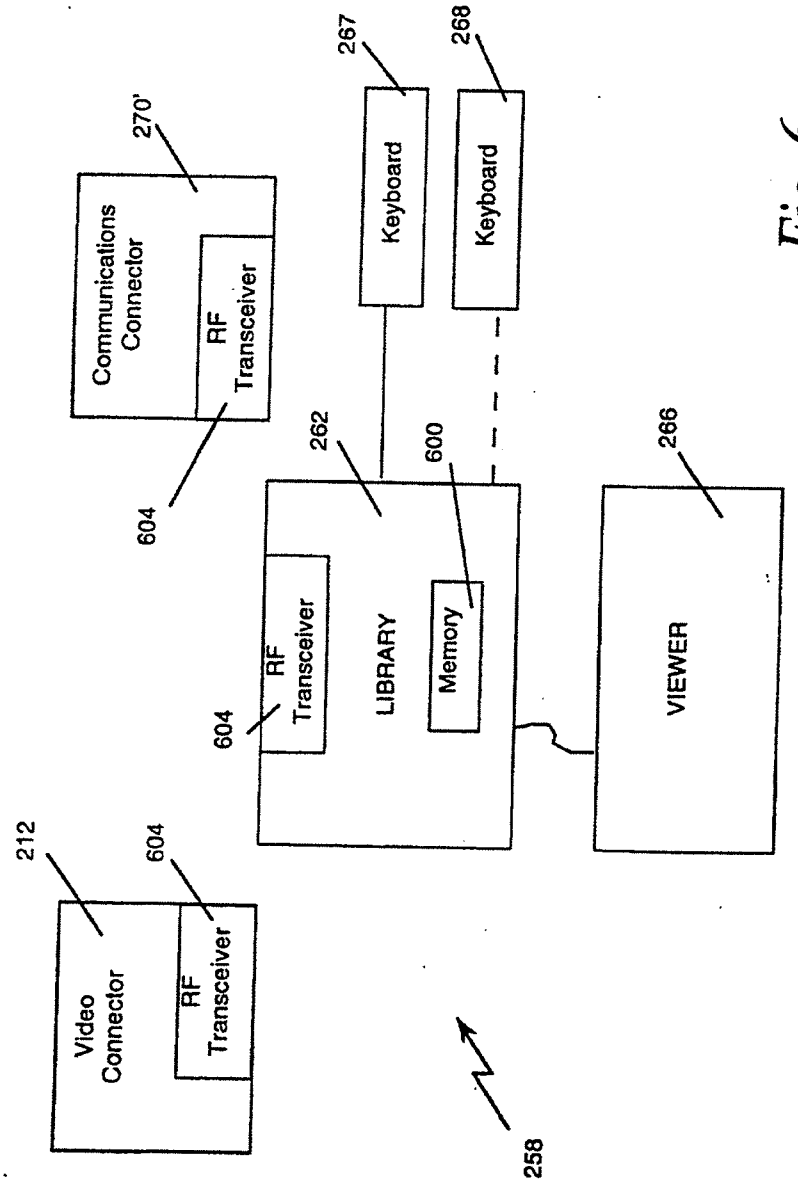

267
268
270'
Keyboard
Keyboard
Communications Connector
RF Transceiver
604
262
600
266
RF Transceiver
LIBRARY
Memory
VIEWER
604
212
604
Video Connector
RF Transceiver
258

Fig. 6a

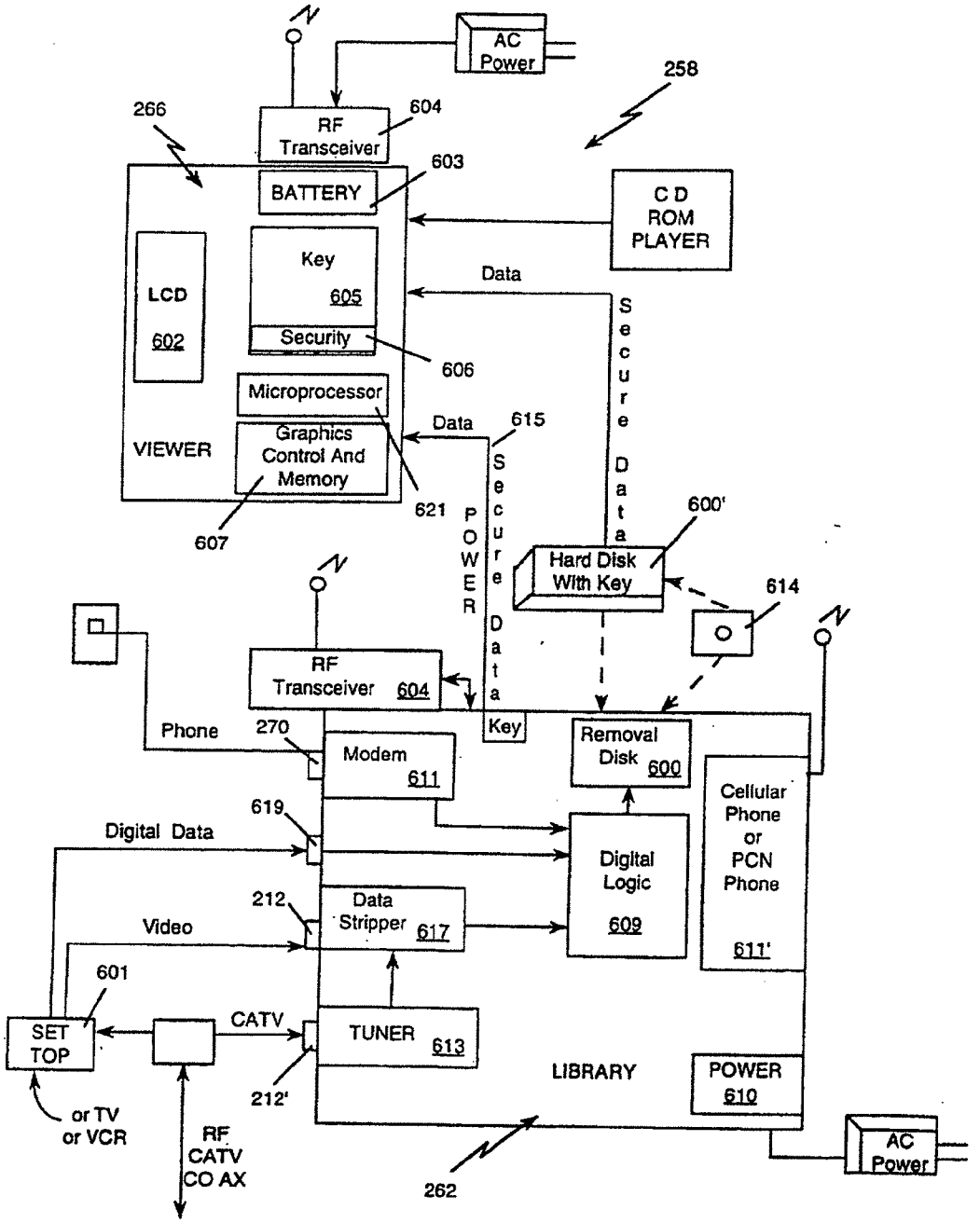

AC Power
258
266
RF Transceiver
604
603
BATTERY
C D ROM PLAYER
LCD 602
Key 605
Security
606
Data
Secure Data
Microprocessor
Data
615
VIEWER
Graphics Control And Memory
621
607
POWER
Secure Data
600'
Hard Disk With Key
614
RF Transceiver 604
Phone
270
Modem 611
Key
Removal Disk 600
Cellular Phone or PCN Phone 611'
619
Digital Data
Digital Logic 609
212
Data Stripper 617
Video
601
SET TOP
CATV
TUNER 613
LIBRARY
POWER 610
212'
or TV or VCR
RF CATV CO AX
262
AC Power

Fig. 6b

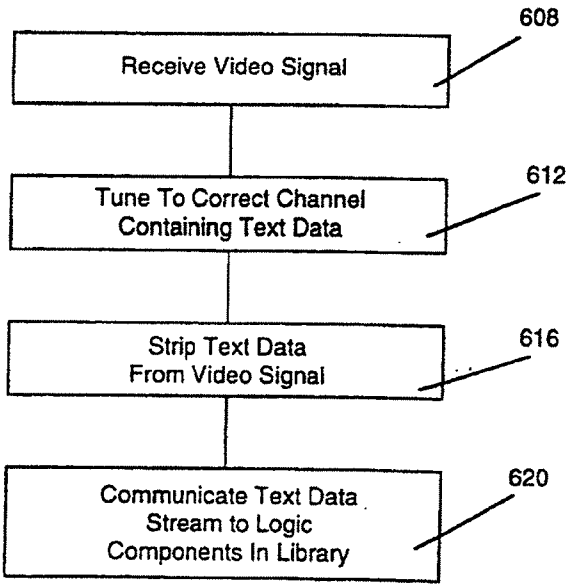

608
Receive Video Signal
612
Tune To Correct Channel Containing Text Data
616
Strip Text Data From Video Signal
620
Communicate Text Data Stream to Logic Components In Library

Fig. 7

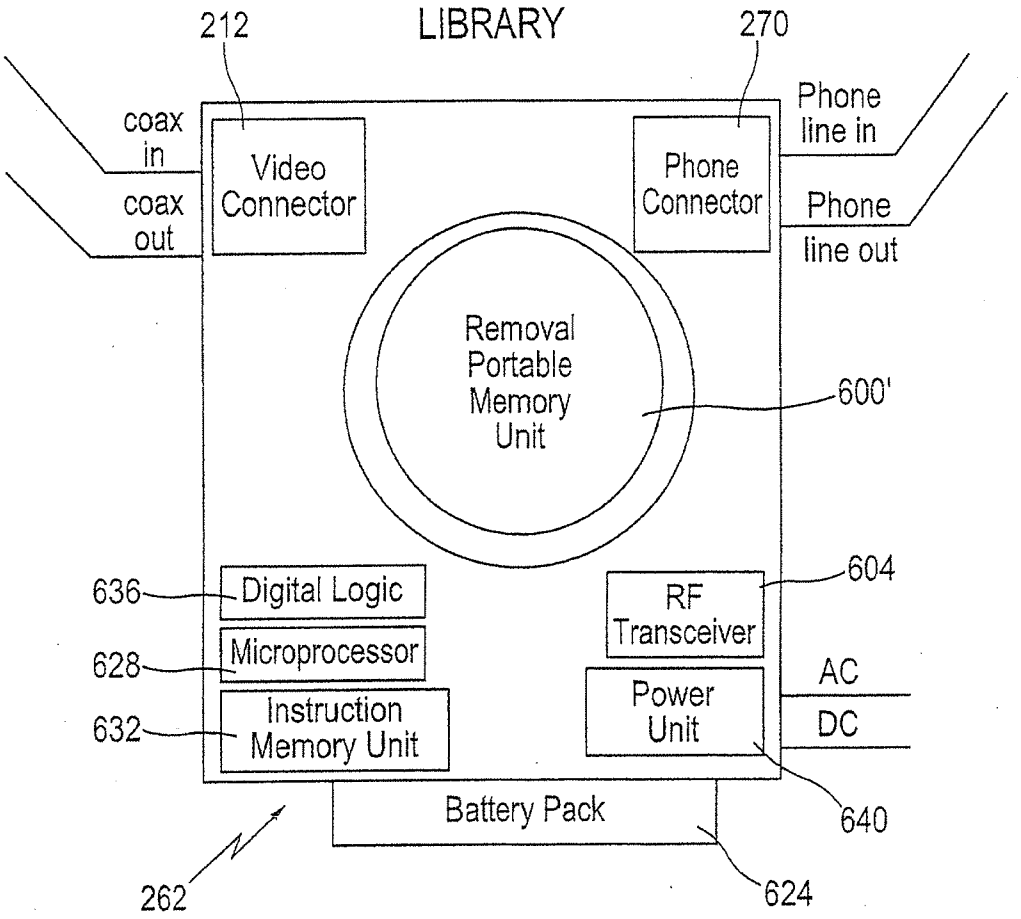

212
LIBRARY
270
coax in
coax out
Video Connector
Phone Connector
Phone line in
Phone line out
Removal Portable Memory Unit
600'
636
Digital Logic
628
Microprocessor
632
Instruction Memory Unit
RF Transceiver
604
Power Unit
AC
DC
640
Battery Pack
624
262

Fig. 8

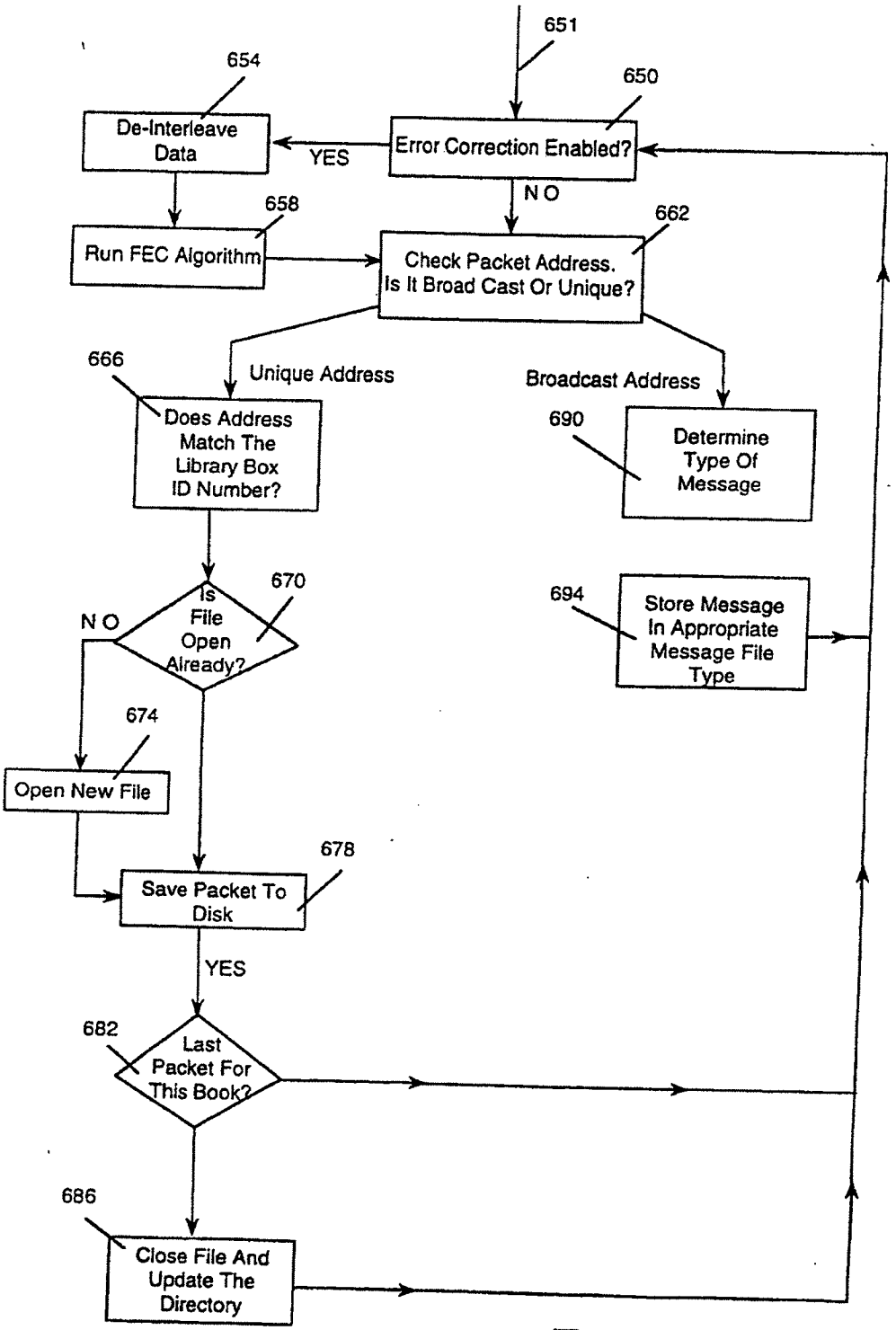

651
654
650
De-Interleave Data
YES
Error Correction Enabled?
NO
658
662
Run FEC Algorithm
Check Packet Address. Is It Broad Cast Or Unique?
666
Unique Address
Broadcast Address
Does Address Match The Library Box ID Number?
690
Determine Type Of Message
670
694
NO
Is File Open Already?
Store Message In Appropriate Message File Type
674
Open New File
678
Save Packet To Disk
YES
682
Last Packet For This Book?
686
Close File And Update The Directory

Fig. 9

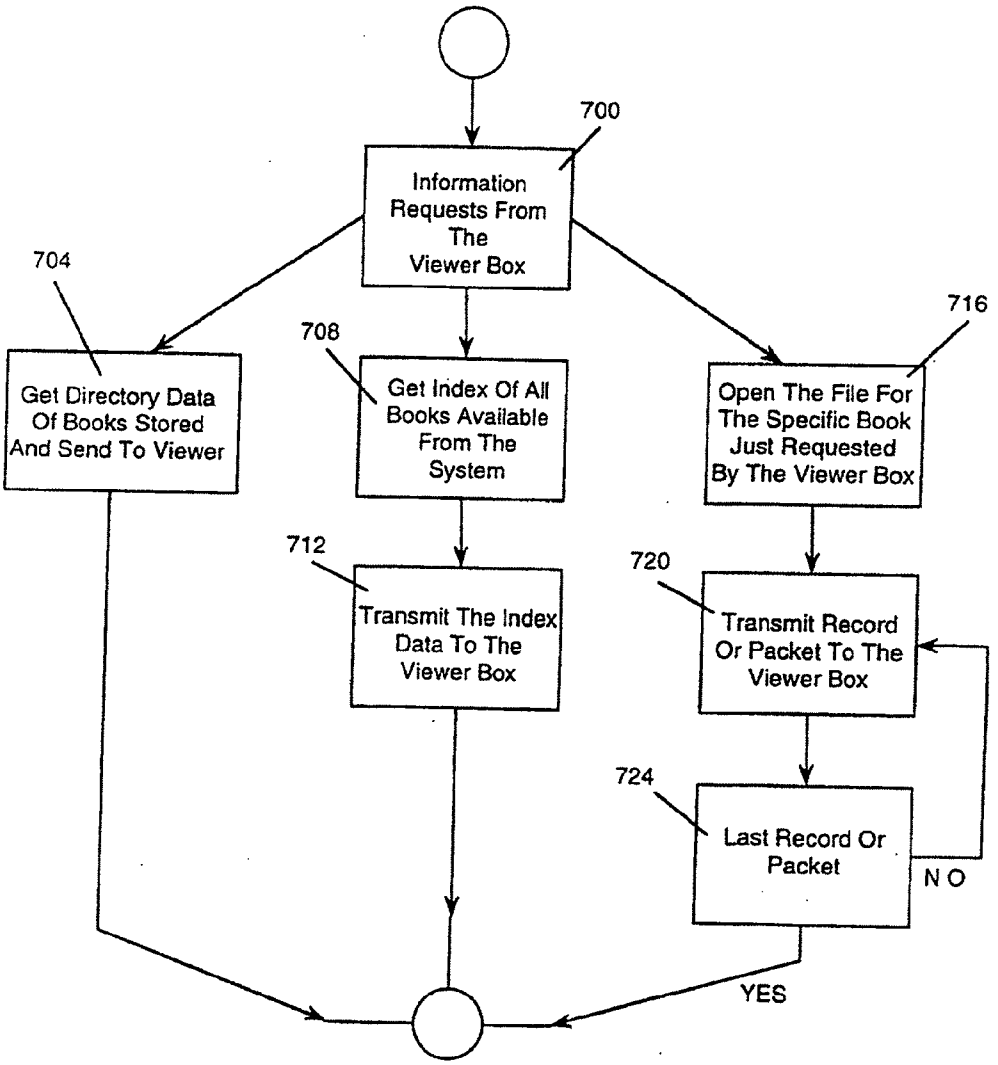

700
Information Requests From The Viewer Box
704
Get Directory Data Of Books Stored And Send To Viewer
708
Get Index Of All Books Available From The System
716
Open The File For The Specific Book Just Requested By The Viewer Box
712
Transmit The Index Data To The Viewer Box
720
Transmit Record Or Packet To The Viewer Box
724
Last Record Or Packet
NO
YES

Fig. 10

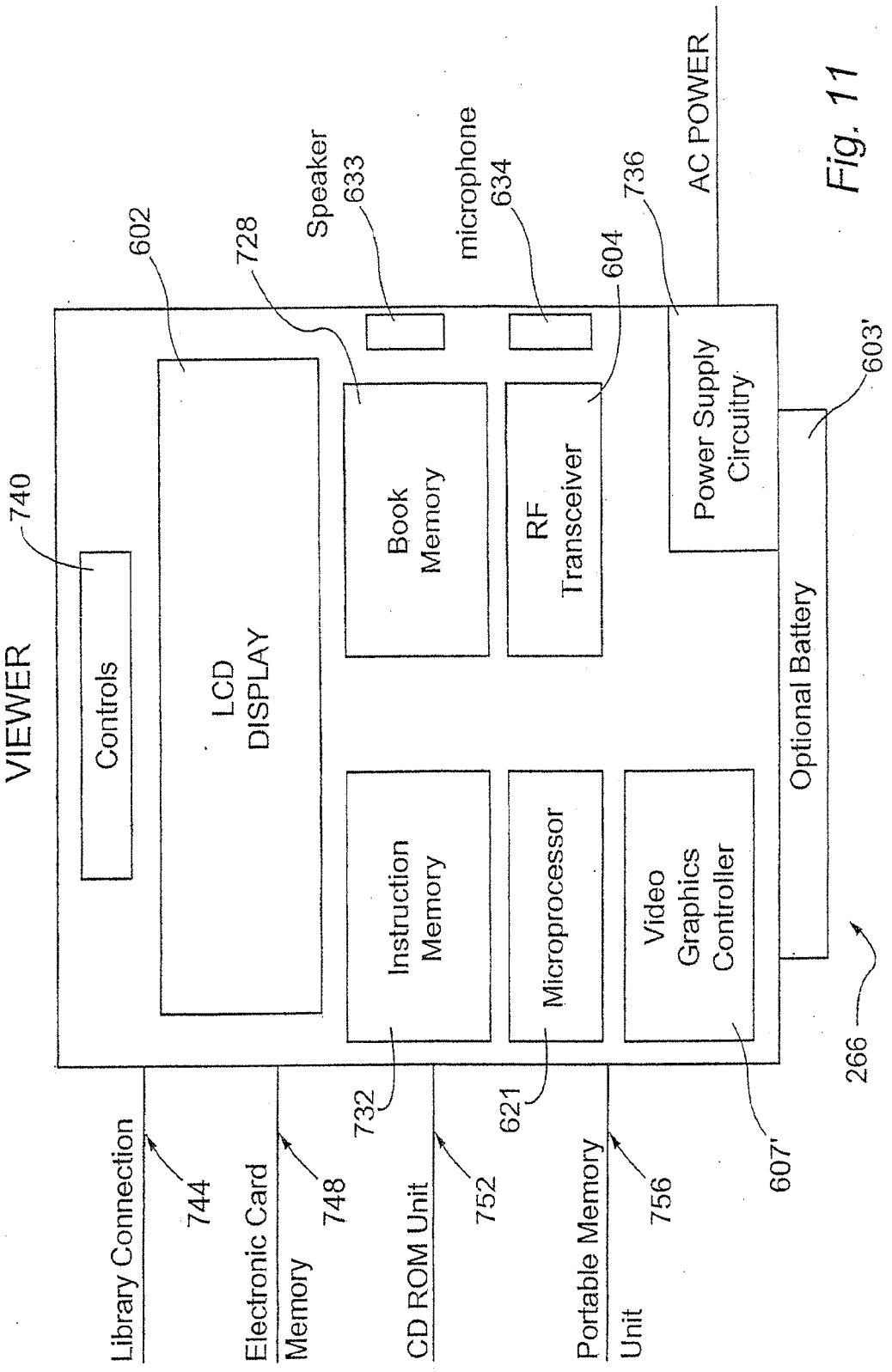

VIEWER
740
Controls
602
LCD DISPLAY
728
Book Memory
Speaker
633
microphone
634
604
RF Transceiver
736
AC POWER
Power Supply Circuitry
603'
Optional Battery
266
Instruction Memory
732
Microprocessor
621
Video Graphics Controller
607'
Library Connection
744
Electronic Card Memory
748
CD ROM Unit
752
Portable Memory Unit
756

Fig. 11

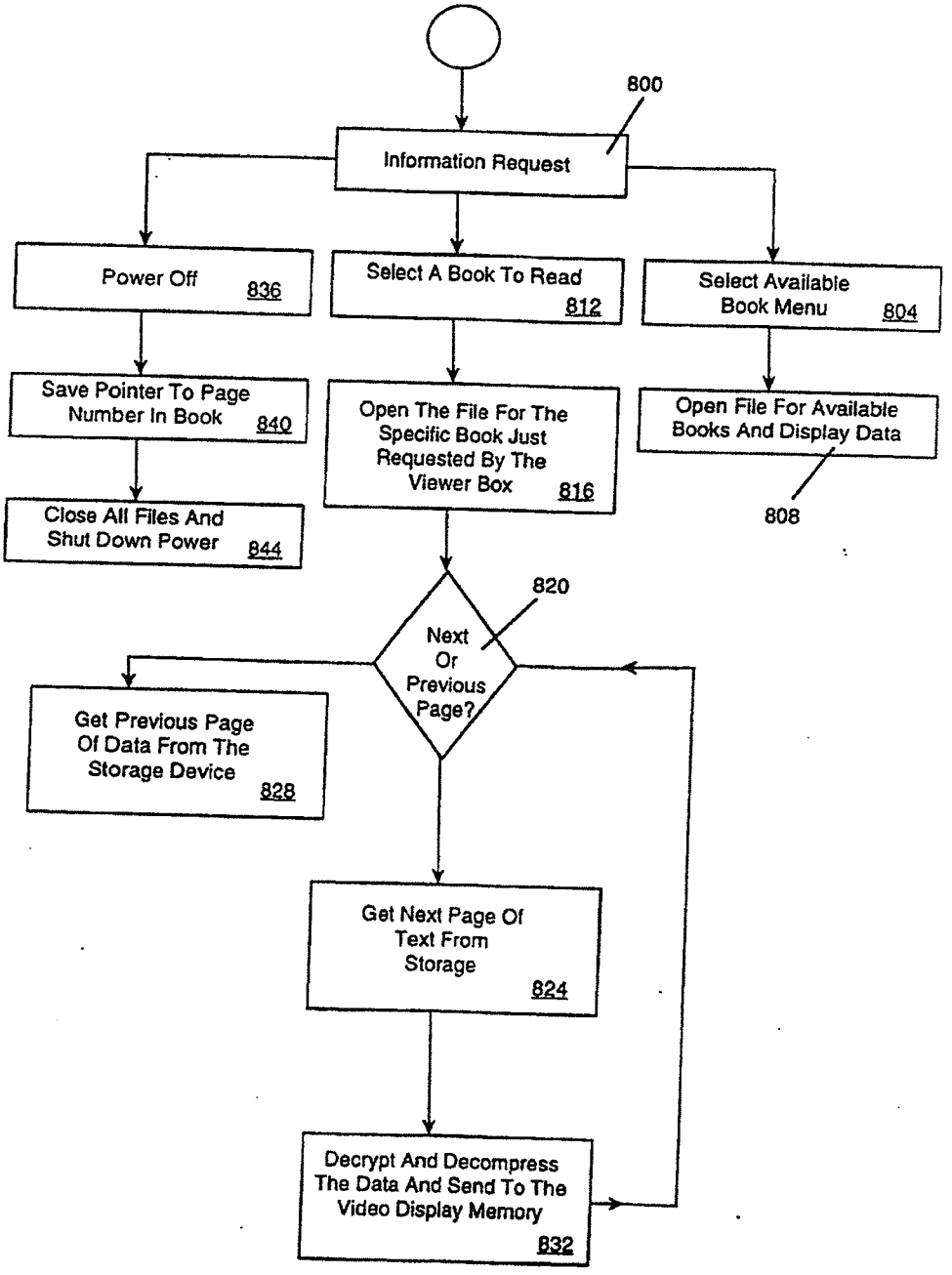

800
Information Request
Power Off 836
Select A Book To Read 812
Select Available Book Menu 804
Save Pointer To Page Number In Book 840
Open The File For The Specific Book Just Requested By The Viewer Box 816
Open File For Available Books And Display Data
808
Close All Files And Shut Down Power 844
820
Next Or Previous Page?
Get Previous Page Of Data From The Storage Device 828
Get Next Page Of Text From Storage 824
Decrypt And Decompress The Data And Send To The Video Display Memory 832

Fig. 12

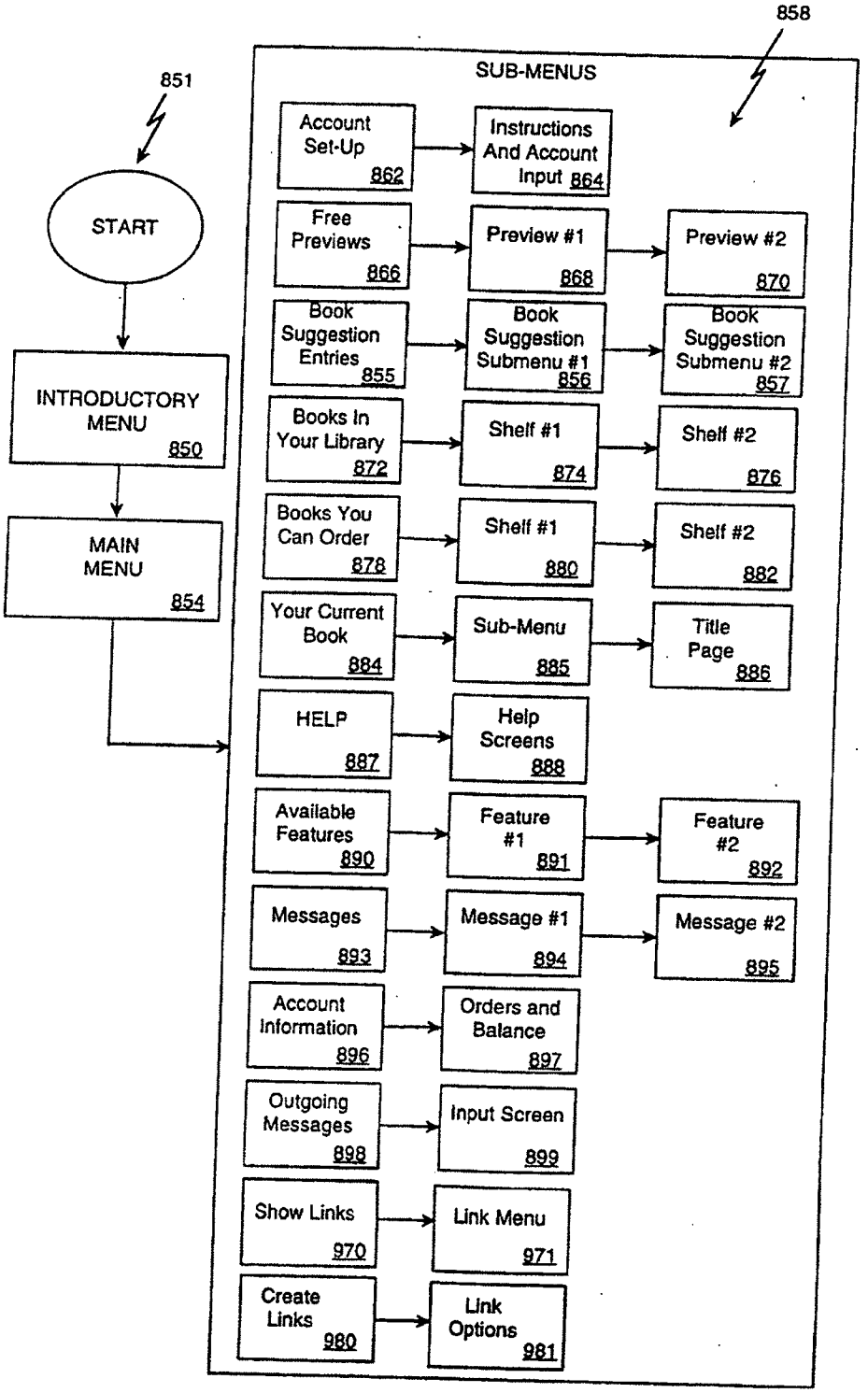

858
SUB-MENUS
851
START
INTRODUCTORY MENU 850
MAIN MENU 854
Account Set-Up 862
Instructions And Account Input 864
Free Previews 866
Preview #1 868
Preview #2 870
Book Suggestion Entries 855
Book Suggestion Submenu #1 856
Book Suggestion Submenu #2 857
Books In Your Library 872
Shelf #1 874
Shelf #2 876
Books You Can Order 878
Shelf #1 880
Shelf #2 882
Your Current Book 884
Sub-Menu 885
Title Page 886
HELP 887
Help Screens 888
Available Features 890
Feature #1 891
Feature #2 892
Messages 893
Message #1 894
Message #2 895
Account Information 896
Orders and Balance 897
Outgoing Messages 898
Input Screen 899
Show Links 970
Link Menu 971
Create Links 980
Link Options 981

Fig. 13

Fig. 14a

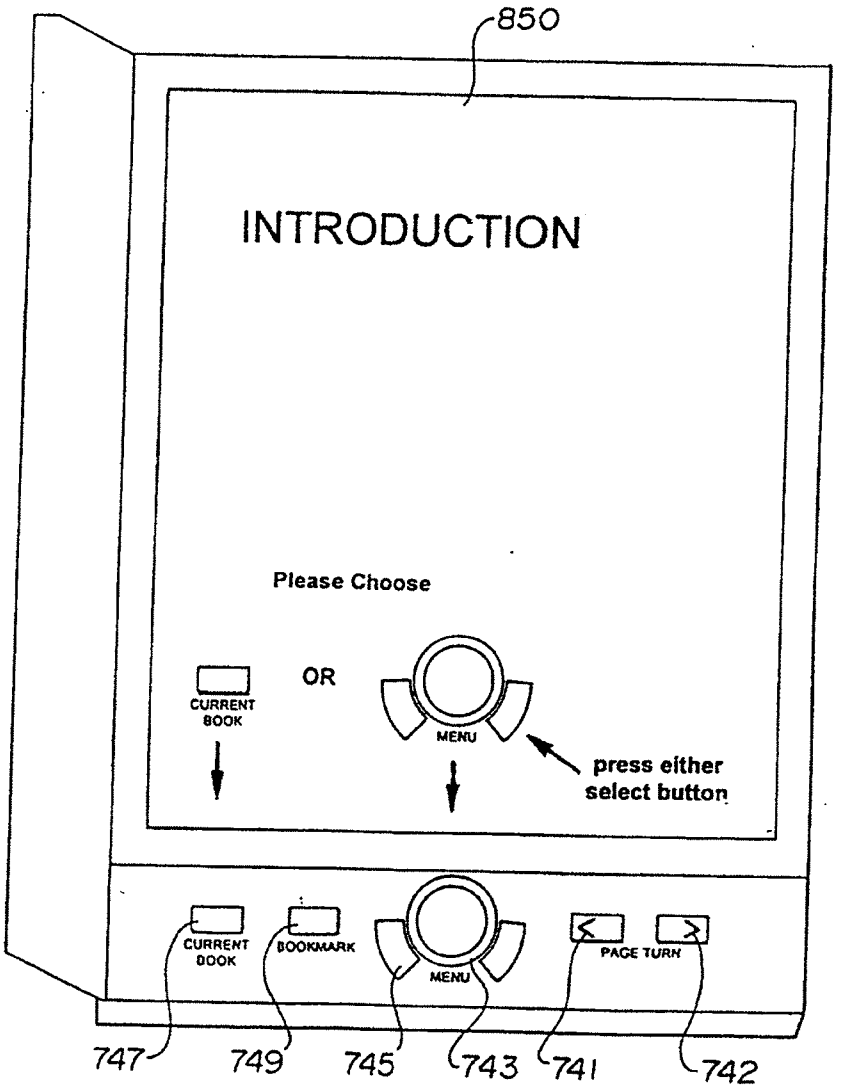

850
INTRODUCTION
Please Choose
CURRENT BOOK
OR
MENU
press either select button
CURRENT BOOK
BOOKMARK
MENU
PAGE TURN
747
749
745
743
741
742

Fig. 14b

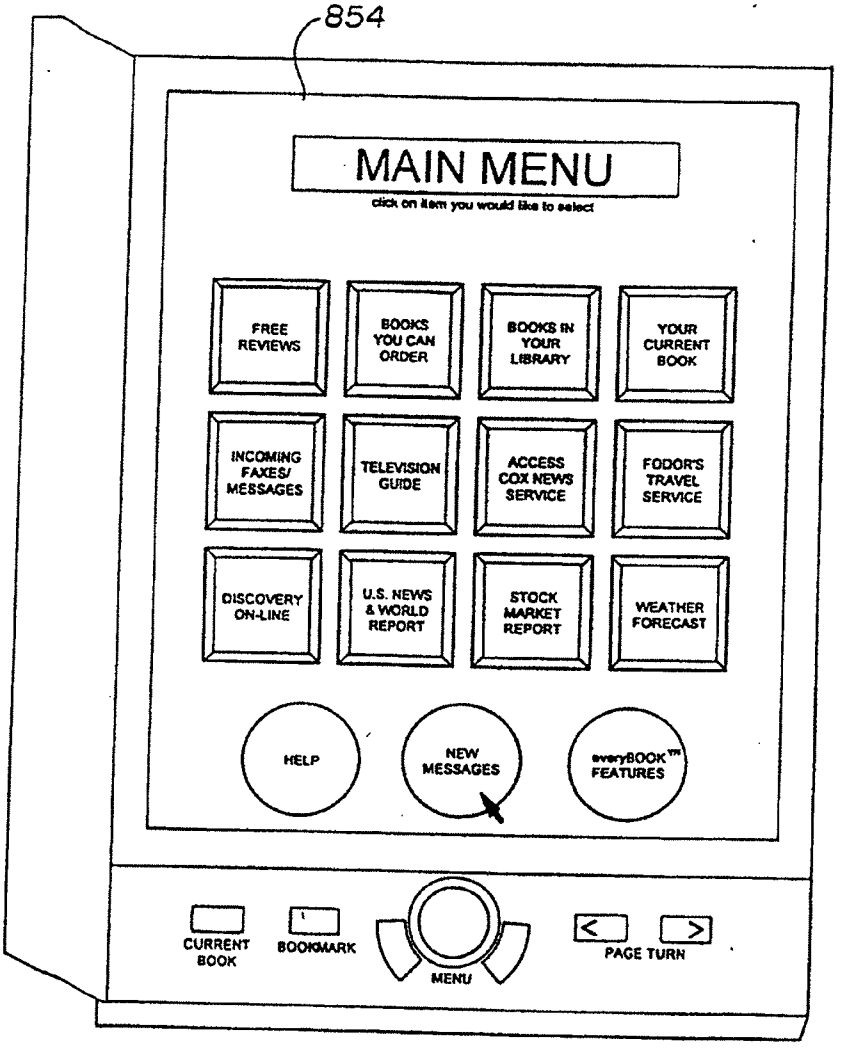

854
MAIN MENU
click on item you would like to select
FREE REVIEWS
BOOKS YOU CAN ORDER
BOOKS IN YOUR LIBRARY
YOUR CURRENT BOOK
INCOMING FAXES/ MESSAGES
TELEVISION GUIDE
ACCESS COX NEWS SERVICE
FODOR'S TRAVEL SERVICE
DISCOVERY ON-LINE
U.S. NEWS & WORLD REPORT
STOCK MARKET REPORT
WEATHER FORECAST
HELP
NEW MESSAGES
everyBOOK™ FEATURES
CURRENT BOOK
BOOKMARK
MENU
PAGE TURN

Fig.14c

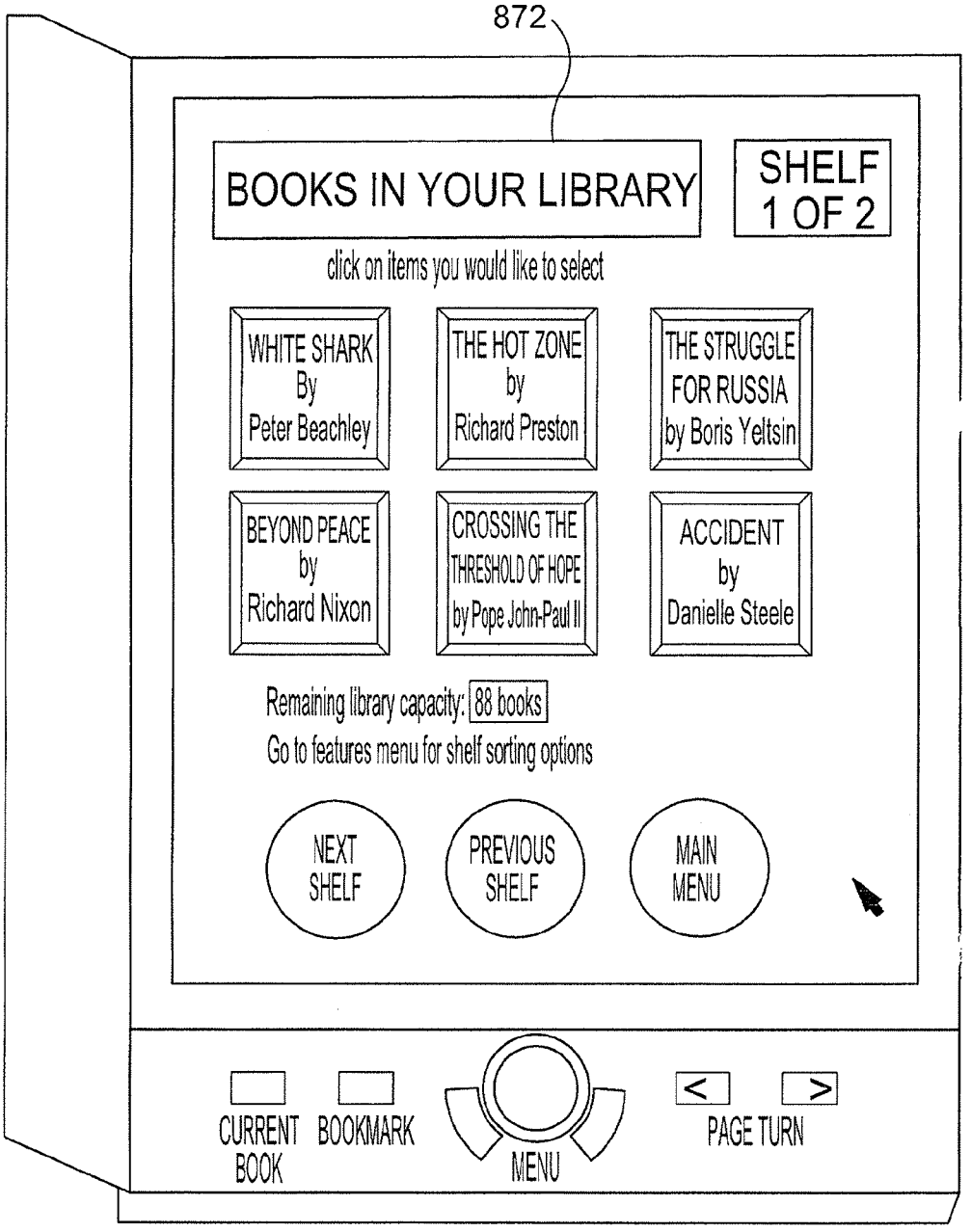

872
BOOKS IN YOUR LIBRARY
SHELF 1 OF 2
click on items you would like to select
WHITE SHARK By Peter Beachley
THE HOT ZONE by Richard Preston
THE STRUGGLE FOR RUSSIA by Boris Yeltsin
BEYOND PEACE by Richard Nixon
CROSSING THE THRESHOLD OF HOPE by Pope John-Paul II
ACCIDENT by Danielle Steele
Remaining library capacity: 88 books
Go to features menu for shelf sorting options
NEXT SHELF
PREVIOUS SHELF
MAIN MENU
CURRENT BOOK
BOOKMARK
MENU
<
>
PAGE TURN

Fig. 14d

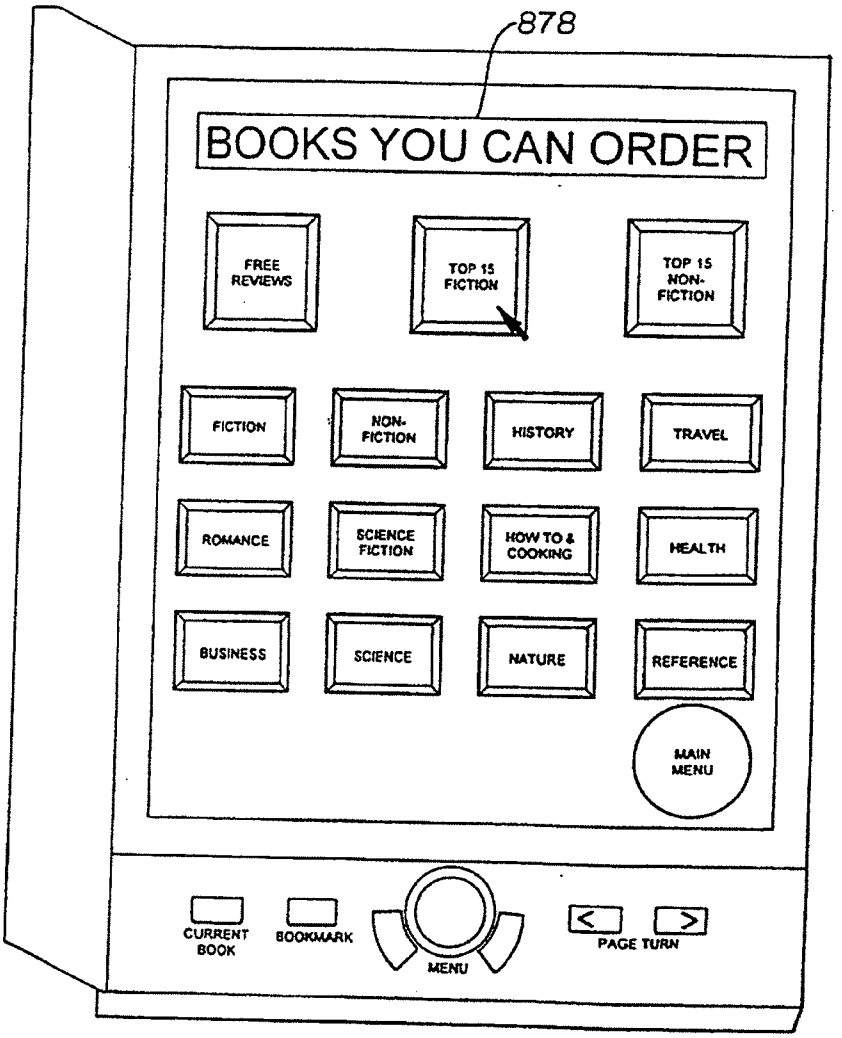

878
BOOKS YOU CAN ORDER
FREE REVIEWS
TOP 15 FICTION
TOP 15 NON-FICTION
FICTION
NON-FICTION
HISTORY
TRAVEL
ROMANCE
SCIENCE FICTION
HOW TO & COOKING
HEALTH
BUSINESS
SCIENCE
NATURE
REFERENCE
MAIN MENU
CURRENT BOOK
BOOKMARK
MENU
PAGE TURN

Fig. 14e

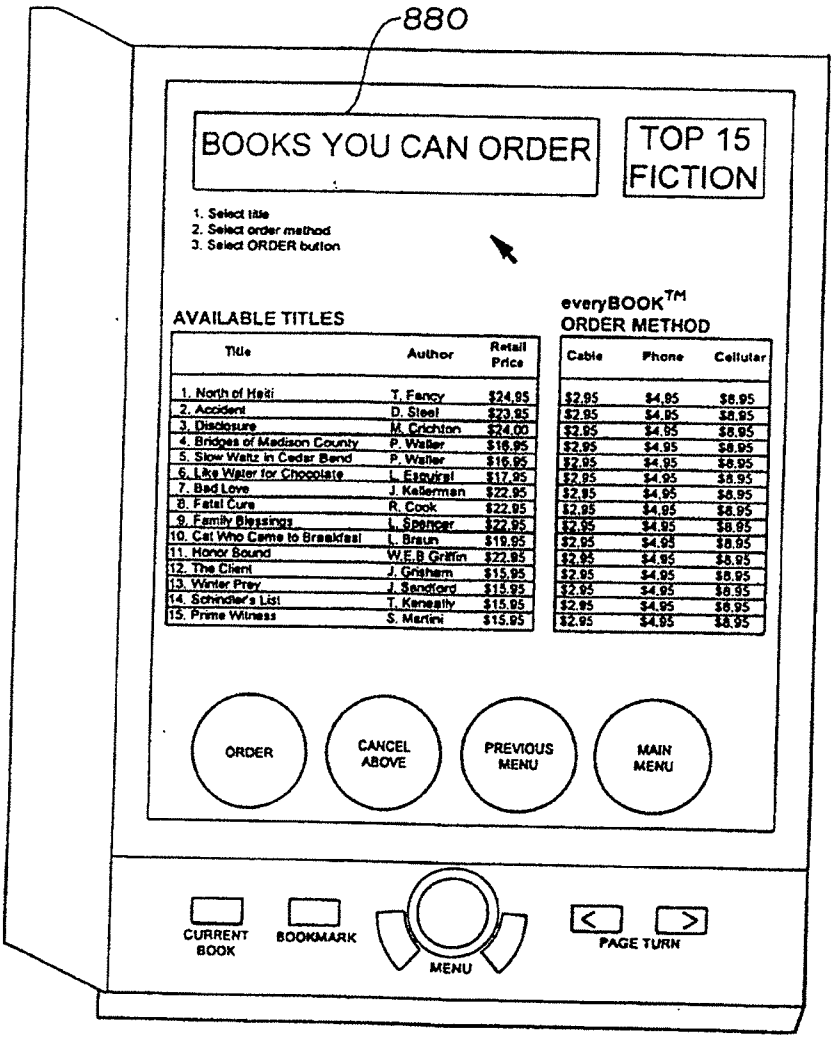

880
BOOKS YOU CAN ORDER
TOP 15 FICTION
1. Select title
2. Select order method
3. Select ORDER button
AVAILABLE TITLES
everyBOOK™ ORDER METHOD
Title
Author
Retail Price
Cable
Phone
Cellular
1. North of Haiti T. Fancy $24.95 $2.95 $4.95 $8.95
2. Accident D. Steel $23.95 $2.95 $4.95 $8.95
3. Disclosure M. Crichton $24.00 $2.95 $4.95 $8.95
4. Bridges of Madison County P. Waller $16.95 $2.95 $4.95 $8.95
5. Slow Waltz in Cedar Bend P. Waller $16.95 $2.95 $4.95 $8.95
6. Like Water for Chocolate L. Esquivel $17.95 $2.95 $4.95 $8.95
7. Bad Love J. Kellerman $22.95 $2.95 $4.95 $8.95
8. Fatal Cure R. Cook $22.95 $2.95 $4.95 $8.95
9. Family Blessings L. Spencer $22.95 $2.95 $4.95 $8.95
10. Cat Who Came to Breakfast L. Braun $19.95 $2.95 $4.95 $8.95
11. Honor Bound W.E.B Griffin $22.95 $2.95 $4.95 $8.95
12. The Client J. Grisham $15.95 $2.95 $4.95 $8.95
13. Winter Prey J. Sandford $15.95 $2.95 $4.95 $8.95
14. Schindler's List T. Keneally $15.95 $2.95 $4.95 $8.95
15. Prime Witness S. Martini $15.95 $2.95 $4.95 $8.95
ORDER
CANCEL ABOVE
PREVIOUS MENU
MAIN MENU
CURRENT BOOK
BOOKMARK
MENU
PAGE TURN

Fig. 14f

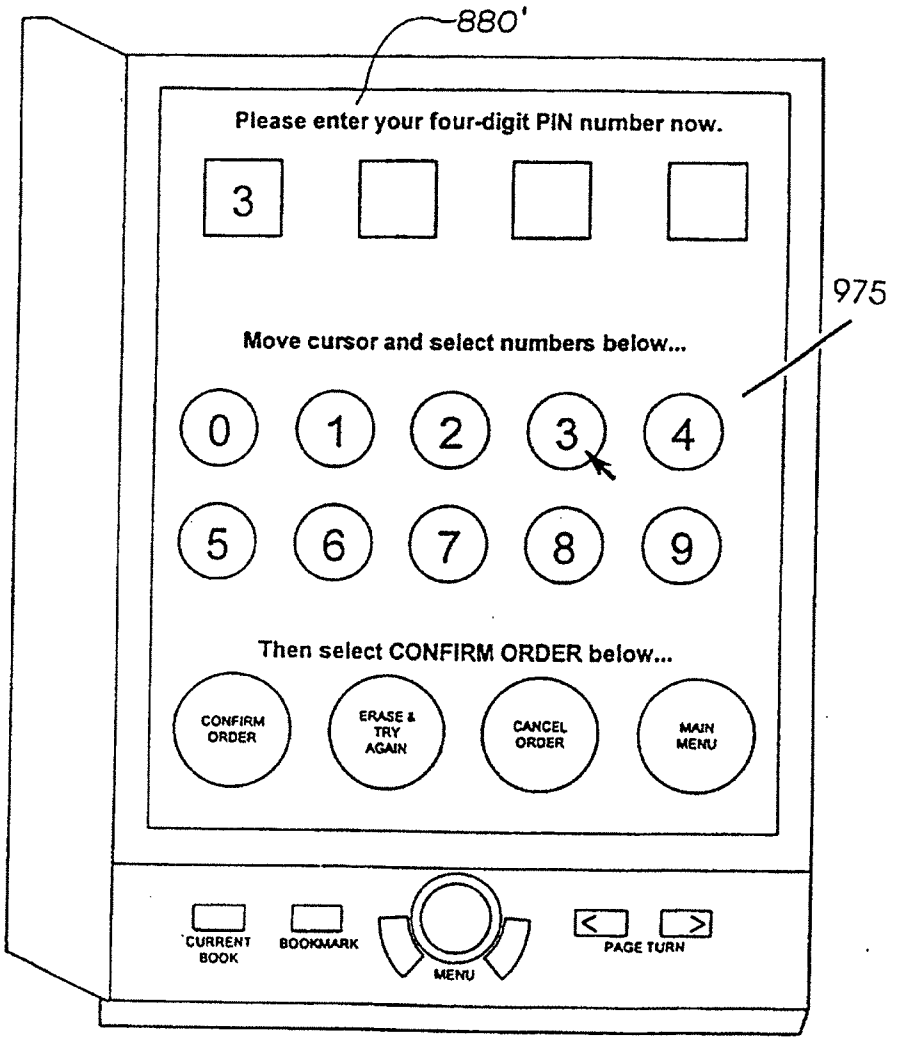

880'
Please enter your four-digit PIN number now.
3
975
Move cursor and select numbers below...
0
1
2
3
4
5
6
7
8
9
Then select CONFIRM ORDER below...
CONFIRM ORDER
ERASE & TRY AGAIN
CANCEL ORDER
MAIN MENU
CURRENT BOOK
BOOKMARK
MENU
PAGE TURN

Fig. 14g

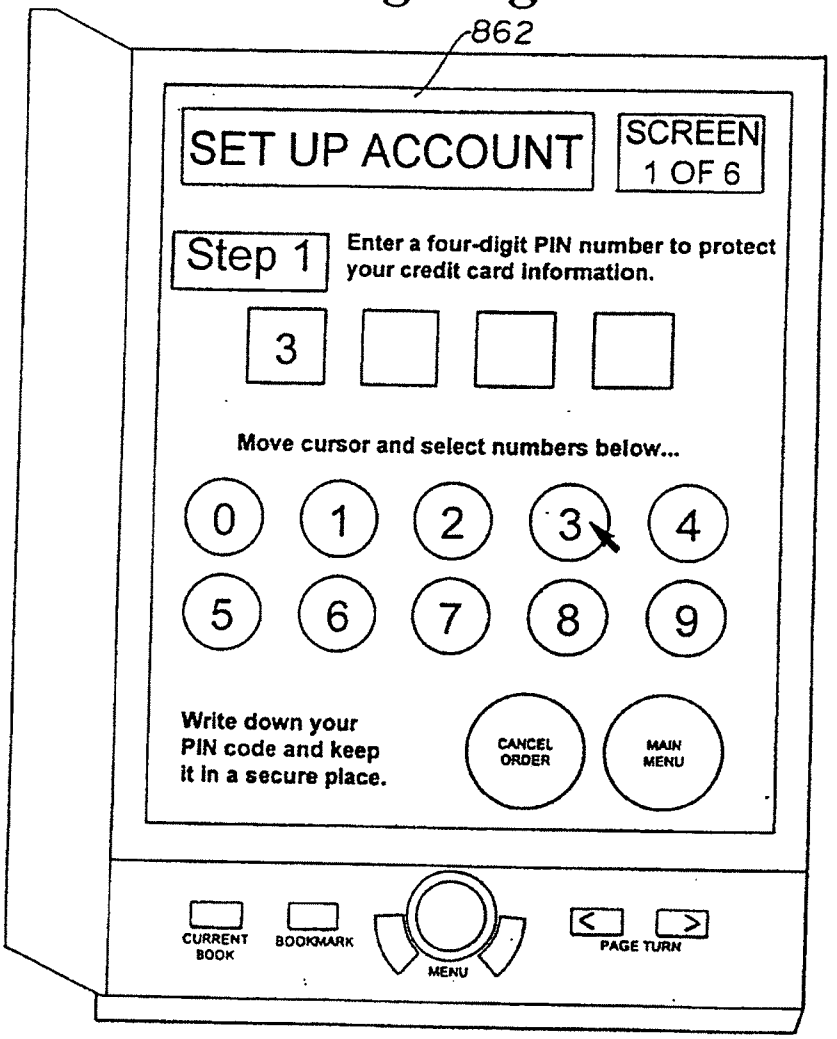

862
SET UP ACCOUNT
SCREEN 1 OF 6
Step 1
Enter a four-digit PIN number to protect your credit card information.
3
Move cursor and select numbers below...
0 1 2 3 4
5 6 7 8 9
Write down your PIN code and keep it in a secure place.
CANCEL ORDER
MAIN MENU
CURRENT BOOK
BOOKMARK
MENU
PAGE TURN

Fig. 14h

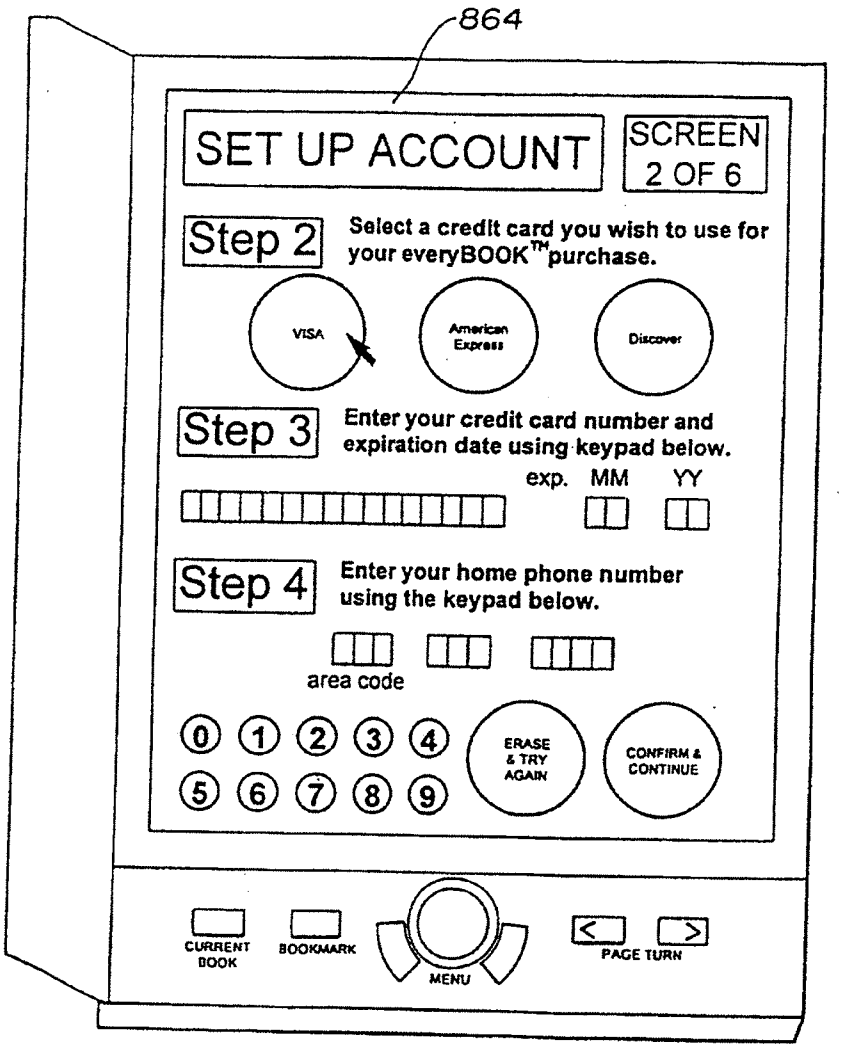

864
SET UP ACCOUNT
SCREEN 2 OF 6
Step 2
Select a credit card you wish to use for your everyBOOK™ purchase.
VISA
American Express
Discover
Step 3
Enter your credit card number and expiration date using keypad below.
exp. MM YY
Step 4
Enter your home phone number using the keypad below.
area code
0 1 2 3 4
5 6 7 8 9
ERASE & TRY AGAIN
CONFIRM & CONTINUE
CURRENT BOOK
BOOKMARK
MENU
PAGE TURN

Fig.14i

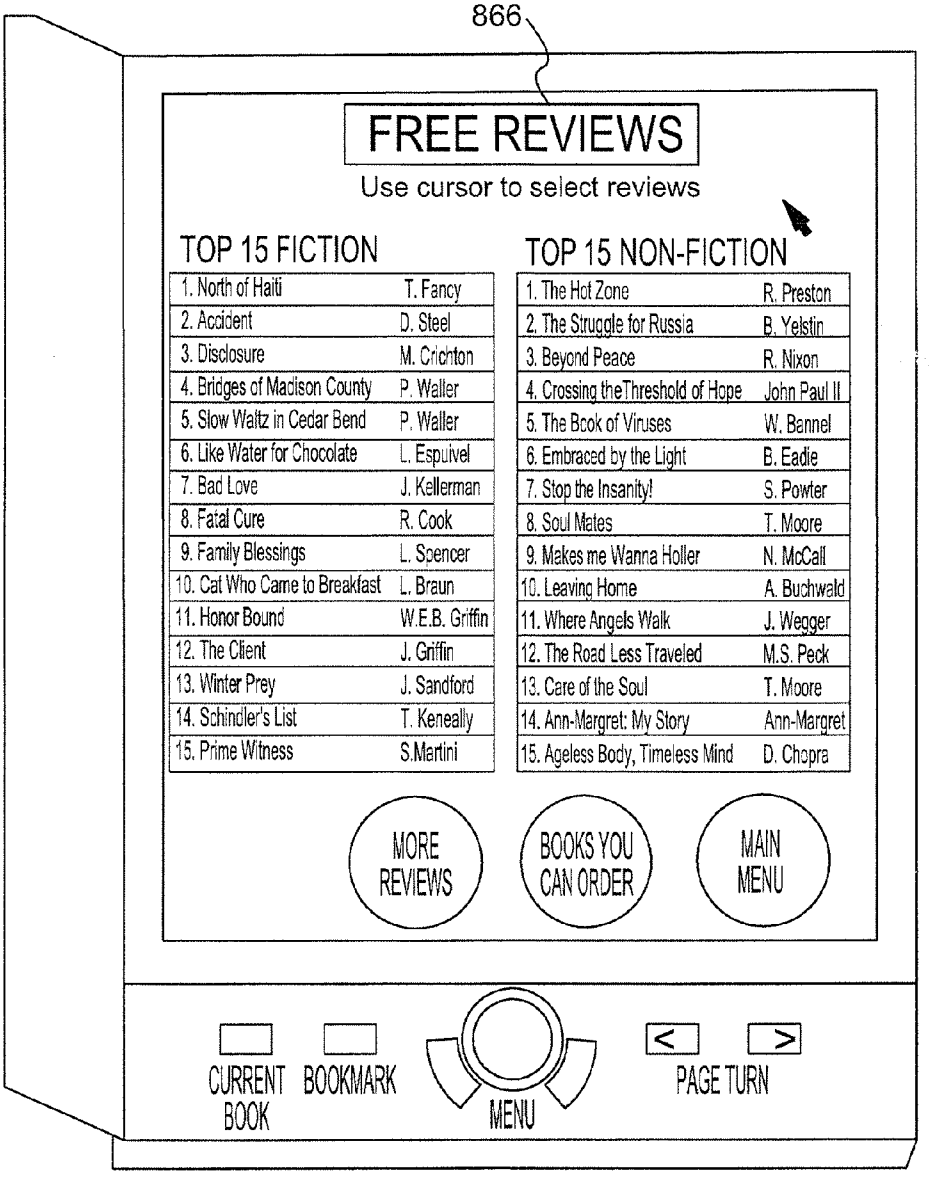

866
FREE REVIEWS
Use cursor to select reviews
TOP 15 FICTION
TOP 15 NON-FICTION
1. North of Haiti T. Fancy
2. Accident D. Steel
3. Disclosure M. Crichton
4. Bridges of Madison County P. Waller
5. Slow Waltz in Cedar Bend P. Waller
6. Like Water for Chocolate L. Espulvel
7. Bad Love J. Kellerman
8. Fatal Cure R. Cook
9. Family Blessings L. Spencer
10. Cat Who Came to Breakfast L. Braun
11. Honor Bound W.E.B. Griffin
12. The Client J. Griffin
13. Winter Prey J. Sandford
14. Schindler's List T. Keneally
15. Prime Witness S.Martini
1. The Hot Zone R. Preston
2. The Struggle for Russia B. Yelstin
3. Beyond Peace R. Nixon
4. Crossing theThreshold of Hope John Paul II
5. The Book of Viruses W. Bennel
6. Embraced by the Light B. Eadie
7. Stop the Insanity! S. Powter
8. Soul Mates T. Moore
9. Makes me Wanna Holler N. McCall
10. Leaving Home A. Buchwald
11. Where Angels Walk J. Wegger
12. The Road Less Traveled M.S. Peck
13. Care of the Soul T. Moore
14. Ann-Margret: My Story Ann-Margret
15. Ageless Body, Timeless Mind D. Chopra
MORE REVIEWS
BOOKS YOU CAN ORDER
MAIN MENU
CURRENT BOOK
BOOKMARK
MENU
<
>
PAGE TURN

Fig.14j

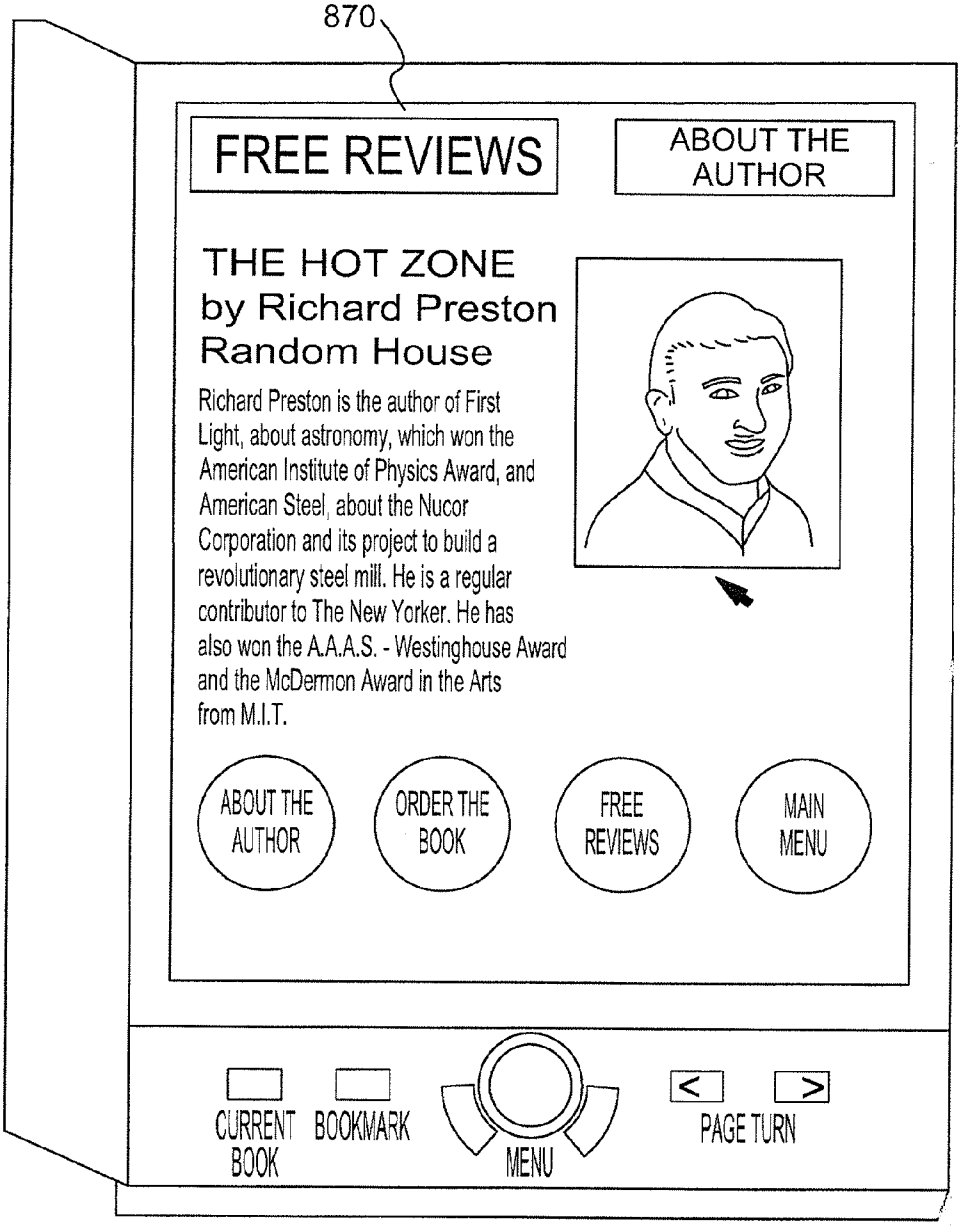
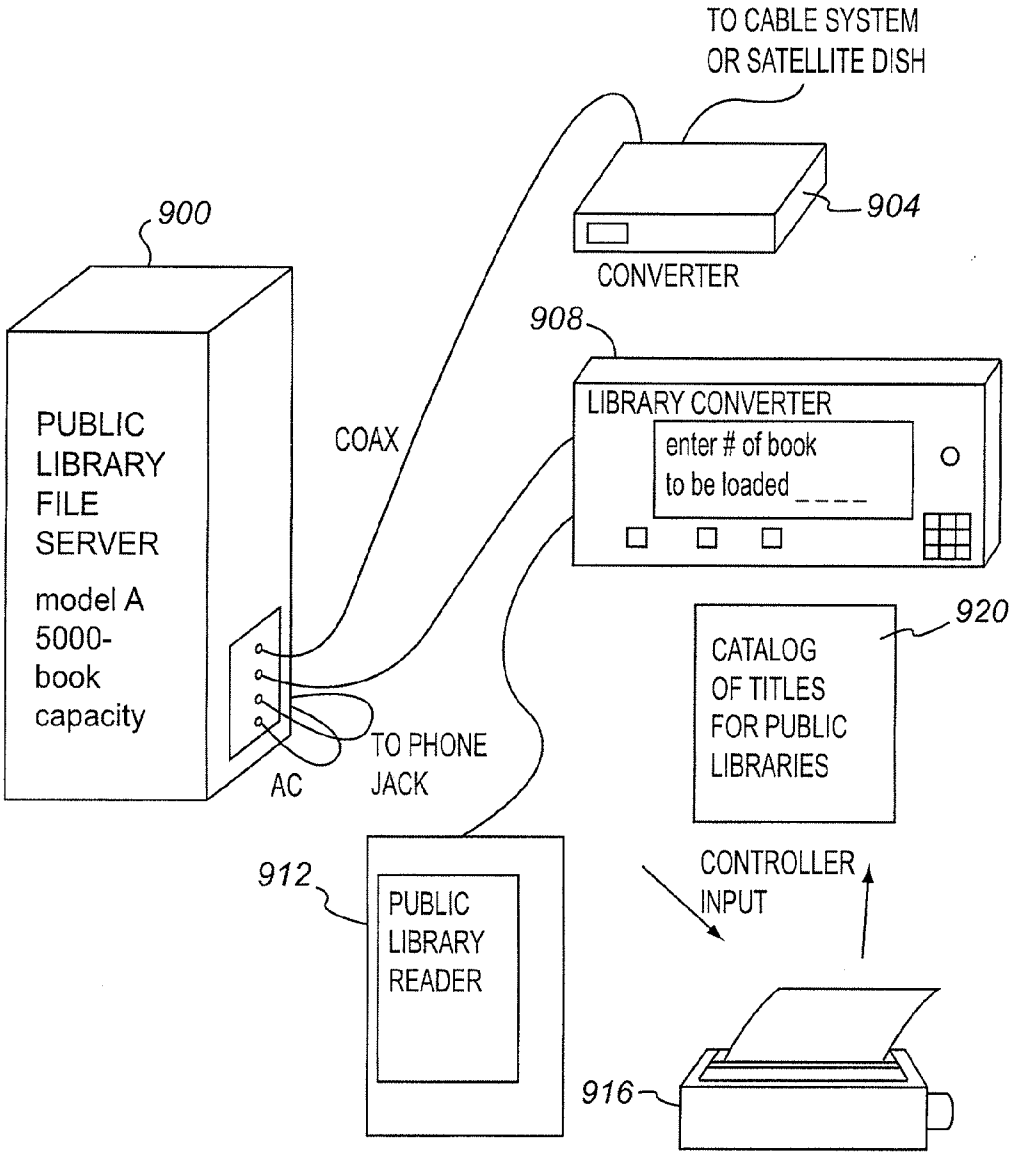

870
FREE REVIEWS
ABOUT THE AUTHOR
THE HOT ZONE
by Richard Preston
Random House
Richard Preston is the author of First Light, about astronomy, which won the American Institute of Physics Award, and American Steel, about the Nucor Corporation and its project to build a revolutionary steel mill. He is a regular contributor to The New Yorker. He has also won the A.A.A.S. - Westinghouse Award and the McDermon Award in the Arts from M.I.T.
ABOUT THE AUTHOR
ORDER THE BOOK
FREE REVIEWS
MAIN MENU
CURRENT BOOK
BOOKMARK
MENU
PAGE TURN

Fig.15


TO CABLE SYSTEM
OR SATELLITE DISH
900
904
CONVERTER
908
LIBRARY CONVERTER
enter # of book
to be loaded _ _ _ _
PUBLIC
LIBRARY
FILE
SERVER
model A
5000-
book
capacity
COAX
TO PHONE
JACK
AC
920
CATALOG
OF TITLES
FOR PUBLIC
LIBRARIES
912
PUBLIC
LIBRARY
READER
CONTROLLER
INPUT
916

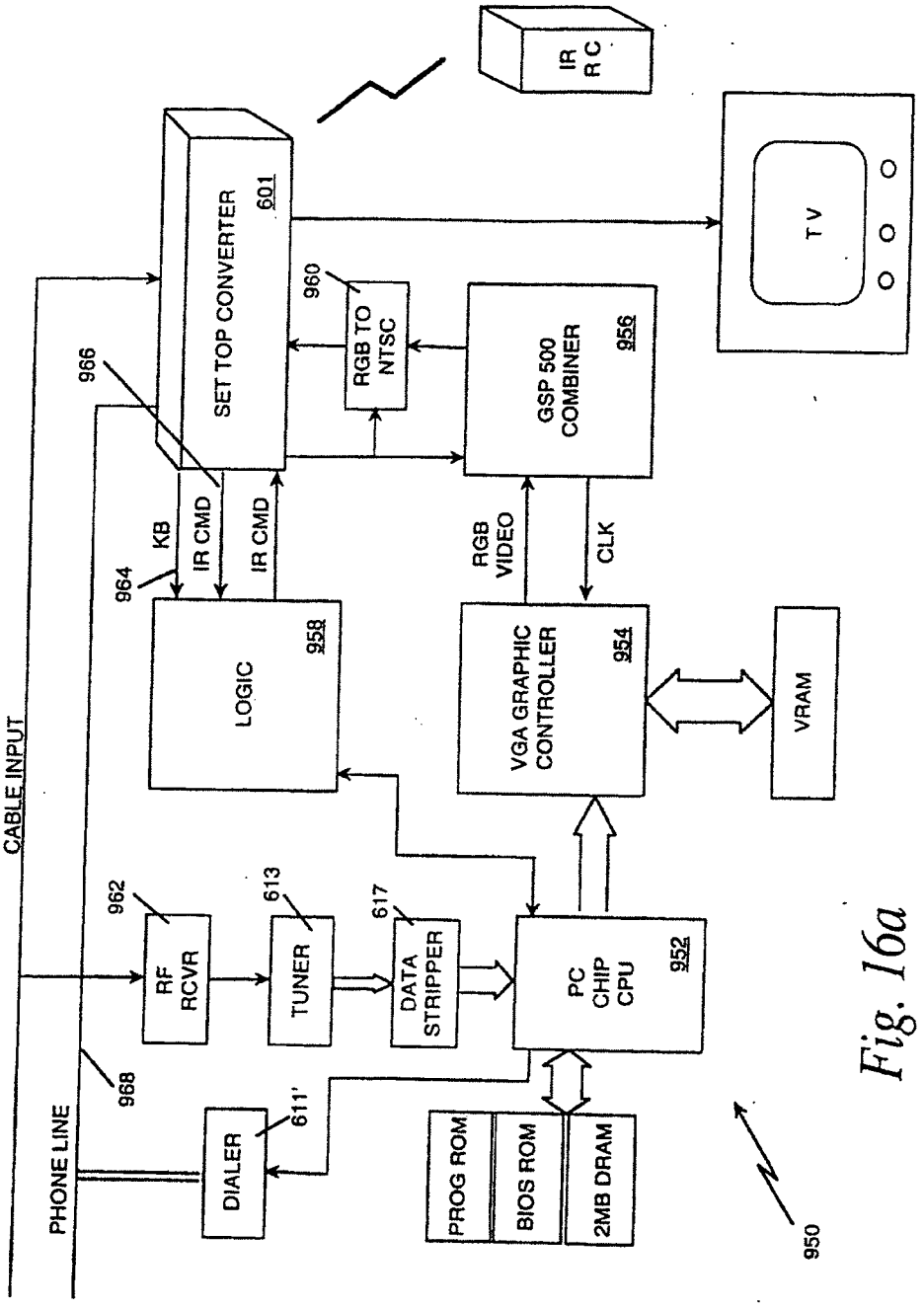

IR R C
SET TOP CONVERTER
601
TV
960
RGB TO NTSC
GSP 500 COMBINER
956
966
KB
964
IR CMD
IR CMD
RGB VIDEO
CLK
LOGIC
958
VGA GRAPHIC CONTROLLER
954
VRAM
CABLE INPUT
962
RF RCVR
613
TUNER
617
DATA STRIPPER
PC CHIP CPU
952
968
PHONE LINE
611'
DIALER
PROG ROM
BIOS ROM
2MB DRAM
950

Fig. 16a

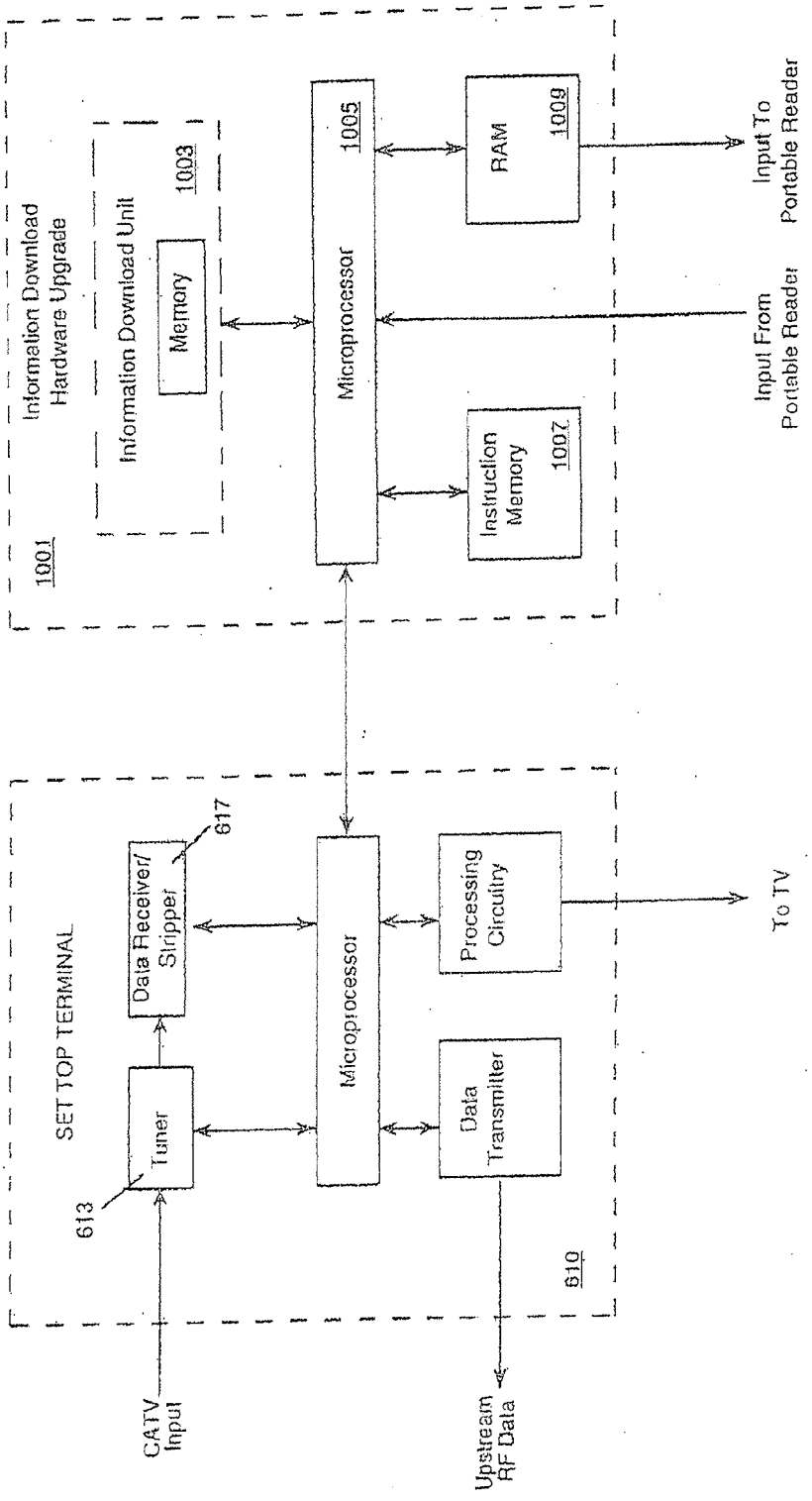

Information Download
Hardware Upgrade
1001
Information Download Unit
Memory
1003
Microprocessor
1005
RAM
1009
Instruction
Memory
1007
Input To
Portable Reader
Input From
Portable Reader
SET TOP TERMINAL
Data Receiver/
Stripper
617
Tuner
613
Microprocessor
Processing
Circuitry
Data
Transmitter
To TV
610
CATV
Input
Upstream
RF Data

Fig. 16b

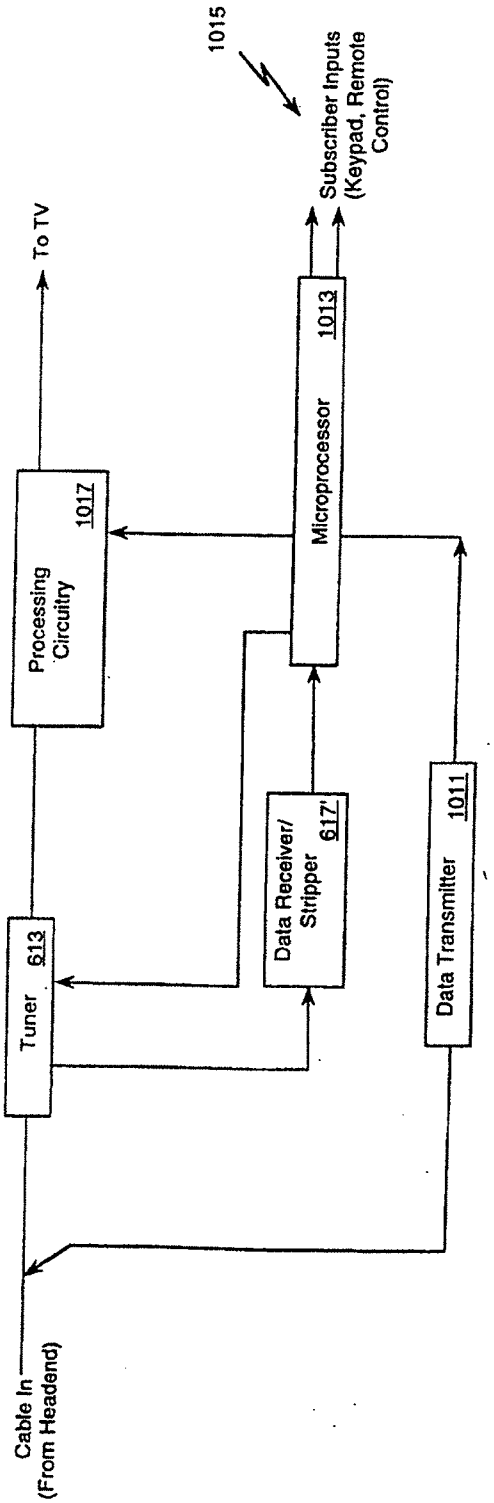

1015
Subscriber Inputs (Keypad, Remote Control)
To TV
Microprocessor 1013
Processing Circuitry 1017
Data Receiver/ Stripper 617'
Data Transmitter 1011
Tuner 613
Cable In (From Headend)

Fig. 17

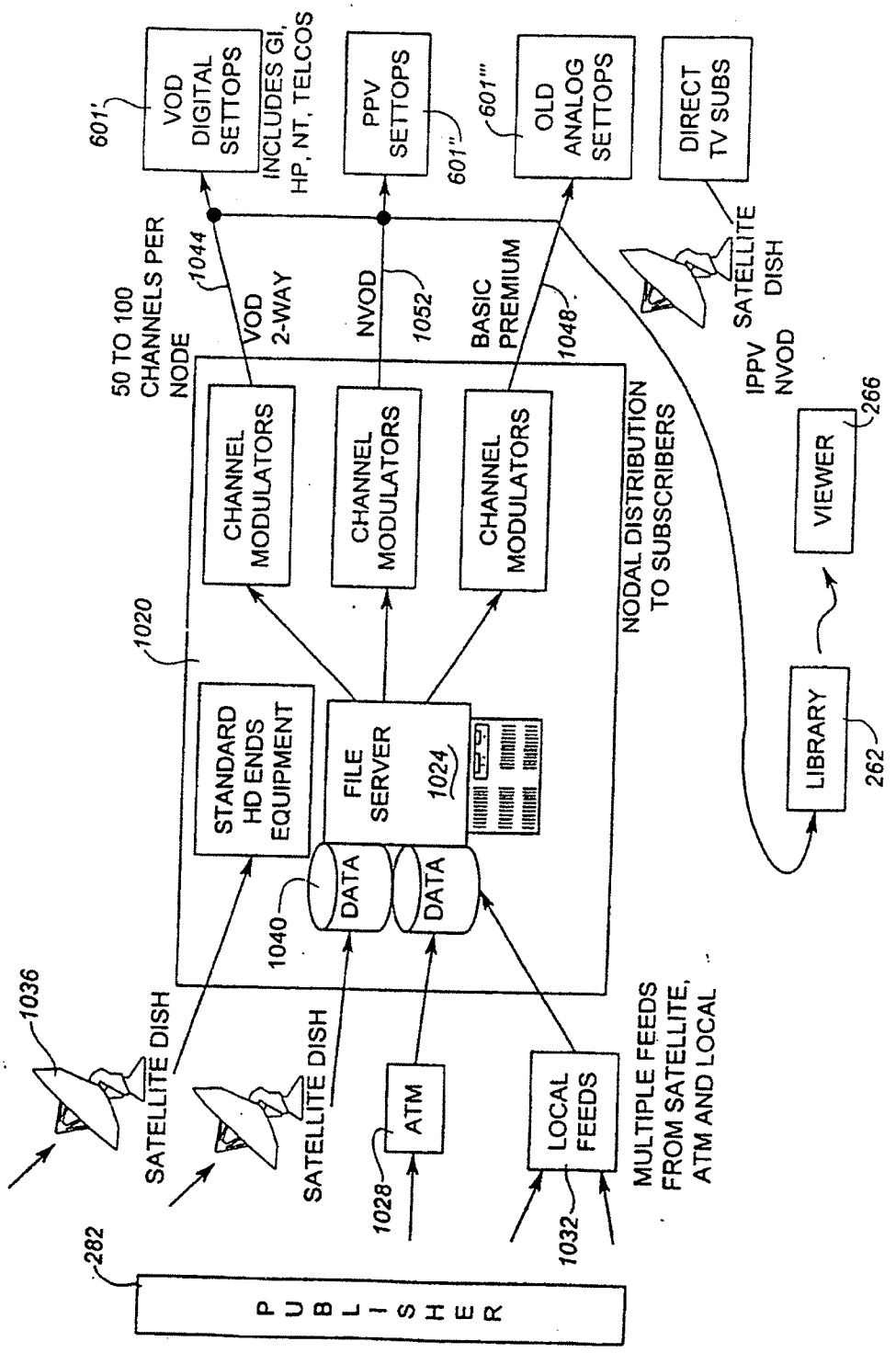

PUBLISHER
282
SATELLITE DISH
1036
SATELLITE DISH
ATM
1028
LOCAL FEEDS
1032
MULTIPLE FEEDS FROM SATELLITE, ATM AND LOCAL
1020
STANDARD HD ENDS EQUIPMENT
FILE SERVER
1024
DATA
DATA
1040
CHANNEL MODULATORS
CHANNEL MODULATORS
CHANNEL MODULATORS
50 TO 100 CHANNELS PER NODE
VOD 2-WAY
1044
NVOD
1052
BASIC PREMIUM
1048
NODAL DISTRIBUTION TO SUBSCRIBERS
601'
VOD DIGITAL SETTOPS
INCLUDES GI, HP, NT, TELCOS
601"
PPV SETTOPS
601'''
OLD ANALOG SETTOPS
DIRECT TV SUBS
SATELLITE DISH
IPPV
NVOD
LIBRARY
262
VIEWER
266

Fig. 18a

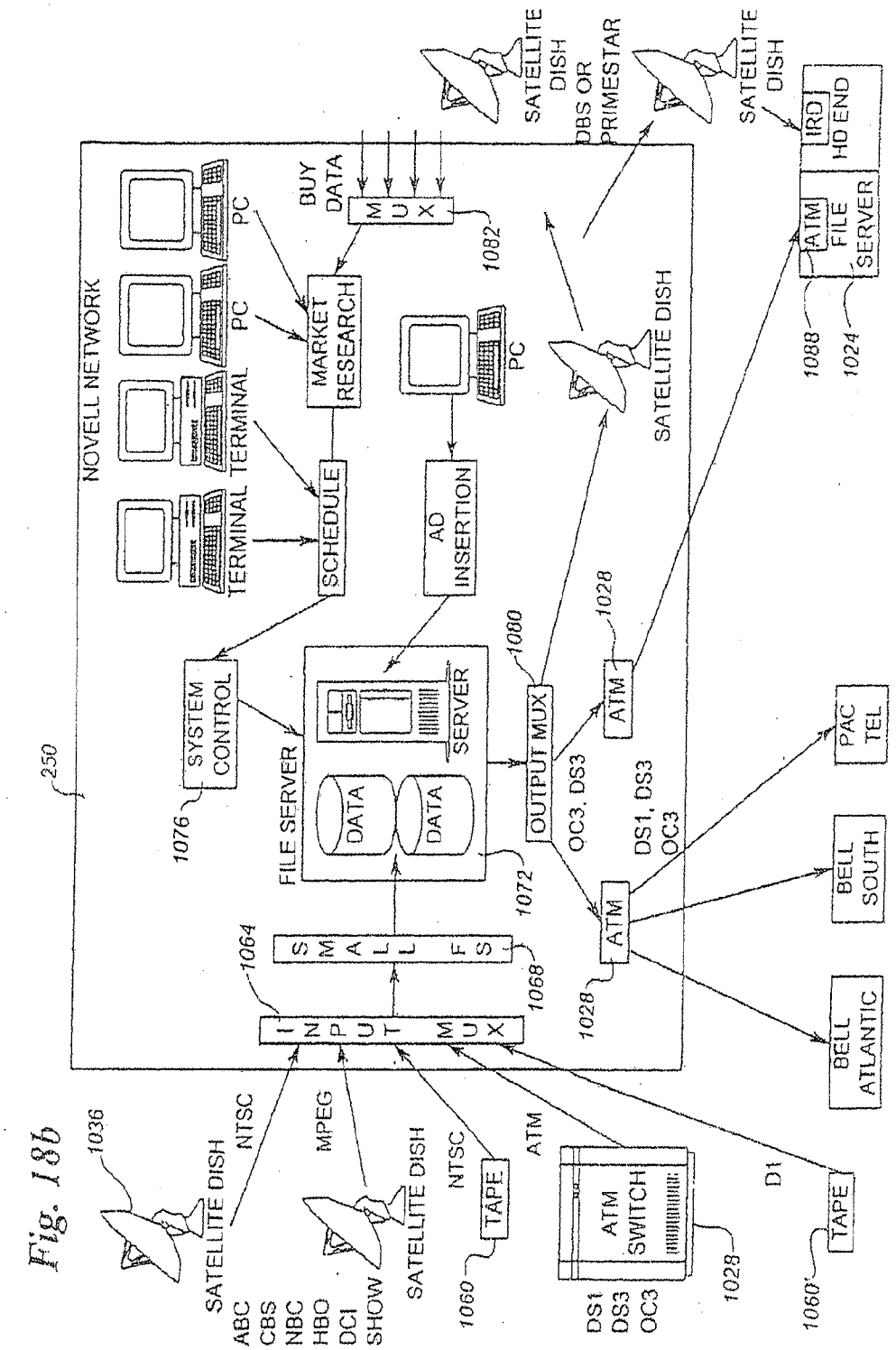

250
NOVELL NETWORK
TERMINAL
TERMINAL
PC
PC
PC
SCHEDULE
MARKET RESEARCH
BUY DATA
MUX
1082
AD INSERTION
SYSTEM CONTROL
1076
FILE SERVER
DATA
DATA
SERVER
1072
OUTPUT MUX
1080
OC3, DS3
ATM
1028
DS1, DS3
OC3
ATM
1028
SMALL FS
1068
INPUT MUX
1064
SATELLITE DISH
DBS OR PRIMESTAR
SATELLITE DISH
SATELLITE DISH
IRD
HD END
ATM
FILE SERVER
1088
1024
PAC TEL
BELL SOUTH
BELL ATLANTIC
1036
SATELLITE DISH
NTSC
ABC
CBS
NBC
HBO
DCI
SHOW
MPEG
SATELLITE DISH
NTSC
TAPE
1060
ATM
ATM SWITCH
1028
DS1
DS3
OC3
D1
TAPE
1060'

Fig. 18b

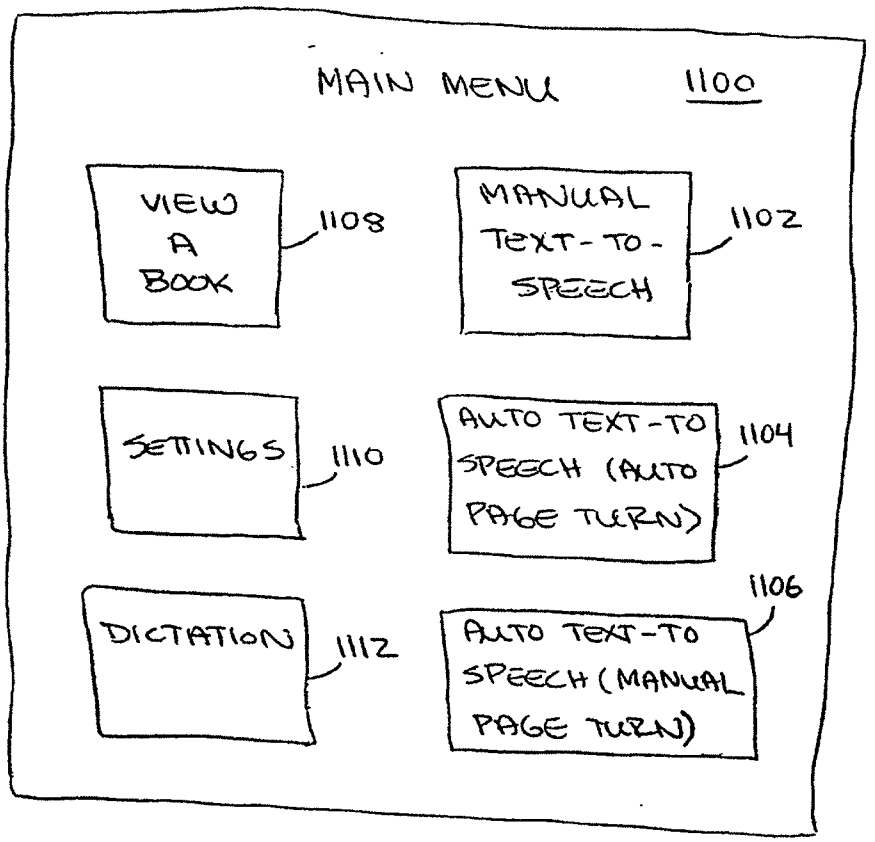

MAIN MENU
1100
VIEW A BOOK
1108
MANUAL TEXT-TO-SPEECH
1102
SETTINGS
1110
AUTO TEXT-TO SPEECH (AUTO PAGE TURN)
1104
DICTATION
1112
AUTO TEXT-TO SPEECH (MANUAL PAGE TURN)
1106

FIG. 19

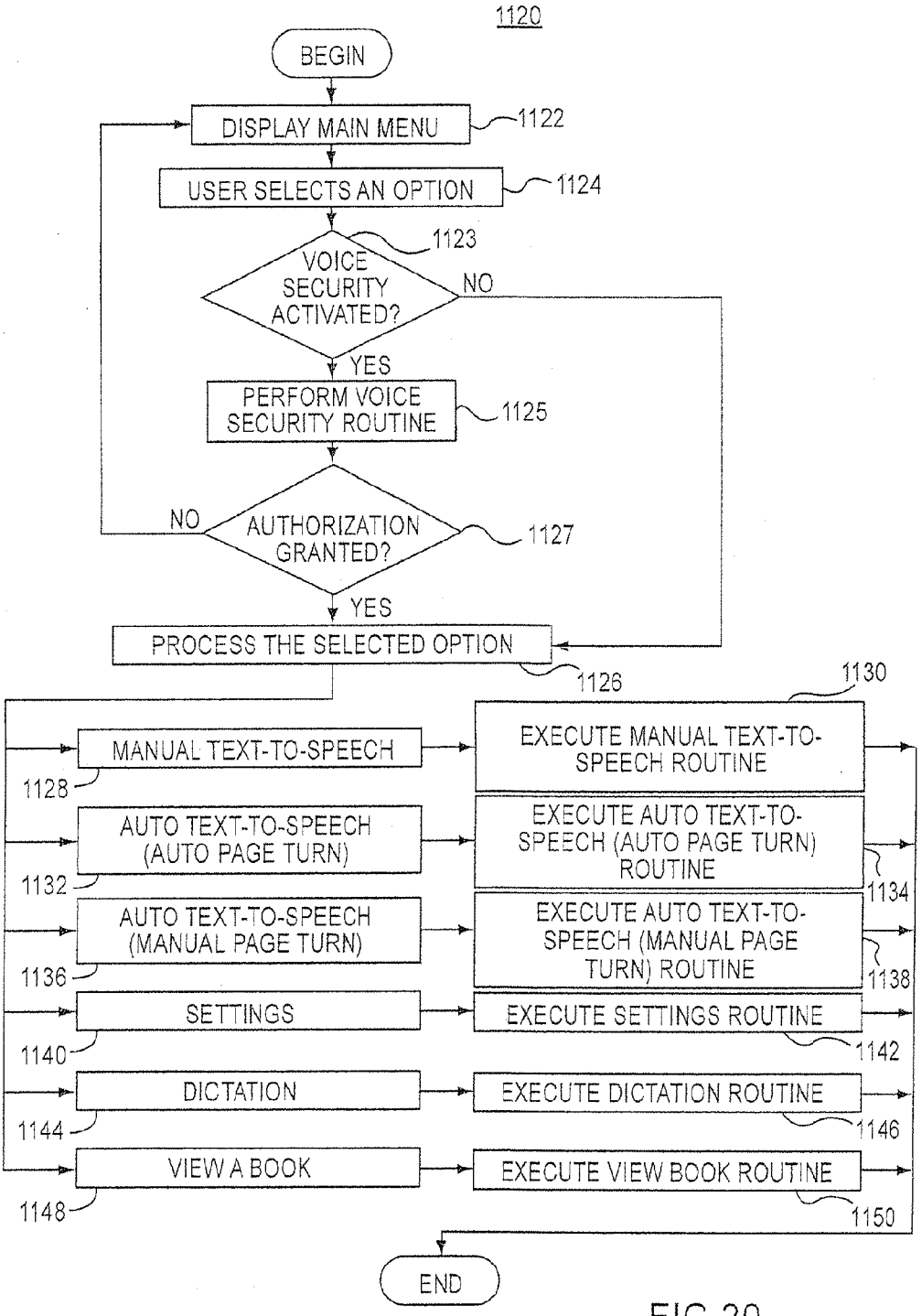

1120
BEGIN
DISPLAY MAIN MENU
1122
USER SELECTS AN OPTION
1124
1123
VOICE SECURITY ACTIVATED?
NO
YES
PERFORM VOICE SECURITY ROUTINE
1125
NO
AUTHORIZATION GRANTED?
1127
YES
PROCESS THE SELECTED OPTION
1126
1130
MANUAL TEXT-TO-SPEECH
1128
EXECUTE MANUAL TEXT-TO-SPEECH ROUTINE
AUTO TEXT-TO-SPEECH (AUTO PAGE TURN)
1132
EXECUTE AUTO TEXT-TO-SPEECH (AUTO PAGE TURN) ROUTINE
1134
AUTO TEXT-TO-SPEECH (MANUAL PAGE TURN)
1136
EXECUTE AUTO TEXT-TO-SPEECH (MANUAL PAGE TURN) ROUTINE
1138
SETTINGS
1140
EXECUTE SETTINGS ROUTINE
1142
DICTATION
1144
EXECUTE DICTATION ROUTINE
1146
VIEW A BOOK
1148
EXECUTE VIEW BOOK ROUTINE
1150
END

FIG.20

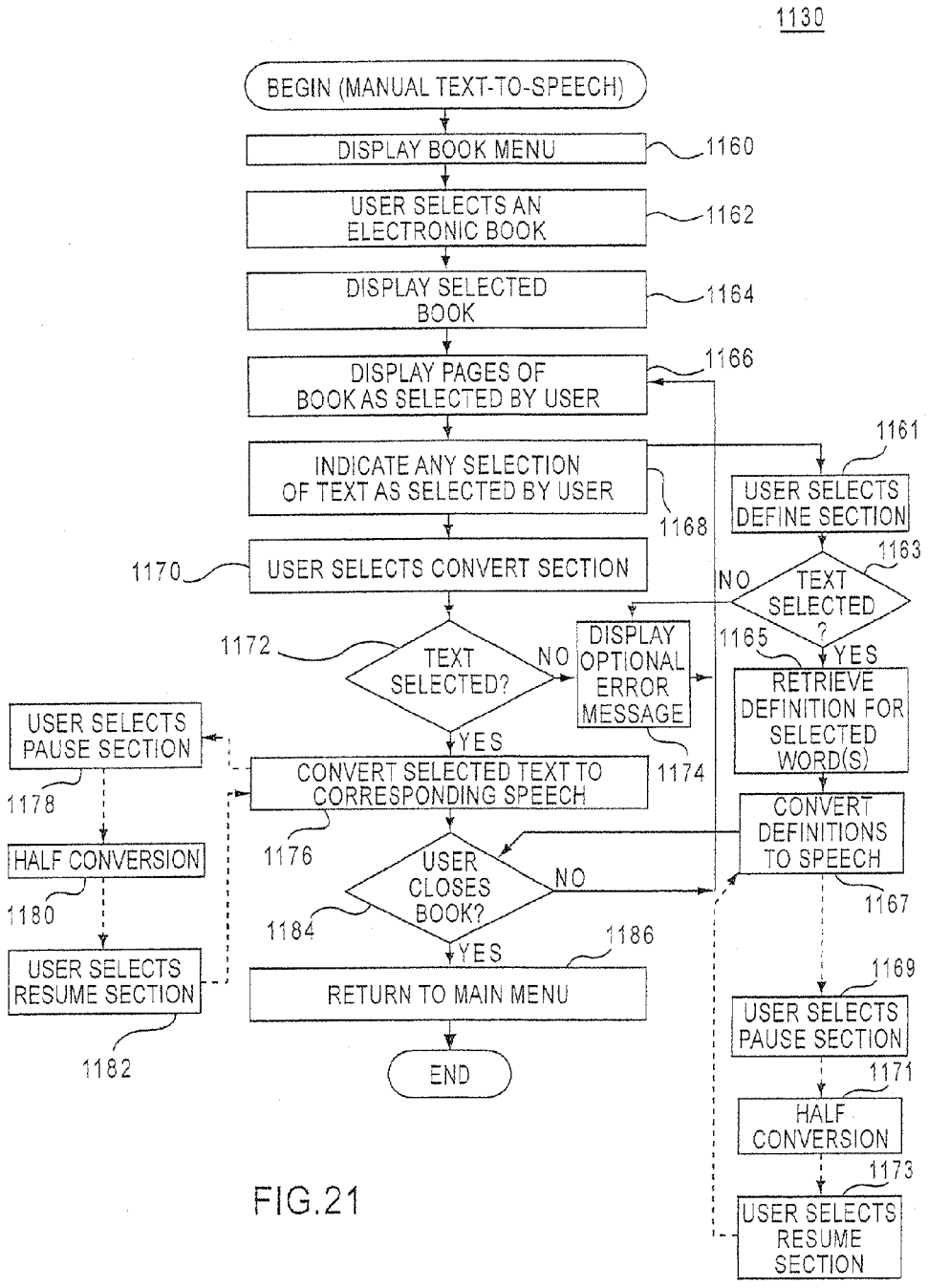

1130
BEGIN (MANUAL TEXT-TO-SPEECH)
DISPLAY BOOK MENU
1160
USER SELECTS AN ELECTRONIC BOOK
1162
DISPLAY SELECTED BOOK
1164
DISPLAY PAGES OF BOOK AS SELECTED BY USER
1166
INDICATE ANY SELECTION OF TEXT AS SELECTED BY USER
1168
USER SELECTS CONVERT SECTION
1170
TEXT SELECTED?
1172
NO
YES
DISPLAY OPTIONAL ERROR MESSAGE
1174
CONVERT SELECTED TEXT TO CORRESPONDING SPEECH
1176
USER CLOSES BOOK?
1184
NO
YES
RETURN TO MAIN MENU
1186
END
USER SELECTS PAUSE SECTION
1178
HALF CONVERSION
1180
USER SELECTS RESUME SECTION
1182
1161
USER SELECTS DEFINE SECTION
1163
TEXT SELECTED ?
NO
YES
1165
RETRIEVE DEFINITION FOR SELECTED WORD(S)
CONVERT DEFINITIONS TO SPEECH
1167
1169
USER SELECTS PAUSE SECTION
1171
HALF CONVERSION
1173
USER SELECTS RESUME SECTION

FIG.21

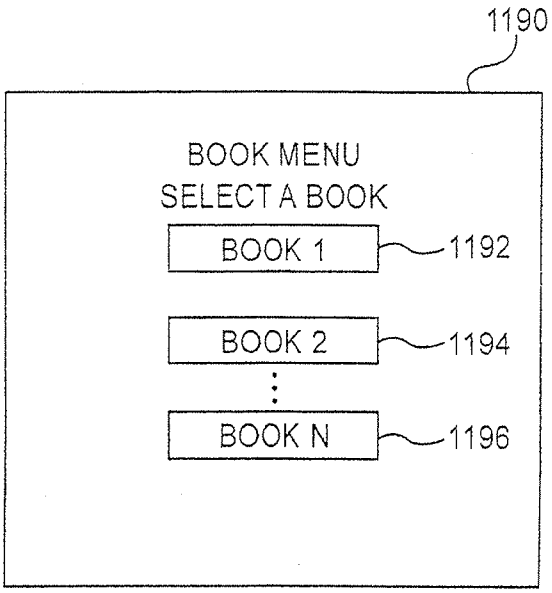

1190
BOOK MENU
SELECT A BOOK
BOOK 1
1192
BOOK 2
1194
BOOK N
1196

FIG.22

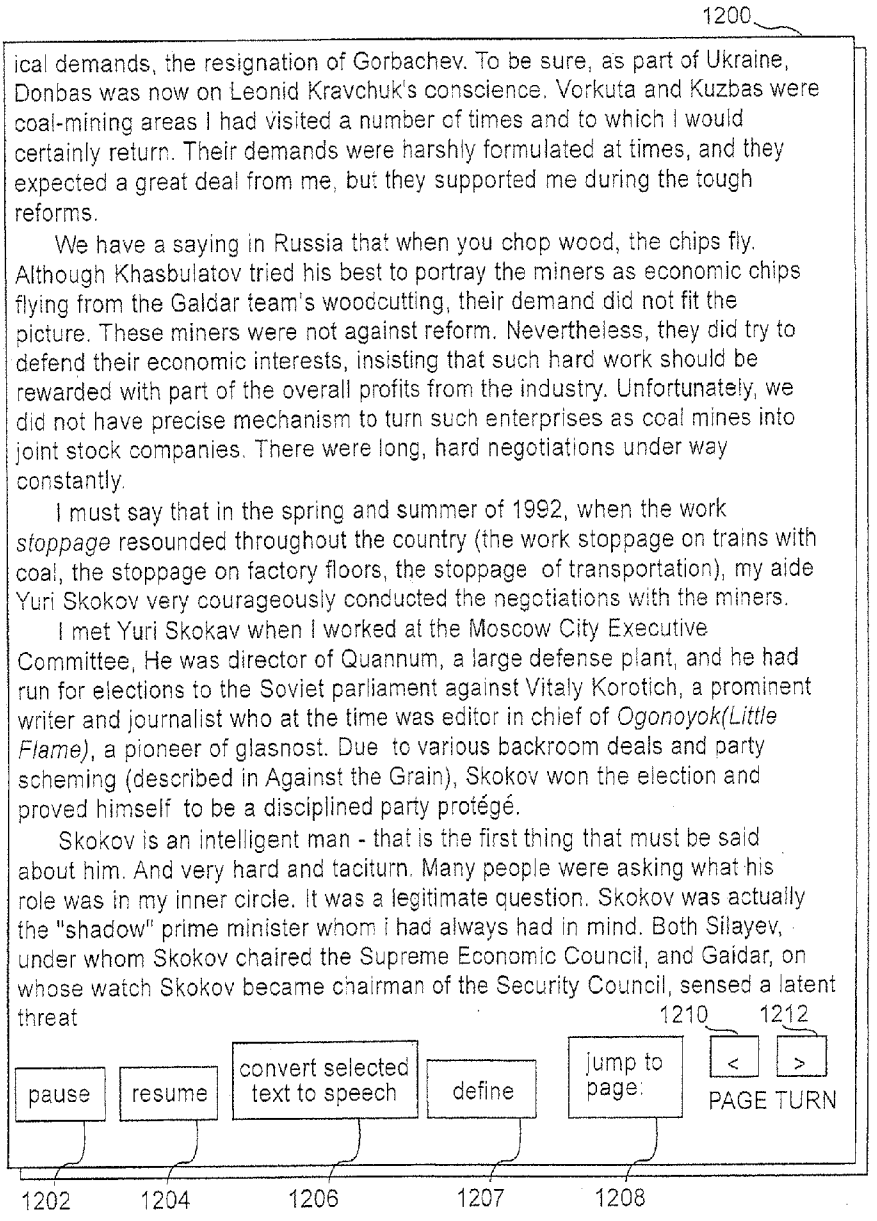
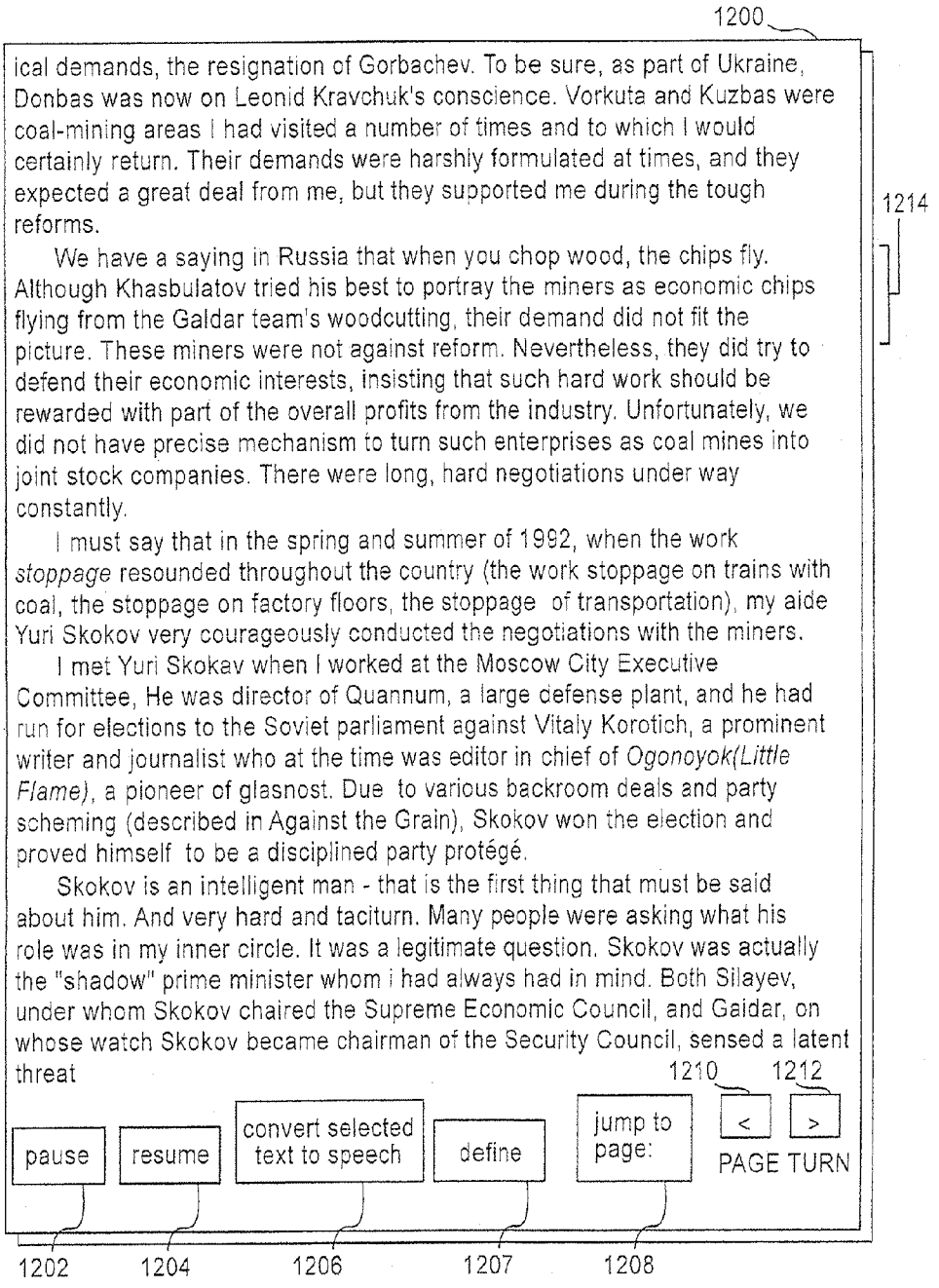

1200
ical demands, the resignation of Gorbachev. To be sure, as part of Ukraine, Donbas was now on Leonid Kravchuk's conscience. Vorkuta and Kuzbas were coal-mining areas I had visited a number of times and to which I would certainly return. Their demands were harshly formulated at times, and they expected a great deal from me, but they supported me during the tough reforms.
We have a saying in Russia that when you chop wood, the chips fly. Although Khasbulatov tried his best to portray the miners as economic chips flying from the Gaidar team's woodcutting, their demand did not fit the picture. These miners were not against reform. Nevertheless, they did try to defend their economic interests, insisting that such hard work should be rewarded with part of the overall profits from the industry. Unfortunately, we did not have precise mechanism to turn such enterprises as coal mines into joint stock companies. There were long, hard negotiations under way constantly.
I must say that in the spring and summer of 1992, when the work stoppage resounded throughout the country (the work stoppage on trains with coal, the stoppage on factory floors, the stoppage of transportation), my aide Yuri Skokov very courageously conducted the negotiations with the miners.
I met Yuri Skokav when I worked at the Moscow City Executive Committee, He was director of Quannum, a large defense plant, and he had run for elections to the Soviet parliament against Vitaly Korotich, a prominent writer and journalist who at the time was editor in chief of Ogonoyok(Little Flame), a pioneer of glasnost. Due to various backroom deals and party scheming (described in Against the Grain), Skokov won the election and proved himself to be a disciplined party protégé.
Skokov is an intelligent man - that is the first thing that must be said about him. And very hard and taciturn. Many people were asking what his role was in my inner circle. It was a legitimate question. Skokov was actually the "shadow" prime minister whom I had always had in mind. Both Silayev, under whom Skokov chaired the Supreme Economic Council, and Gaidar, on whose watch Skokov became chairman of the Security Council, sensed a latent threat
1210
1212
pause
resume
convert selected text to speech
define
jump to page:
<
>
PAGE TURN
1202
1204
1206
1207
1208

FIG.23


1200
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1214
1210
1212
pause
resume
convert selected text to speech
define
jump to page:
<
>
PAGE TURN
1202
1204
1206
1207
1208

FIG.24

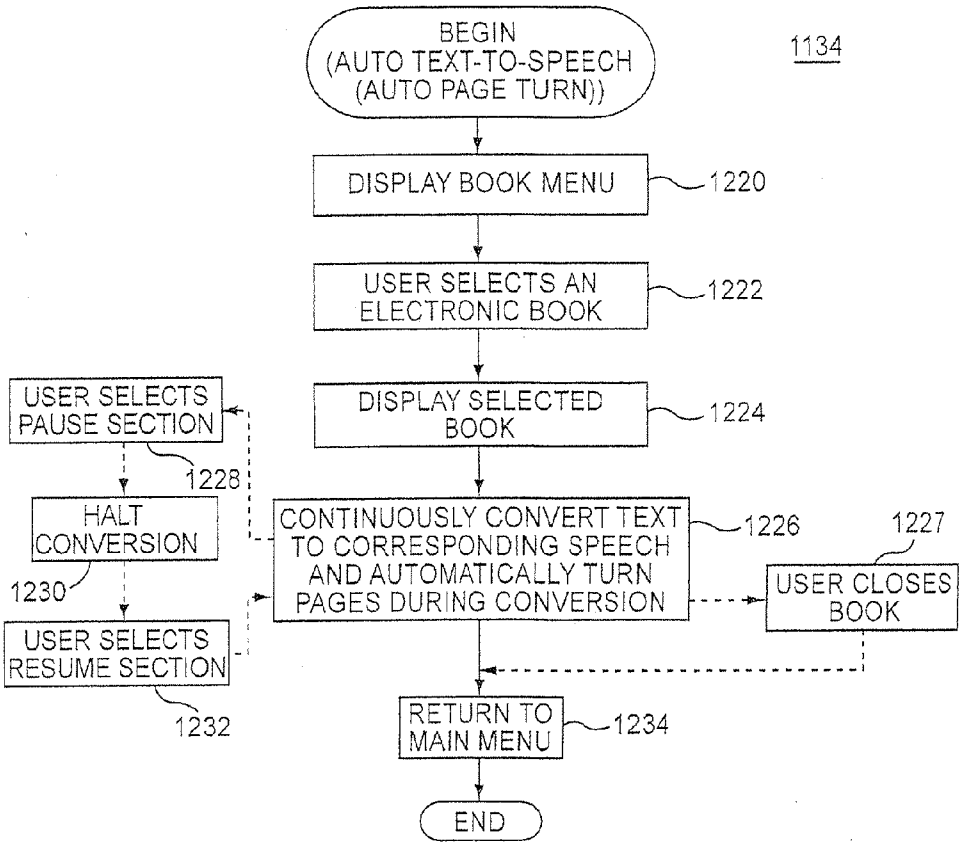

BEGIN
(AUTO TEXT-TO-SPEECH
(AUTO PAGE TURN))
1134
DISPLAY BOOK MENU
1220
USER SELECTS AN
ELECTRONIC BOOK
1222
DISPLAY SELECTED
BOOK
1224
USER SELECTS
PAUSE SECTION
1228
HALT
CONVERSION
1230
USER SELECTS
RESUME SECTION
1232
CONTINUOUSLY CONVERT TEXT
TO CORRESPONDING SPEECH
AND AUTOMATICALLY TURN
PAGES DURING CONVERSION
1226
1227
USER CLOSES
BOOK
RETURN TO
MAIN MENU
1234
END

FIG.25

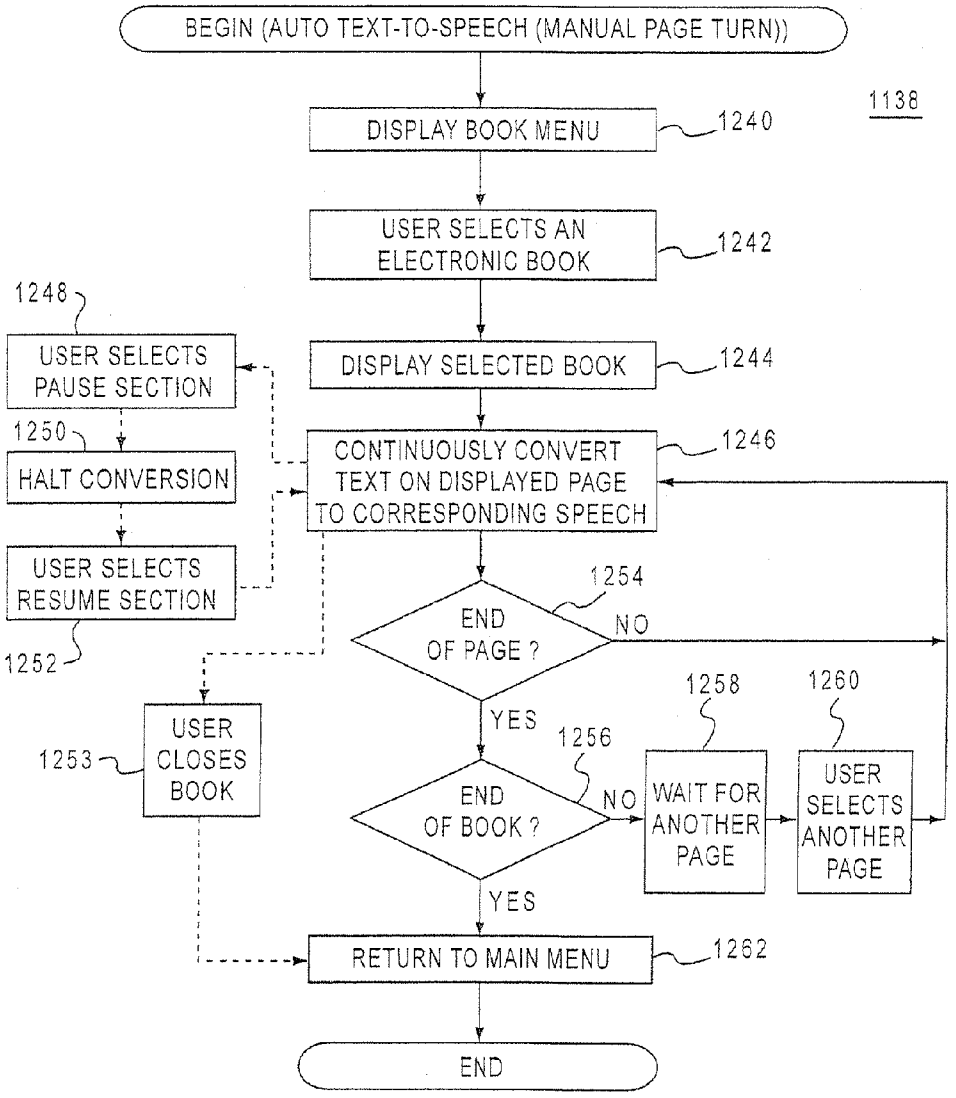

BEGIN (AUTO TEXT-TO-SPEECH (MANUAL PAGE TURN))
1138
DISPLAY BOOK MENU
1240
USER SELECTS AN ELECTRONIC BOOK
1242
1248
USER SELECTS PAUSE SECTION
DISPLAY SELECTED BOOK
1244
1250
HALT CONVERSION
CONTINUOUSLY CONVERT TEXT ON DISPLAYED PAGE TO CORRESPONDING SPEECH
1246
USER SELECTS RESUME SECTION
1254
END OF PAGE ?
NO
1252
YES
1258
1260
1253
USER CLOSES BOOK
1256
END OF BOOK ?
NO
WAIT FOR ANOTHER PAGE
USER SELECTS ANOTHER PAGE
YES
RETURN TO MAIN MENU
1262
END

FIG.26

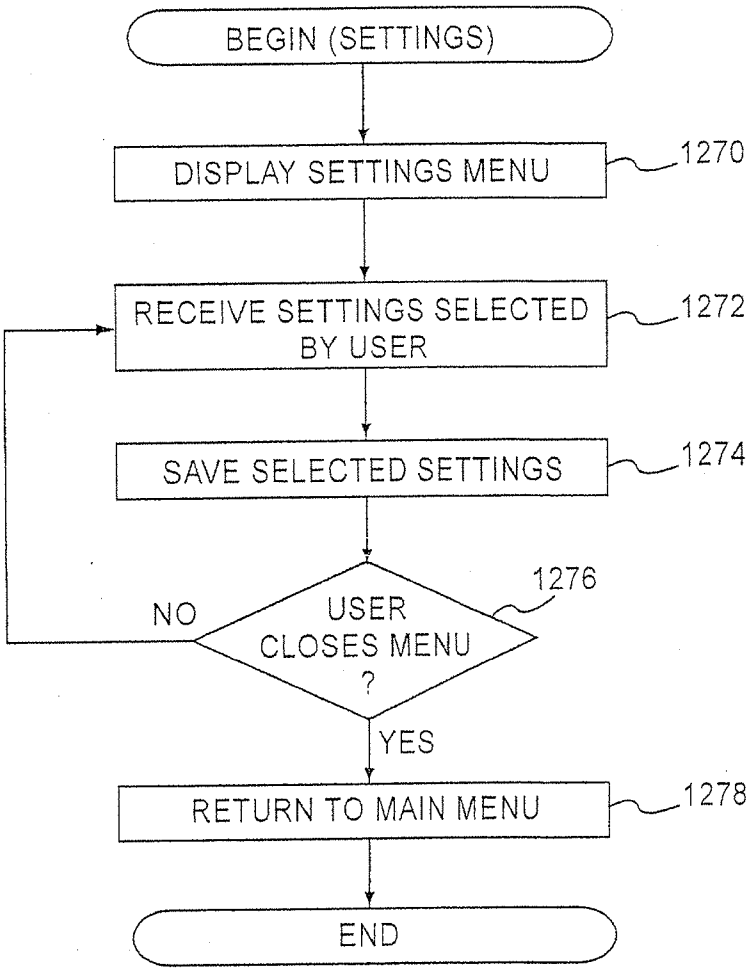

BEGIN (SETTINGS)
1142
DISPLAY SETTINGS MENU
1270
RECEIVE SETTINGS SELECTED BY USER
1272
SAVE SELECTED SETTINGS
1274
USER CLOSES MENU ?
1276
NO
YES
RETURN TO MAIN MENU
1278
END

FIG.27

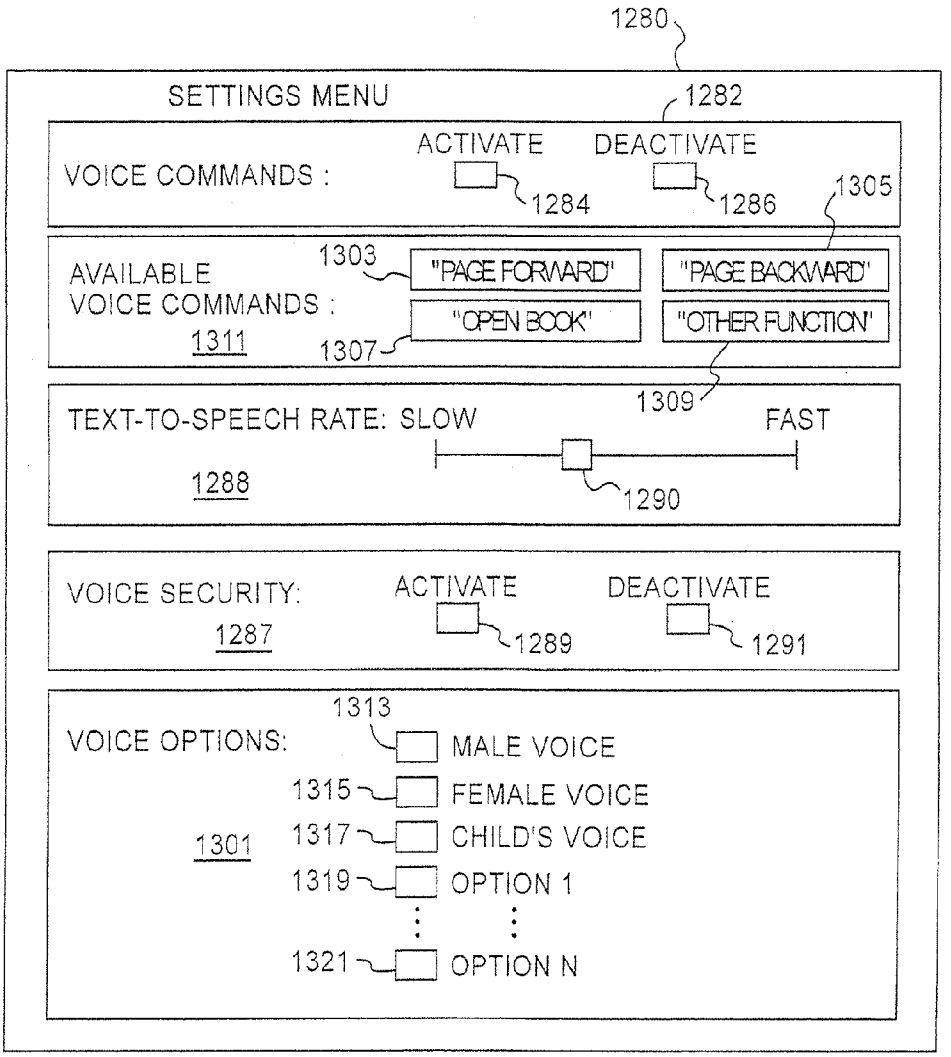

1280
SETTINGS MENU
1282
VOICE COMMANDS :
ACTIVATE
DEACTIVATE
1284
1286
1305
AVAILABLE VOICE COMMANDS :
1303
"PAGE FORWARD"
"PAGE BACKWARD"
"OPEN BOOK"
"OTHER FUNCTION"
1311
1307
1309
TEXT-TO-SPEECH RATE: SLOW
FAST
1288
1290
VOICE SECURITY:
ACTIVATE
DEACTIVATE
1287
1289
1291
1313
VOICE OPTIONS:
MALE VOICE
1315
FEMALE VOICE
1301
1317
CHILD'S VOICE
1319
OPTION 1
1321
OPTION N

FIG.28

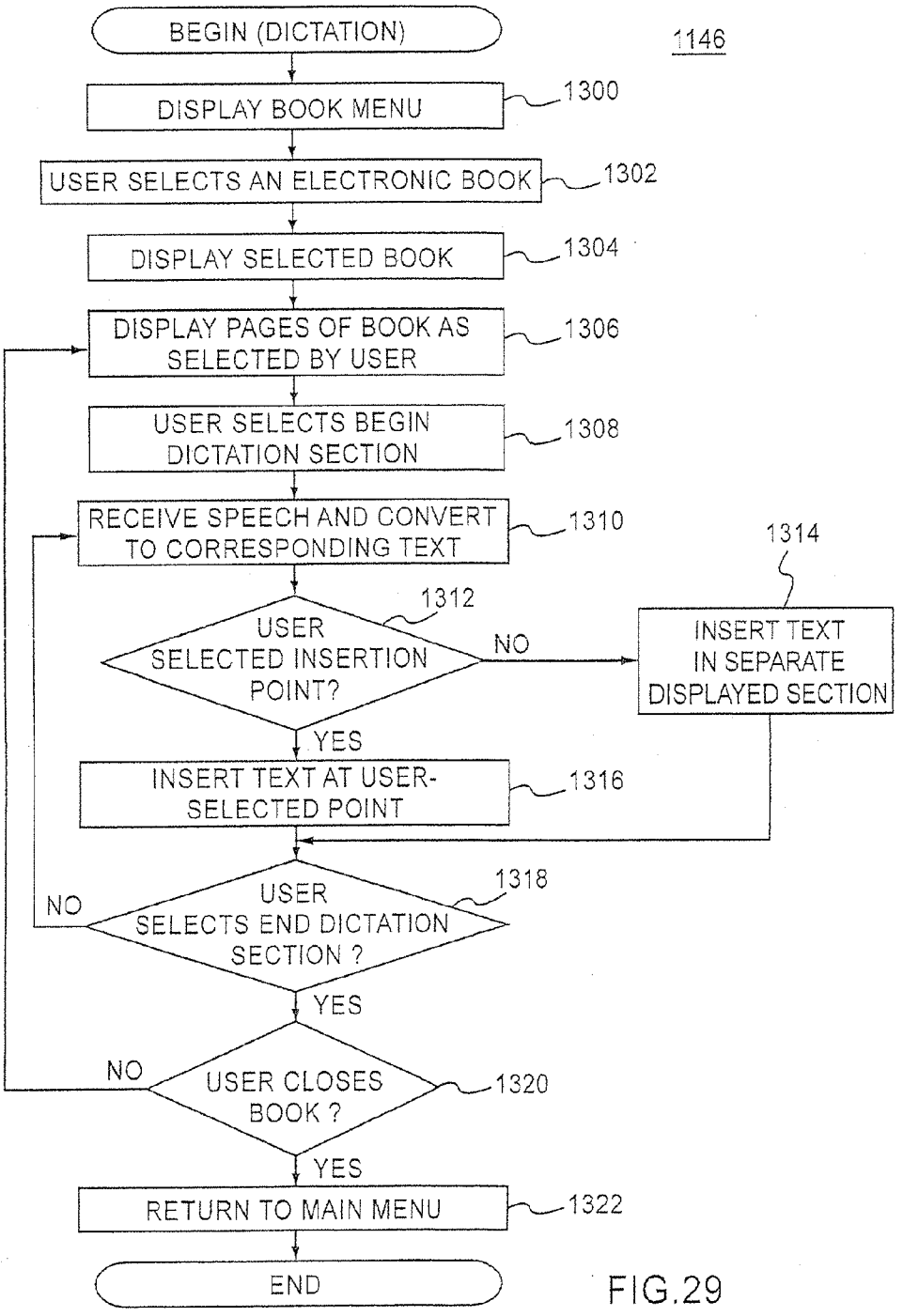

BEGIN (DICTATION)
1146
DISPLAY BOOK MENU
1300
USER SELECTS AN ELECTRONIC BOOK
1302
DISPLAY SELECTED BOOK
1304
DISPLAY PAGES OF BOOK AS SELECTED BY USER
1306
USER SELECTS BEGIN DICTATION SECTION
1308
RECEIVE SPEECH AND CONVERT TO CORRESPONDING TEXT
1310
1314
1312
USER SELECTED INSERTION POINT?
NO
INSERT TEXT IN SEPARATE DISPLAYED SECTION
YES
INSERT TEXT AT USER-SELECTED POINT
1316
1318
NO
USER SELECTS END DICTATION SECTION ?
YES
NO
USER CLOSES BOOK ?
1320
YES
RETURN TO MAIN MENU
1322
END

FIG.29

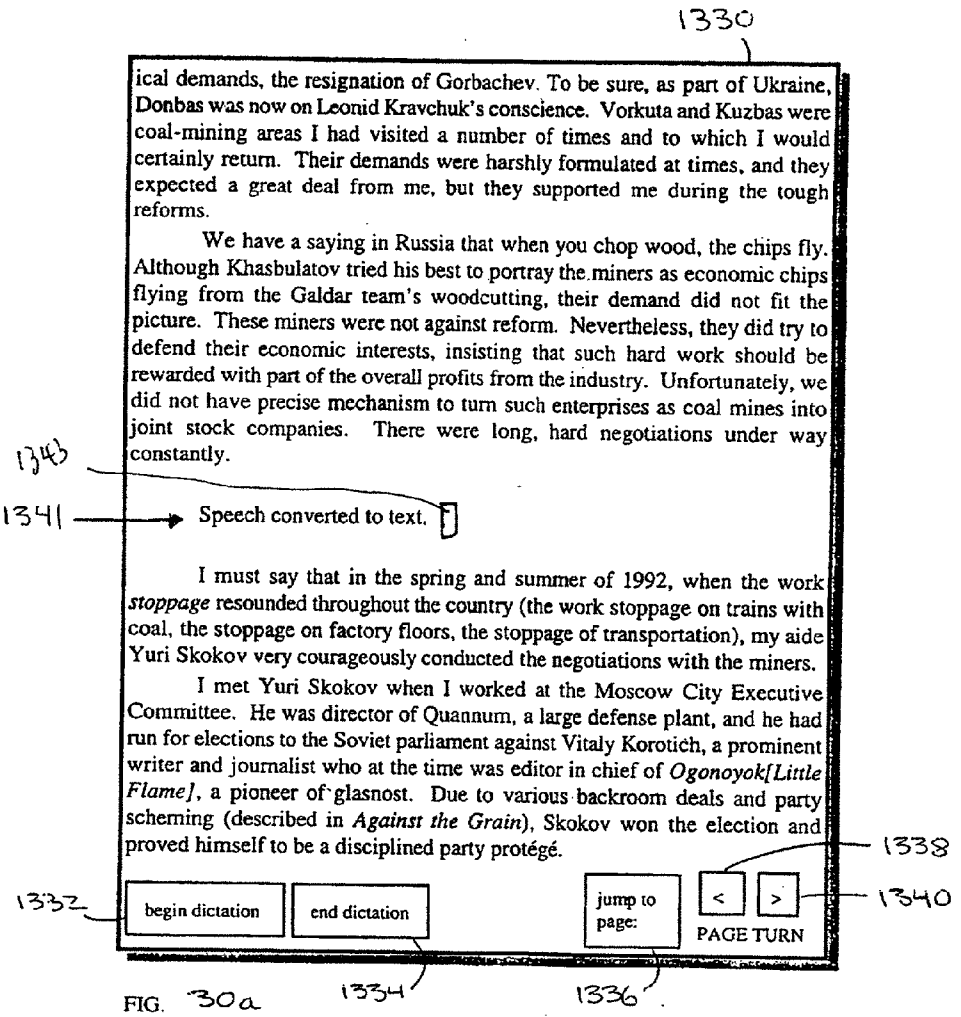
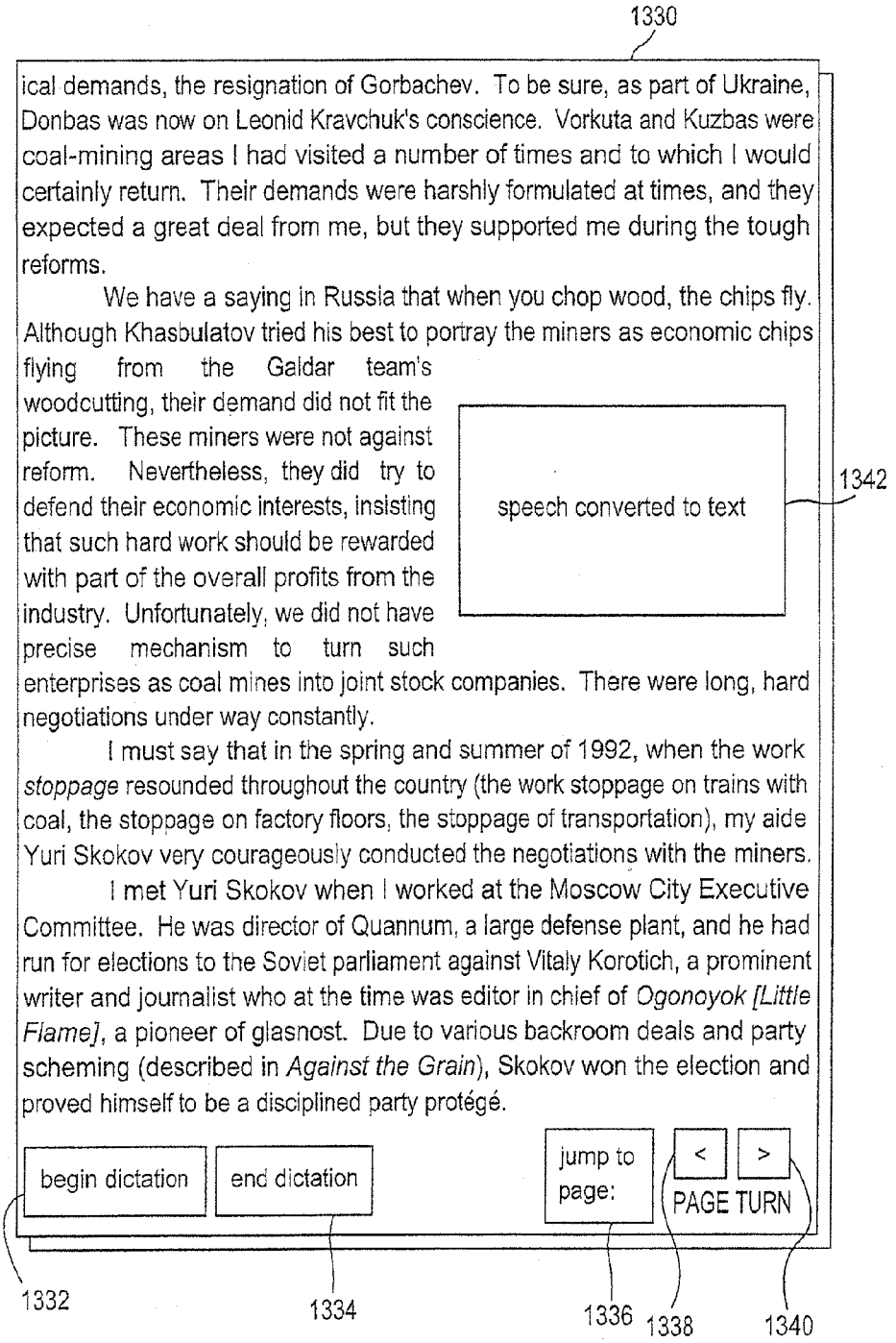

1330
ical demands, the resignation of Gorbachev. To be sure, as part of Ukraine, Donbas was now on Leonid Kravchuk's conscience. Vorkuta and Kuzbas were coal-mining areas I had visited a number of times and to which I would certainly return. Their demands were harshly formulated at times, and they expected a great deal from me, but they supported me during the tough reforms.
We have a saying in Russia that when you chop wood, the chips fly. Although Khasbulatov tried his best to portray the miners as economic chips flying from the Galdar team's woodcutting, their demand did not fit the picture. These miners were not against reform. Nevertheless, they did try to defend their economic interests, insisting that such hard work should be rewarded with part of the overall profits from the industry. Unfortunately, we did not have precise mechanism to turn such enterprises as coal mines into joint stock companies. There were long, hard negotiations under way constantly.
1343
1341
Speech converted to text.
I must say that in the spring and summer of 1992, when the work *stoppage* resounded throughout the country (the work stoppage on trains with coal, the stoppage on factory floors, the stoppage of transportation), my aide Yuri Skokov very courageously conducted the negotiations with the miners.
I met Yuri Skokov when I worked at the Moscow City Executive Committee. He was director of Quannum, a large defense plant, and he had run for elections to the Soviet parliament against Vitaly Korotich, a prominent writer and journalist who at the time was editor in chief of *Ogonoyok[Little Flame]*, a pioneer of glasnost. Due to various backroom deals and party scheming (described in *Against the Grain*), Skokov won the election and proved himself to be a disciplined party protégé.
1338
1332
begin dictation
end dictation
jump to page:
<
>
PAGE TURN
1340
1334
1336

FIG. 30a


1330
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speech converted to text
1342
I must say that in the spring and summer of 1992, when the work *stoppage* resounded throughout the country (the work stoppage on trains with coal, the stoppage on factory floors, the stoppage of transportation), my aide Yuri Skokov very courageously conducted the negotiations with the miners.
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begin dictation
end dictation
jump to page:
<
>
PAGE TURN
1332
1334
1336
1338
1340

Fig. 30b

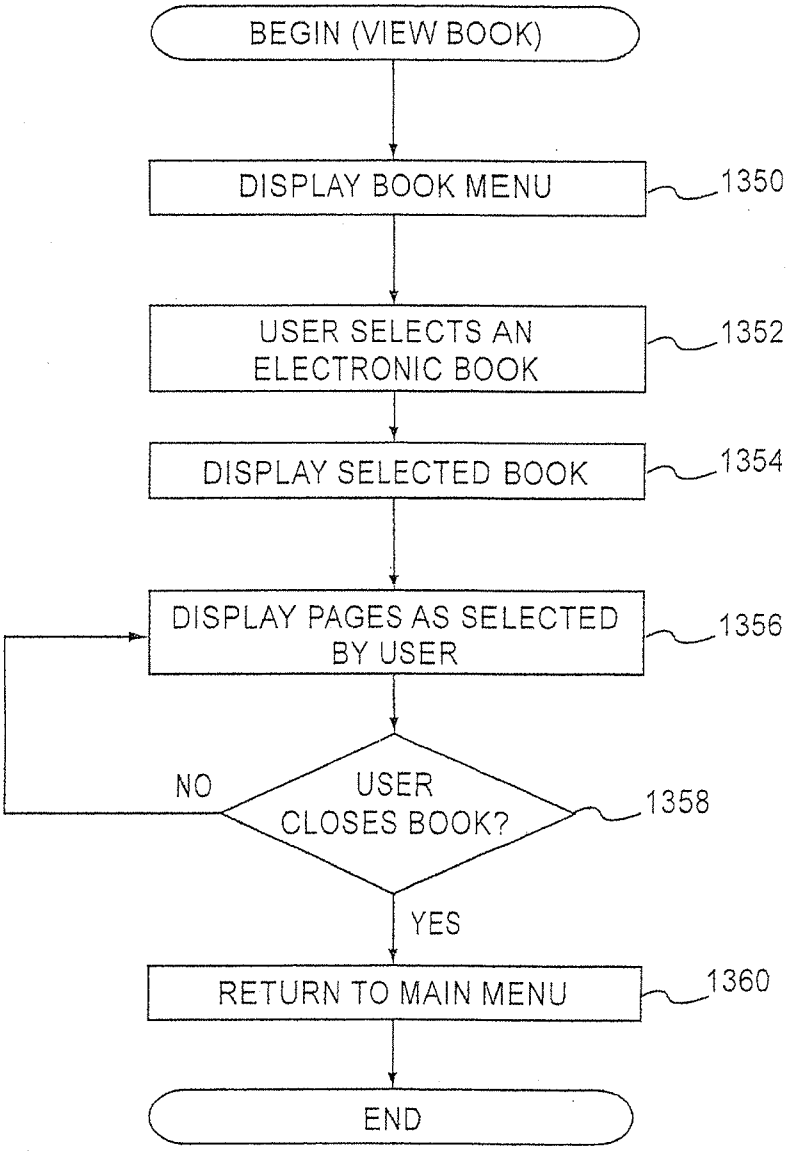
BEGIN (VIEW BOOK)
1150
DISPLAY BOOK MENU
1350
USER SELECTS AN ELECTRONIC BOOK
1352
DISPLAY SELECTED BOOK
1354
DISPLAY PAGES AS SELECTED BY USER
1356
NO
USER CLOSES BOOK?
1358
YES
RETURN TO MAIN MENU
1360
END

FIG.31

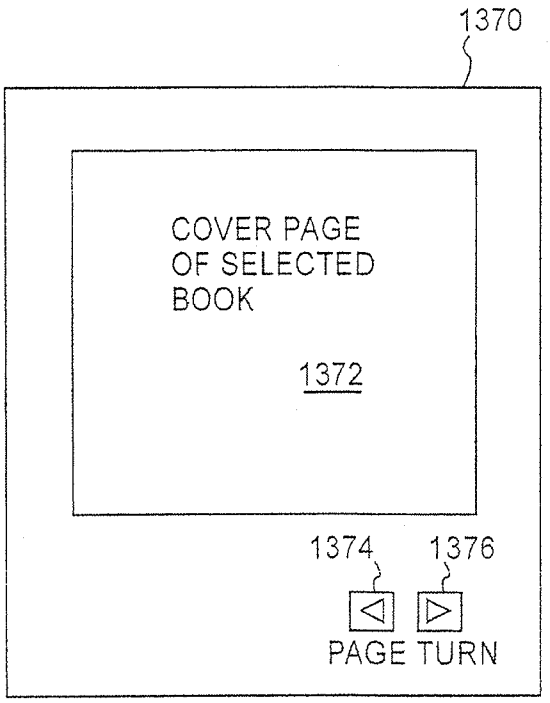

FIG.32

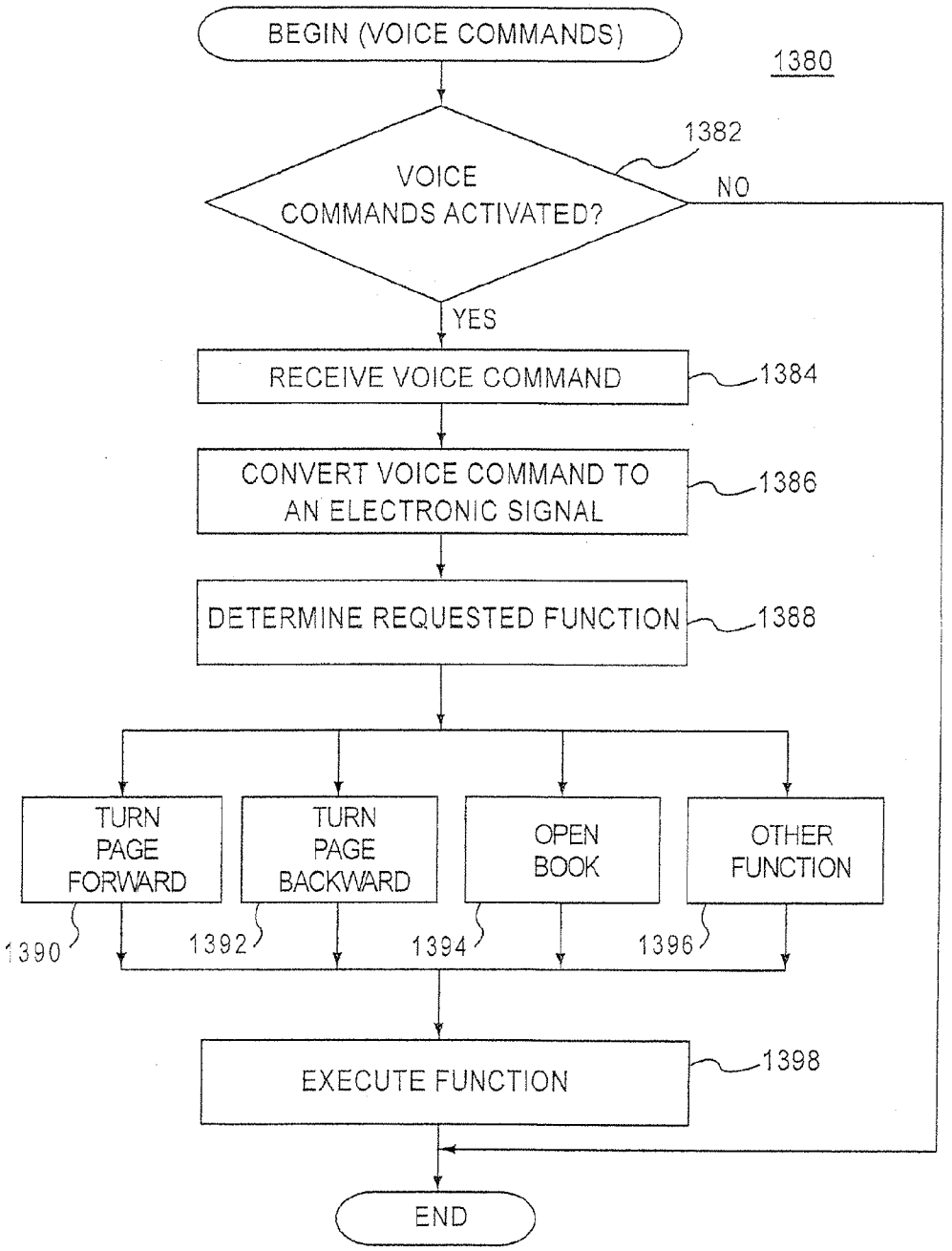
BEGIN (VOICE COMMANDS)
1380
1382
VOICE COMMANDS ACTIVATED?
NO
YES
RECEIVE VOICE COMMAND
1384
CONVERT VOICE COMMAND TO AN ELECTRONIC SIGNAL
1386
DETERMINE REQUESTED FUNCTION
1388
TURN PAGE FORWARD
TURN PAGE BACKWARD
OPEN BOOK
OTHER FUNCTION
1390
1392
1394
1396
EXECUTE FUNCTION
1398
END

FIG.33

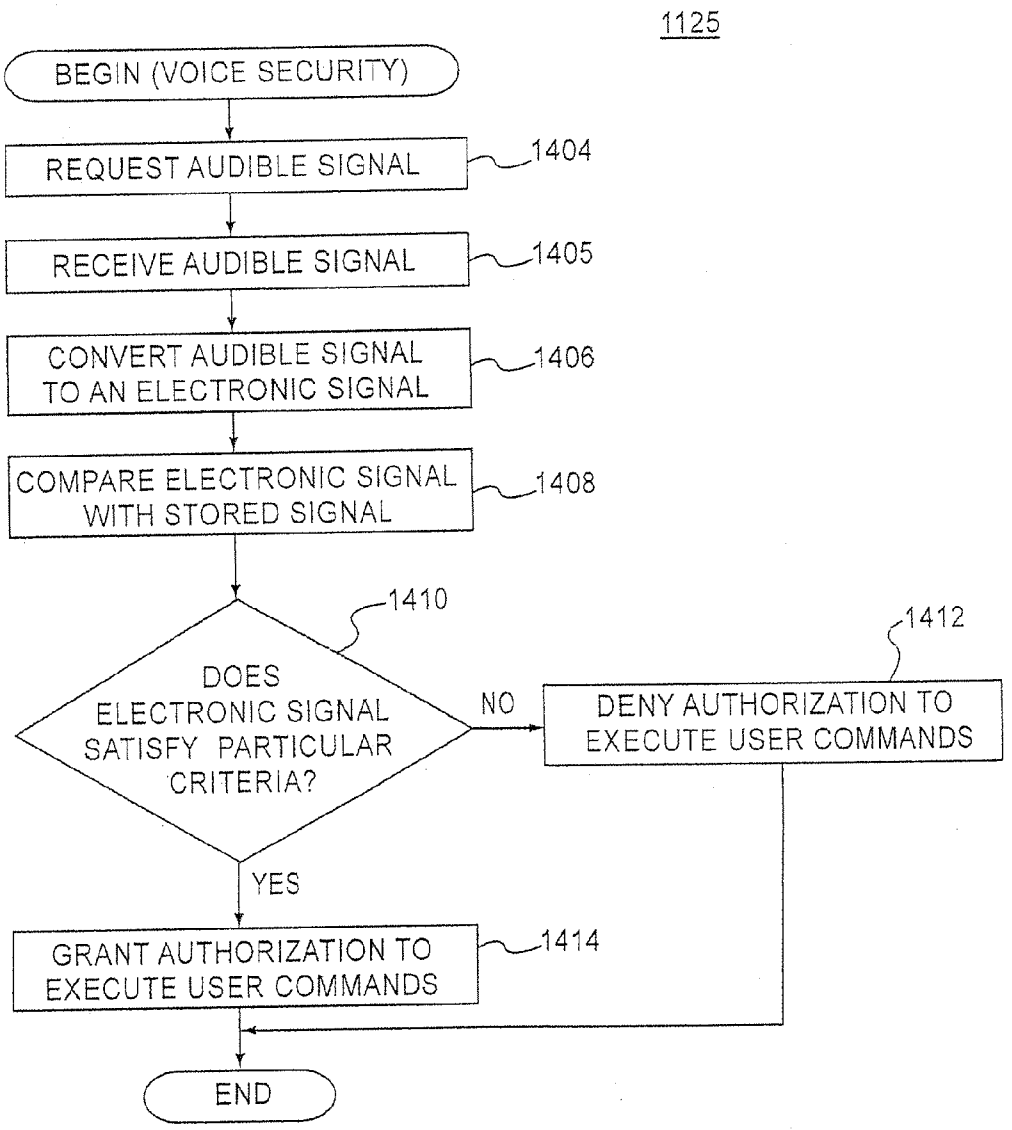
1125
BEGIN (VOICE SECURITY)
REQUEST AUDIBLE SIGNAL
1404
RECEIVE AUDIBLE SIGNAL
1405
CONVERT AUDIBLE SIGNAL TO AN ELECTRONIC SIGNAL
1406
COMPARE ELECTRONIC SIGNAL WITH STORED SIGNAL
1408
1410
DOES ELECTRONIC SIGNAL SATISFY PARTICULAR CRITERIA?
NO
1412
DENY AUTHORIZATION TO EXECUTE USER COMMANDS
YES
GRANT AUTHORIZATION TO EXECUTE USER COMMANDS
1414
END

FIG.34

ELECTRONIC BOOK WITH VOICE EMULATION FEATURES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a Continuation of U.S. application Ser. No. 13/757,409, filed Feb. 1, 2013, which is a Continuation of U.S. application Ser. No. 13/298,898, filed Nov. 11, 2011, which is a divisional of U.S. application Ser. No. 09/344,499, filed Jun. 25, 1999. These applications are hereby incorporated by reference in their entirety.

TECHNICAL FIELD

[0002] This invention is directed to an electronic book unit having one or more electronic books. More specifically, the invention relates to an apparatus and method for providing text-to-speech and speech recognition features for electronic books.

BACKGROUND ART

[0003] Sparked by the concept of an information superhighway, a revolution will take place in the distribution of books. Not since the introduction of Gutenberg's movable typeset printing has the world stood on the brink of such a revolution in the distribution of text material. The definition of the word "book" will change drastically in the near future. Due to reasons such as security, convenience, cost, and other technical problems, book and magazine publishers are currently only able to distribute their products in paper form. This invention solves the problems encountered by publishers.

SUMMARY OF INVENTION

[0004] Methods and apparatus consistent with the present invention include features for text-to-speech conversion and speech recognition for electronic books. In one embodiment, the methods and apparatus display a page of an electronic book on a viewer, the page including text. They receive a selection of text on the displayed page for conversion to speech and convert at least a portion the selected text into the corresponding speech. They may alternatively automatically display a next page of the electronic book and convert at least a portion of text on the next page into corresponding speech, or automatically perform the conversion upon selection of the next page by a user.

[0005] In one embodiment, a user selects a portion of displayed text and converts it into audio. The text-to-audio conversion may be performed via a header file and pre-recorded audio for each electronic book, via text-to-speech conversion, or other available means. The user may select manual or automatic text-to audio conversion. The automatic text-to-audio conversion may be performed by automatically turning the pages of the electronic book or by the user manually turning the pages. The user may also select to convert the entire electronic book, or portions of it, into audio. The user may also select an option to receive an audio definition of a particular word in the electronic book. The present invention allows a user to control the system by selecting options from a screen or by entering voice commands.

[0006] For voice or audible commands, the methods and apparatus receive an audible command relating to a function of the electronic book. They convert the audible command into a corresponding electronic signal and execute the function in response to the electronic signal.

BRIEF DESCRIPTION OF DRAWINGS

[0007] FIG. **1** is a block diagram of the primary components of the electronic book selection and delivery system.

[0008] FIG. **2** is a schematic showing an overview of the electronic book selection and delivery system.

[0009] FIG. **3***a* is a schematic of the delivery plan for the electronic book selection and delivery system.

[0010] FIG. **3***b* is a schematic of an alternate delivery plan.

[0011] FIG. **4** is a block diagram of an operations center.

[0012] FIG. **5***a* is a flow diagram of the processing at the operations center and uplink.

[0013] FIG. **5***b* is a block diagram of the hardware configuration for an uplink site.

[0014] FIG. **6***a* is a block diagram of the hardware configuration for a four component home subsystem.

[0015] FIG. **6***b* is a schematic of a two unit home subsystem.

[0016] FIG. **7** is a flow diagram of the processes performed by the video connector.

[0017] FIG. **8** is a block diagram for an example of a library unit.

[0018] FIG. **9** is a flow diagram of some of the processes performed by the library on the received data stream.

[0019] FIG. **10** is a flow diagram of the processes performed by the library unit on information requests from the viewer.

[0020] FIG. **11** is a block diagram showing the components for an example of a viewer.

[0021] FIG. **12** is a flow diagram of some of the processes performed by the viewer on an information request from a subscriber.

[0022] FIG. **13** is a chart depicting the menu structure and sequencing of menus in the menu system.

[0023] FIG. **14***a* is a schematic of an introductory menu.

[0024] FIG. **14***b* is a schematic showing an example of a main menu.

[0025] FIGS. **14***c*, **14***d*, **14***e*, **14***f*, **14***g*, **14***h*, **14***i* and **14***j* are schematics showing examples of submenus.

[0026] FIG. **15** is a schematic diagram of an electronic book system for a bookstore or public library.

[0027] FIG. **16***a* and FIG. **16***b* are schematics of hardware modifications or upgrades to a set top converter.

[0028] FIG. **17** is a schematic showing a set top terminal that includes a data receiver and data transmitter.

[0029] FIG. **18***a* is a schematic of a book-on-demand system.

[0030] FIG. **18***b* is a schematic of an operations center supporting a book-on-demand system.

[0031] FIG. **19** is a diagram of a main menu screen for presenting on a viewer voice emulation options for electronic books.

[0032] FIG. **20** is a flow chart of a main menu routine.

[0033] FIG. **21** is a flow chart of a manual text-to-speech routine.

[0034] FIG. **22** is a diagram of a book menu screen.

[0035] FIG. **23** is a diagram of a page of an electronic book.

[0036] FIG. **24** is a diagram of a page of an electronic book illustrating selected text for conversion to speech.

[0037] FIG. **25** is a flow chart of an automatic text-to-speech routine with an automatic page turn feature.

[0038] FIG. **26** is a flow chart of an automatic text-to-speech routine with a manual page turn feature.
[0039] FIG. **27** is a flow chart of a settings routine.
[0040] FIG. **28** is a diagram of a settings menu.
[0041] FIG. **29** is a flow chart of a dictation routine.
[0042] FIG. **30***a* is a diagram of a page of an electronic book with transcribed text.
[0043] FIG. **30***b* is a diagram of a page of an electronic book with a section for presenting transcribed text.
[0044] FIG. **31** is a flow chart of a view book routine.
[0045] FIG. **32** is a diagram of a view book screen.
[0046] FIG. **33** is a flow chart of a voice commands routine.
[0047] FIG. **34** is a flow chart of a voice security routine.

DETAILED DESCRIPTION

[0048] An electronic book selection and delivery system is a new way to distribute electronic books to bookstores, public libraries, schools and consumers. The technological breakthroughs of this invention provide a secure system for both delivering selected electronic books and receiving payments. The system has an unusual combination of features that provides the consumer with an electronic book unit that has a high tech aura while being very practical, portable, and easy to use.
[0049] The clear advantage of the system is that it eliminates the distribution of any physical object such as a paper book or computer memory device from any book or text distribution system. The purchase of an electronic book may become a PAY-PER-READ™ event avoiding the overhead, "middle-men," printing costs, and time delay associated with the current book distribution system. Published material and text such as the President's speech, a new law, a court decision on abortion, or O. J. Simpson's testimony can be made immediately available to the consumer at a nominal fee.
[0050] The system is a novel combination of new technology involving the television, cable, telephone, and computer industries. It uses high bandwidth data transmissions, strong security measures, sophisticated digital switching, high resolution visual displays, novel controls, and user friendly interface software.
[0051] The primary components of the text delivery system are the subsystem for placing the text onto a signal path and the subsystem for receiving and selecting text that was placed on the signal path. A preferred embodiment of the system includes additional components and optional features that enhance the system. The system may be configured for use by bookstores, public libraries, schools and consumers.
[0052] The system for consumer use is made up of four subsystems, namely: (1) an operations center, (2) a distribution system, (3) a home subsystem including reception, selection, viewing, transacting and transmission capabilities, and (4) a billing and collection system.
[0053] The operations center performs several primary functions: manipulating text data (including receiving, formatting and storing of text data), security encoding of text, cataloging of books, providing a messaging center capability, and performing uplink functions. The system delivers the text from the operations center to consumer homes by inserting text data into an appropriate signal path. The insertion of text is generally performed with an encoder at an uplink site that is within or near the operations center. If the signal path is a video signal path, the system can use several lines of the Vertical Blanking Interval (VBI), all the lines of the analog video signal, a digital video signal or unused portions of bandwidth to transmit text data. Using the VBI delivery method, the top ten or twenty book titles may be transmitted with video during normal programming utilizing existing cable, satellite, wireless or broadcast transmission capability without disruption to the subscriber's video reception. Using the entire video signal, thousands of books may be transmitted within just one hour of air time. Nearly any analog or digital video distribution system may be used to deliver the video signal with included text.
[0054] The text data may also be transmitted over other low and high speed signal paths including a telephone network (e.g., a public switched telephone network) having a high speed connection such as an asynchronous digital subscriber line (ADSL) connection. Alternatively, other delivery systems may be used, such as those disclosed in the related applications identified above.
[0055] The home subsystem performs four primary functions: connecting to the video distribution system, selecting text, storing text, and transacting through a phone or cable communicating mechanism. The components of the home subsystem may be configured in a variety of hardware configurations. Each function may be performed by a separate component, the components may be integrated, or the capability of existing cable set top converter boxes, personal computers, and televisions may be utilized. Preferably, a connector, library unit and an electronic book unit, or viewer unit, are used. The connector portion of the home subsystem receives the analog video signal and strips or extracts the text from the video. The home library stores the text signal, provides a user friendly software interface to the system and processes the transactions at the consumer home. The viewer provides a screen for viewing text or menus and novel user friendly controls. The viewer may also incorporate all the functionality of the home subsystem.
[0056] The viewing device is preferably a portable book shaped viewer which stores one or more electronic books for viewing and provides a screen for interacting with the home library unit. A high resolution LCD display is used to both read the books and to interact with the home library software. An optional phone connector or return-path cable connection initiates the telephone calls and, with the aid of the library, transmits the necessary data to complete the ordering and billing portion of the consumer transaction. The user friendly controls include a bookmark, current book and page turn button. The billing and collection system performs transaction management, authorizations, collections and publisher payments automatically utilizing the telephone system. Alternatively, other ordering methods may be used, such as those disclosed in the related applications identified above.
[0057] In one embodiment, the primary components of the electronic book selection and delivery system **200** are an encoder **204**, a video distribution system **208**, a connector **212**, and a text selector **216** as shown in FIG. **1**. The encoder **204** places textual data on a video signal to form a composite video signal. Although the composite signal may contain only textual data, it usually carries both video and textual data. A variety of equipment and methods may be used to encode text data onto a video signal. The video distribution system **208** distributes the composite video signal from the single point of the encoder **204** to multiple locations which have connectors **212**. The connector **212** receives the digital or analog video signal from the video distribution system **208** and separates, strips or extracts the text data from the composite video signal. If necessary, the extracted text data is converted into a

digital bit stream. Text selector **216** works in connection with the connector **212** to select text.

[0058] Using a connector **212** and text selector **216** combination, various methods of selecting and retrieving desired text from a composite or video signal are possible. Text may be preselected, selected as received or selected after being received and stored. A preferred method is for the connector **212** to strip or extract all the text from the video signal and have the text selector **216** screen all the text as received from the connector **212**. The text selector **216** only stores text in long term or permanent memory if the text passes a screening process described below.

[0059] An overview of the electronic book selection and delivery system **200** is shown in FIG. **2**. The delivery system **200** includes: an operations center **250** including an uplink site **254**, a video distribution system **208**, a home system **258** including a video connector **212**, a library **262**, a viewer **266**, and a phone connector **270**, telephone system **274**, an internet web site **279** and a billing and collection system **278**. Also as shown in FIG. **2**, the home system **258** may include connections to a television **259** and a personal computer **261**. The television **259** and the personal computer **261** may be used to display menu screens, electronic books, electronic files, or any other information associated with the delivery system **200**. In addition, the television **259** and the personal computer **261** may provide control function that replicate and supplement those of the viewer **266**.

[0060] The operations center **250** receives textual material from outside sources **282** such as publishers, newspapers, and on-line services. Alternately, the outside sources may maintain electronic books at the Internet web site **279**. The outside sources **282** may convert textual and graphical material to digital format, or may contract with another vendor to provide this service. The operations center **250** may receive the textual and graphical material in various digital formats and may convert the textual material to a standard compressed format for storage. In so doing, the operations center **250** may create a pool of textual material that is available to be delivered to the home system **258**. The textual material may be grouped by books or titles for easy access.

[0061] As used herein, "book" means textual or graphical information such as contained in any novels, encyclopedias, articles, magazines or manuals. The term "title" may represent the actual title assigned by an author to a book, or any other designation indicating a particular group, portion, or category of textual information. The title may refer to a series of related textual information, a grouping of textual information, or a portion of textual data. For example, "Latest Harlequin Romance", "Four Child Reading Books (Ages 10-12)", "Encyclopedia 'BRITANNICA'™", "President's Speech", "Instruction Manual", "Schedule of 4th of July Events", "Pet Handbooks", "Roe v. Wade", and "The Joy of Cooking" are suitable titles. Also, the title may be a graphical symbol or icon. Thus, a picture of a wrench may be a title for a repair book, a picture of a computer a title for a computer book, a graphical symbol of a telephone a title for a telephone book, a drawing of a dagger a title for a mystery book, a picture of a bat and ball a title for a sports book and a picture of tickertape a title for a business book. The term "electronic book" refers to the electronic counterpart to a "book."

[0062] The operations center **250** includes an uplink site **254** for placing the text onto a video signal and sending the composite video signal into a video distribution system. The uplink site **254** would generally include an encoder **204** (not shown in FIG. **2**) to encode the text onto a video signal.

[0063] Many analog and digital distribution systems **208**, or other telecommunications systems, can be used with the delivery system **200**, such as a cable television distribution system, a broadcast television distribution system, video distributed over telephone systems, distribution from the Internet, direct satellite broadcast distribution systems, and other wired and wireless distribution systems.

[0064] The home system **258** performs five primary functions: (1) connecting with a video distribution system, (2) selecting data, (3) storing data, (4) displaying data, and (5) handling transactions. An important optional function of the home sub-system **258** is communicating using a telephone communication system **274**. The home system **258** is made up of primarily four parts: a video connector **212** or similar type of connector for connecting with the video distribution system **208**, a library unit **262** for storing and processing, an electronic book, or viewer unit, **266** for viewing menus and text and a telephone connector **270** for connecting with a telephone communications system **274**. In an alternate arrangement, the viewer **266** may include all the functionality of the home system **258**.

[0065] The billing and collection system **278** may be co-located with the operations center **250** or located remote from the operations center **250**. In one embodiment, the billing and collection system **278** is in communication with the home system **258** via telephone-type communication systems (for example **274**). Any of a number of telephone type communication systems, such as, a cellular system, will operate with the billing and collection system **278**. The billing and collection system **278** records the electronic books or portions of text that are selected or ordered by the subscriber. The collection system will charge a subscriber's credit account or bill the subscriber. In addition, the billing and collection system **278** will monitor that amount due to publishers or other outside sources **282** who have provided textual data or other services such as air time to enable the text delivery system **200** to operate.

[0066] When electronic books are provided via the Internet web site **279**, the billing and collecting functions may be incorporated into the Internet web site **279**. For example, a subscriber may pay for an electronic book selection by entering a credit card number into a data field of a page of the Internet web site **279**. In this configuration, a separate billing and collection system may not be required.

[0067] FIG. **3***a* is an expanded overview of a delivery plan **301** for the delivery system **200**. The delivery plan **301** supports various types of subscribers and various billing systems. FIG. **3***a* shows that publishers **282** will provide text transfer **302** to the operations center **250'** and receive payments **306** from the billing and collection system **278'**. A separate channel uplink site **254'** is shown in this configuration receiving data **310** from the operations center **250'**. The operations center **250'** has three separate sections (**318**, **322**, **326**) one for text receiving, formatting and re-entry **318**, a second for security encoding **322** and a third section for catalog and messaging center functions **326**.

[0068] The billing and collection system **278'** shown has two sections (**330**, **334**) one for transaction management, authorizations and publisher payments **330**, and the other for customer service **334**. The customer service section **334** provides for data entry and access to customer account information. Transaction accounting information **338** is supplied to

credit card companies **342** by the transaction management section **330** of the billing and collection system **278'**. The credit card companies **342** provide billing **346** to customers either electronically or by mail.

[0069] Three methods for communicating between the subscriber base **348** and the billing and collection system **278'** are shown: by telephone switching **350** alone, cellular switching **354** and telephone switching **350** combined, and by use of the cable system **358** and the telephone switching **350**. The system shown supports both one-way **362** and two-way cable communication **366** with subscribers. Public libraries and schools **370** as well as bookstores **374** may use the delivery system **301**.

[0070] Public libraries and schools **370** would have a modified system to allow the viewer **266** to be checked-out or borrowed while bookstores **374** would rent or sell the viewer **266** and sell the electronic books. The bookstores **374** as well as the public libraries and schools **370** may be serviced by cable **378**. Optional direct broadcast systems (DBS) **382** can also be used with the delivery system **200**. The DBS **382** may provide the electronic books using digital satellite technology, with the electronic books being received via a backyard satellite antenna, for example.

[0071] FIG. **3***b* is an alternate delivery plan **301'** that provides for electronic book selection and delivery using the Internet. In FIG. **3***b*, the publishers **282** provide the electronic books to be posted at the Internet web site **279**. The publishers may convert the text and graphical data to digital format, compress the digital data, and upload the compressed digital data to the Internet web site **279**. Alternately, the publishers **282** may arrange for an outside conversion activity **283** to convert the text and graphical data to digital format. The conversion activity **283** may then provide the digital data to the Internet web site **279**. For example, a large on-line bookstore could gather publications in electronic form from a variety of publishers, or could convert hard-copy books to electronic form, and post the electronic books on the Internet such as at the Internet web site **279**.

[0072] The electronic books may then be transferred via a public switched telephone network (PSTN), for example, direct to a subscriber **285**, a library **286** and a bookstore **287**. The library **286** and the bookstore **287** may also provide electronic books to the subscriber **285**.

[0073] I. The Operations Center

[0074] FIG. **4** is a schematic of an operations center **250** which includes an uplink **254**. The operations center **250** gathers text or books by receiving, formatting, storing, and encoding. A data stream **302** containing text is received at the operations center **250** by a data receiver **402**. The data receiver **402** is under the control of a processor **404**. After reception, the data stream is formatted using digital logic for formatting **406** which is also under the control of the processor **404**. If any additional text is being generated at the operation center **250** locally for insertion into the distributed signal, the text generation is handled through text generator hardware **410** which may include a data receiver and a keyboard (not shown). Following processing by the text generator **410**, the additional text can be added to the text received by the combining hardware **414** that includes digital logic circuitry (not shown).

[0075] The processing at the operations center **250** is controlled by a processor **404** which uses an instruction memory **416**. The processor **404** and instruction memory **416** may be supplied by a personal computer or mini-computer. To perform the catalog and messaging functions, the operations center **250** uses a catalog and message memory **420** and the text generator **410** if necessary.

[0076] The data stream of text, catalog and messages is preferably encoded by security module encoding **424** prior to being sent to the uplink module **254**. Various encoding techniques may be used by the security encoding module **424** such as the commercial derivative of NSA's encryption algorithm (Data Encryption System (DES)) and General Instrument's DigiCipher II. Following encoding, the encoded text may be stored in text memory **428** prior to being sent to the uplink **254**. A first-in-first-out text memory arrangement may be used under the control of the processor **404**. Various types of memory may be used for the text memory **428** including RAM. The operations center **250** may use file server technology for the text memory **428** to catalog and spool electronic books for transmission as is described below.

[0077] To transmit textual data (i.e., electronic books), the delivery system **208** uses high bandwidth transmission techniques such as those defined by the North American Broadcast Teletext Standard (NABTS) and the World System Teletext (WST) standard. Using the WST format (where each line of the Vertical Blanking Interval contains 266 data bits), a four hundred page book, for example, may be transmitted during programming using four lines of the Vertical Blanking Interval at a rate of approximately one book every 1.6 minutes (63,840 bits per second). Alternatively, electronic books may be transmitted over a dedicated channel, which interrupts programming so that 246 lines of video can be used to transmit approximately 2,250 books every hour (3.9 Mbits per second). A teletext type format is the simplest but possibly the slowest text format to use with the delivery system **200**. In either event, an encoder **204** is utilized at an uplink site **254** to insert textual data into the analog video signal. In many other respects, the delivery of the textual information is completed using existing cable television plant and equipment.

[0078] FIG. **5***a* is a flowchart of the steps involved in processing text from the publisher or provider **282** that occurs at the operations center **250**. As shown in block **500**, the publisher **282** processes data files of text for books, compresses, encrypts and sends the data files to the operations center **250** or uplink **254**. Text files for books are preferably sent one book at a time. As shown in block **504**, the uplink **254** or operations center **250** receives and processes the data stream from the publisher **282**. Generally, part of this processing includes encryption and error correction.

[0079] As shown in block **508**, files are broken into smaller packets of information. Header information is added to the packets. The bit stream is converted from a serial digital bit stream to an analog bit stream that is compatible with an NTSC video signal. Block **512** shows the switching of analog data into the video lines of a video signal. The analog data is generally placed either in the VBI or the active video lines. In some instances, it may be preferable to utilize unused portions of bandwidth (such as 5-40 MHZ, 70-75 MHZ, 100-109 MHZ or other guard bands) instead of the video lines.

[0080] FIG. **5***b* is an example of a hardware configuration to perform some of the functions for blocks **508** and **512**. A video feed **516** is received and processed through a sync stripper **520**. The stripped sync signal **532** is used by the digital logic control **524**. The digital logic control **524** receives the sync signal **532** and a serial digital bit stream **528** for processing. The digital logic control **524** passes the serial digital bit stream to the Digital to Analog converter **536** and

outputs a control signal **540** for the video switch **544**. The video switch **544** integrates the video feed **516** and analog data stream **548** into a video feed with analog data signal inserted **552**.

[0081] As an alternative to cable, satellite, broadcast, or other television delivery methods, the public telephone system may be used to transmit books to the subscribers. An average electronic book would take about 7 minutes to transmit over the public telephone system. Using the telephone system, it is not necessary to combine video and text into a composite signal. In most other respects, the operation center would remain similar whether text delivery was by telephone or cable. File server technology (such as that described in U.S. Pat. No. 5,262,875, entitled AUDIO/VIDEO FILE SERVER INCLUDING DECOMPRESSION/PLAYBACK MEANS, issued to Mincer, et al., and, U.S. Pat. No. 5,218,695, entitled FILE SERVER SYSTEM HAVING HIGH-SPEED WRITE EXECUTION, issued to Noveck, et al., incorporated herein by reference) may be used at the operation center with a telephone system text delivery method.

[0082] As another alternative to cable, television, and telephone system delivery, the public telephone system may be used to provide access to the Internet, where the Internet web site **279** may be accessed. Electronic books may be ordered, paid for, and delivered directly from the Internet web site **279** over the telephone system.

[0083] In any delivery system using the telephone system, individual subscribers may increase the electronic book deliver rate by incorporating high speed modems or other communication devices such as an Integrated Services Digital Network (ISDN) connector, or by use of an Asymmetric Digital Subscriber Line (ADSL).

[0084] II. The Home System

[0085] The hardware configuration for a four component home system **258** is shown in FIG. **6***a*. FIG. **6***b* shows a hardware configuration for a two component home system. The hardware components may also be incorporated into a single unit that communicates with a terminal in a television delivery system or with a telephone system by use of a modem, for example. The home system **258** performs several functions, such as receiving data and video transmissions, stripping (or extracting) the data from the video signal, screening and storing the data, providing user friendly interface controls and software, displaying menus and text, processing transactions, initiating telephone calls and transmitting billing data. Various hardware configurations may be utilized to achieve the desired functions of the home system **258**. For example, as shown in FIG. **6***b*, the home system **258** can be configured to utilize the reception and channel tuning capability of the current installed subscriber base of cable converter boxes and televisions **601**. The home system **258** can also be designed as an advanced set top terminal converter box with menu generation capability, electronic memory and a telephone modem as described in section V below.

[0086] The electronic components which make up the home system **258** can be arranged in a variety of ways. In the four unit system of FIG. **6***a* the viewer **266** and library unit **262** are wired together while the remaining components communicate through RF transceivers **604**. In a simple version of the home system **258** there are only two units, the library unit **262** and a viewer **266**. FIG. **6***b* shows a two unit home system **258** with certain optional features. Finally, all the functionality of the home system **258** may be incorporated into one electronic book unit, or viewer.

[0087] The viewer **266** is generally equipped with a high resolution viewing area **602**, digital logic (including a key **605**, security **606**, and a microprocessor **621**), video graphics control and memory **607**, power supply circuitry **602** (not shown), an optional battery **603** and an optional RF transceiver **604**. In a two unit arrangement, the library unit **262** contains the connector function to the video distribution system **208**, connector function to a public telephone communications system, and memory **600** (which may be removable and portable **600'**). More specifically, the library unit **262** would include data stripping functions **617**, digital logic **609**, memory storage **600**, power circuitry **610**, optional telephone connections **611** (including cellular or PCN **611'**), optional battery (not shown), optional tuner module **613** and an optional RF transceiver **604**. The video connector **212** and the public telephone system connection **270**, as well as the removable portable memory unit **600** of the library unit **262** may be broken out into separate components. (FIG. **6***b* shows a removable portable hard disk memory **600'** with removable cartridges **614**.) Finally, the home system **258** may include an attached keyboard **267** or a wireless keyboard **268**. Both the attached keyboard **267** and the wireless keyboard **268** may be used to communicate with the viewer **266** (not shown) or the library unit **262**.

[0088] The wireless keyboard **268** may communicate via radio frequency (RF) signaling, for example. Therefore, the home system **258** may have as many as six separate components which communicate with each other. The two, three, four, five or six separate components which make up the home system **258** can communicate with each other in a variety of ways, including hardwired connection **615**, RF transceiver **604**, and other wireless methods.

[0089] RF communications are preferred in the home because they allow separate components to be located throughout the home without restriction. The data communicated between the units is preferably secure data. In addition, the library unit **262** may provide power to the viewer **266** through the hardwired connection **615**.

[0090] Alternatively, a single unit may perform all of the home system **258** functions. The single unit should use light-weight materials, including a light-weight battery. A single unit eliminates the need to communicate (externally) between units. The single unit is less expensive and eliminates duplicative processing, memory storage and power circuitry.

[0091] To receive and strip the data from the video signal at the consumer's home, either a cable interface device or cable connector **212** is used. The cable connector device includes a tuner **613**, while the cable interface device makes use of existing tuning equipment in the home. In either configuration, data is stripped from the video signal and stored at the subscriber's location in the library unit **262**. The phone connector **270**, and modem **611** initiate telephone calls and transmit ordering and billing information to the operations center **250** or billing and collection system **278**. Alternatively, the phone connecter **270** and the modem **611** may be used to provide access to the Internet to order and receive electronic books from an Internet web site. A digital connector **619** is provided to communicate digital information with the set top **601**. The library unit **262** is the intelligent component of the home system, incorporating the hardware and software necessary to store the text data, generate menus and effect the purchase transactions. In addition to an RF transceiver **604**, the library unit **262** also includes the necessary jacks and connections to allow the delivery system **200** to be connected

to the viewer **266**. As shown in FIG. **6***b*, the library **262** communicates the text data (electronic book) to the viewer **266** in a secure format which requires a key **605** for decryption. The text is generally only decrypted page by page just before viewing.

[0092] a. The Video Connector

[0093] FIG. **7** shows the flow of the processes performed by the video connector **212**. The video connector receives the video signal **608**, tunes to the channel containing the text data **612**, strips the text data from the video signal **616**, and communicates the text data stream to logic components in the library **620**.

[0094] The connection to the video distribution system is preferably a cable connector to a cable television delivery system, as shown in FIG. **6***b*. The cable connector includes a data stripper circuit **617**, which accepts video input from either a set top converter, TV or VCR **601**, or an optional tuner block **613** that receives the CATV signal through the cable connector **212'**. The data stripper circuit **617** strips data out of the video, and outputs a digital bit stream to the digital logic portion **609** of the library unit **262**. The data is embedded in the video signal either in the vertical blanking interval or the active video portion in an encrypted and compressed format. The data stripper circuit **617** can be placed inside the set top converter box **601**, TV, or in the library unit. The data stripper circuit **617** outputs the digital bit stream to be used by the library digital logic **609**.

[0095] The video connector **212** may also contain a channel tuner module **613** that can tune to the video channel and provide access to the video that contains the data to be stripped. Using the optional tuner module **613**, a set top converter, VCR, or TV tuner is not needed in the home system. The optional tuner module **613** would instead receive the CATV signal directly through the cable connector **212**.

[0096] b. Library

[0097] An embodiment of the library unit **262** for a two unit home system **258** is shown in both FIG. **6***b* and FIG. **8**. The embodiment shown includes the following optional parts: the video connector **212**, phone connector **270**, RF transceiver **604**, and battery pack **624** in addition to a removal portable memory **600'**, microprocessor **628**, instruction memory unit **632**, digital logic **636**, and power unit **640**.

[0098] The library unit **262** contains a digital logic section **609** (not shown in FIG. **8**) which includes the microprocessor **628**, the digital logic **636** and the instruction memory unit **632**. The microprocessor **628** is preferably a secure microprocessor such as the Mot SC21 device sold by Motorola. The digital logic section **609** will receive the serial digital bit stream from the data stripper circuit **617** and process the data. Error correction will also be performed by the digital logic section **609** and the data will be checked for proper address. If the address of the data is correct and the library unit **262** is authorized to receive the data, the data will be transferred to the memory storage unit **600**, **600'**. Authorization to receive the data is provided by the cable headend or another distribution point. An authorization code may be sent in the serial digital bit stream. The digital logic section **609** will send appropriate text and graphical data to the memory storage unit **600**, **600'**. It transfers this data in a compressed and encrypted format and the data remains stored in a compressed and encrypted format.

[0099] i. Memory Storage Unit

[0100] The memory storage unit of the library may be a removable portable memory unit **600'** (as shown in FIGS. **6***a*, **6***b* and **8**). A variety of options are available for memory storage: a hard disk drive, a hard disk with removable platters, and a CD ROM or memory stick. Referring to FIG. **6***b*, a hard disk drive unit **600'** which contains removable platters may also be used. This would provide virtually unlimited library storage capacity. Data (i.e., electronic book files) may be stored in the memory storage unit in a compressed and encrypted format. As is also shown in FIG. **6***b*, the data may also contain a key or unique ID number that matches the ID or key of the viewer **266**. This matching of a unique key or ID number prevents unauthorized transfer of text data from the memory storage unit to an unauthorized viewer. Small memory devices such as smart cards, electronic memory cards or PCMCIA cards or memory sticks (personal computer memory card industry association) may also be used to store the data.

[0101] ii. Power Circuitry

[0102] As shown in FIGS. **6***b* and **8**, the library unit **262** may accept power from either AC wall power **610**, DC power **640**, or optional battery power **624**. The power circuitry **610**, **640** may provide all the voltage necessary from either the battery **624** or AC unit for the various circuitry in the library. The power circuitry **610**, **640** may also provide power to the viewer **266** through a single data cable when connected to the viewer. The power circuitry **610**, **640** will recharge the battery using AC power when in operation. With the optional battery unit **624** installed, the library unit **262** becomes a portable unit and can still provide power to the viewer **266**. In order to extend battery life, power conservation measures may be utilized, such as shutting down the memory system when not in use. When the viewer **266** is being utilized and the library circuitry is not being utilized, virtually all power may be shut down to the library unit **262**.

[0103] iii. Connection to the Public Telephone System

[0104] The connection to the telephone system may be provided by a modem **611**. Various available modems may be used to perform this function. As shown in FIG. **6***b*, cellular phone or PCN phone connections **611'** may also be provided. When the home system **258** is first initialized, the modem may be used to transfer the name and credit card information of the consumer to the billing and collection system **278**. The telephone connection **270** may be utilized each time an electronic book is purchased by a consumer to complete and record the transaction. The telephone connection **270** may also be used as a means for receiving the electronic books from the operations center **250** or from an Internet web site, by-passing the video distribution system **208**. The phone connection **270** may be a separate unit as shown in FIG. **6***b*.

[0105] iv. Library Processing

[0106] FIG. **9** shows an example of some basic processing performed by the library unit **262** on the data stream **651** received from the video connector **212** or stripper circuit **617**. First the data stream **651** is checked for error correction by block **650**. If an error is detected, block **654** de-interleaves the data followed by block **658** running a FEC (Forward Error Correcting) algorithm. The combination of block **650**, **654** and **658** perform the error correction needed on the data stream. If no error correction is necessary the data proceeds to block **662** where packets are individually checked for packet address.

[0107] If the address is a unique address, block **666** checks whether the address of the packet matches the library box ID number. The library box ID number is a unique number associated with that library unit **262** which is used to ensure

security of the data. Block **670** determines whether an electronic file has already been opened into which the data packet can be saved. If no data file has been opened then block **674** opens a new data file for that packet. If an electronic file has been opened, then the packet is saved in that electronic file on disk, block **678**. Next, the process checks to see if this is the last packet for a particular book for a particular textual data block being received **682**. If it is the last packet of information, then the electronic file is closed and the directory of available electronic files is updated **686**. Following either block **682** or **686**, the process returns to receive another data packet from the data stream received from the data stripper block.

[0108] If the packet address is checked and the address is determined to be a broadcast address, the process determines the type of message that is being sent **690**. The message may be an index of book titles, menu (and menu graphics) information, announcements, special offerings, discounts, promotions, previews etc. The message is then stored in appropriate electronic message file **694** and the process is returned to block **650** to receive another data packet and perform another error check.

[0109] Using the process of FIG. **9**, the library unit **262** is able to receive, store and update directories related to the textual data and graphical data (that can be used to depict pictures in a given book or to generate menus). Variations of the processes are possible depending on the format of the data and operating system of the library unit **262**.

[0110] FIG. **10** shows an example of the processing of information requests from the viewer **266** at the library unit **262**. Information requests from the viewer **266** are received either through the cable connecting the viewer **266** to the library unit **262** or through wireless transmissions such as RF. It is possible in some embodiments for subscribers' requests to come from a set top converter box **602** (see Section V).

[0111] Information requests received from the viewer **266** generally fall into three categories: (1) directory data of electronic books stored in the library unit **262**, (2) index of all available electronic books on the system, and (3) requests for a specific electronic book (Block **700**). A get directory process **704** answers a request from the viewer **266** for a directory of data showing the electronic books stored at the viewer **266**. The directory of data is sent to the viewer **266** so that it may be displayed to the subscriber. A get index process **708** handles requests from the viewer **266** for an index of all available electronic books on the home system **258**. The library unit **262** will obtain an index of all the available books on the system and transmit that index, process **712**, with menu information to the viewer **266**. An open file process **716** replies to a request from the viewer **266** for a specific electronic book. The library unit **262** opens an electronic file for the specific electronic book requested by the viewer **266** and transmits the record or transmits the information **720** on a packet-by-packet basis to the viewer **266**. This process of transmitting the specific electronic book, record, or packets to the viewer **266** continues until the last record or packet has been sent, **724**.

[0112] In addition to the processes shown on FIG. **10** in handling a request for a specific electronic book, the library unit **262** also orders and receives specific electronic books from the operations center **250** using the process as described in the open file process **716**. Following a request for a specific electronic book which is not stored at the library unit **262**, the library unit **262** will proceed to determine the next available time the electronic book will be on the video distribution system **208** and ensure reception and storage of that electronic book (process not shown). In performing this process the library unit **262** will transmit to the viewer **266** information on when it will obtain the text data for the electronic book so that the subscriber may view the electronic book. In addition to timing information, price and other ordering information may also be passed by the library unit **262** to the subscriber.

[0113] c. The Viewer

[0114] FIG. **11** is a block diagram of the viewer **266** showing its internal components. The viewer **266** of FIG. **11** is similar to the viewer **266** depicted in FIG. **6***b*. The viewer **266** is designed to physically resemble a bound book. The viewer **266** is made up of several primary components and several optional components: (1) LCD display **602**, (2) digital circuitry (not shown), (3) video graphics controller **607'**, (4) controls **740**, (5) book memory **728**, (6) optional power supply circuitry **736**, (7) optional battery **603'**, (8) optional RF transceiver **604**, (9) optional cellular or mobile communicator (**608**), (10) optional keyboards **267** and **268**, (11) a speaker **633**, and (12) a microphone **634**.

[0115] (1) A high resolution LCD screen **602**, preferably of VGA quality, is used by the viewer **266** to display text and graphic images. The screen is preferably the size of one page of a book. A two page screen or two screens may also be used with the viewer **266**.

[0116] (2) Digital circuitry that includes a secure microprocessor **621**, instruction memory **732**, and digital logic. Data is transferred to the viewer **266** in compressed and encrypted format. The secure microprocessor **621** compares the ID number of the viewer **266** with the incoming data stream and only stores the text data if the ID number of the viewer **266** matches that within the incoming data stream. It is preferred that the viewer **266** not output text data or other data and that the data is decompressed and decrypted only at the moment of viewing and only for the current page being viewed. These measures are preferred because they provide additional security against unauthorized access to data.

[0117] (3) A video graphics controller **607'** that is capable of assisting and displaying VGA quality text and graphic images is included in the viewer **266**. The graphics controller **607'** is controlled by the digital circuitry described above. Text may be displayed in multiple font sizes.

[0118] (4) The viewer **266** of FIG. **11** has touch panel controls **740**. These unique and novel controls **740** allow the consumer to select stored electronic books and electronic books from catalogues, move a cursor, and turn pages in a book. Typically, preferred controls **740** include forward and reverse page buttons **742**, **741**, a ball (or trackball) **743** for cursor movement, one or more selection buttons **745**, a current book button **747** and a bookmark button **749** (see FIG. **14***a*).

[0119] The controls **740** should be easy to use and conveniently located. Referring to FIG. **14***a*, the controls for the viewer **266** may be located below the screen **602** at the bottom portion of the viewer **266**. The next page turn button **742** is the most used button **740** and may be located towards the right edge of the page. The subscriber is likely to use right hand thumb movements to work the controls particularly the page turn buttons **741**, **742**. Therefore, it is preferred that the buttons be arranged in such a manner that the buttons are easily

controlled by a subscriber's right thumb. Generally, this can be accommodated either on the lower portion of the viewer **266** (as shown) or along the right hand margin of the viewer **266** (not shown). The current book button **747** and bookmark button **749** are usually the least used of the controls **740**. Therefore, in the example shown those buttons **747**, **749** are located on the inside portion towards the binder of the viewer **266**.

[0120] Locating the ball **743** or other cursor movement device (such as four pointer arrows —not shown) in the bottom center of the viewer **266** is both easier for the subscriber to use and easier in manufacturing the viewer **266**. The selection buttons for the cursor **745** are preferably located below the middle diameter of the cursor ball **743** on the right and left sides of the ball as shown. If pointer arrows are used for cursor movement, a selection button **745** may be located in the center of the four arrow buttons (not shown). Again, the most used controls should be located where a subscriber's right hand thumb would normally rest.

[0121] (5) Book memory **728** for at least one electronic book or more of text is included in the viewer **266**. The memory **728** stores text and any graphics which represent pictures in a book. The memory **728** can also store menu graphics data. Two different memory **728** devices may be used in the viewer **266**, one for the instructions for the microprocessor **621** in the digital circuitry and a second type of memory may be used for the book memory **728** (and graphics). Various memory devices available on the market may be used such as, ROM, RAM or a small hard disk. Since an electronic book requires approximately 0.6 megabytes of storage, a small hard disk providing approximately 60 MBytes of storage provides memory to store approximately 100 electronic books. The large hard disk drives currently available allow for storage of thousands of electronic books.

[0122] Text for books may be displayed in various font sizes. To accommodate various fonts for display, a variety of fonts are stored in instruction **732** or book memory **728**. Thus larger or smaller fonts may be recalled from memory **621**, **728** to create displays desired by the subscriber.

[0123] (6) Power supply circuitry **736** in the viewer **266** will accept power from either an AC power source or from an optional battery **603'**, or the library unit **262**. The power supply circuitry **736** provides the necessary voltages to accommodate the various systems within the viewer **266**.

[0124] (7) An optional battery **603'** is provided in a preferred embodiment. The battery **603'** is automatically recharged when AC power is available.

[0125] (8) An optional RF transceiver **604** which provided two-way data link between the viewer **266** and other components of the home system can also be included in the viewer **266**.

[0126] (9) Also, the viewer **266** may include a cellular transceiver for mobile communications.

[0127] (10) The optional wired (attached) keyboard **267** and wireless (e.g., RF) keyboard **268** (see FIG. **6***a*) may be used with the viewer **266** to provide communications between the subscriber and the viewer **266**.

[0128] (11) and (12) The speaker **633** and the microphone **634** allow the viewer **266** to provide audio signals to the subscriber, and allow the subscriber to provide an audio input. The speaker **633** and the microphone **634** may be used in conjunction with the cellular transceiver **608** or other telecommunications equipment to provide for reception and transmission of telephony and data.

[0129] The viewer **266** of FIG. **11** has parts available for providing connections to: a library **744**, electronic card memory **748**, CD ROM units **752**, and a portable memory unit **756** (such as that shown in FIG. **6***b* **600'**). Various electronic memory cards such as PCMCIA can be used with this viewer **266**.

[0130] Security, low power consumption and excellent display technology are desired features of the viewer **266** design. The viewer **266** should be lightweight and portable. The viewer **266** contains a software operating system that allows electronic books to be stored, read and erased and includes the capability to order electronic books and retain them in memory **728** for a predefined period of time determined by the system operator. The software can be configured to allow the electronic book to be read during a period of time (i.e., two weeks) and then automatically erased, read once and erased, or held in memory permanently. Each viewer **266** has a unique key **605**. All of the data storage is encrypted with the key **605** for an individual viewer **266** to prevent more than one viewer **266** accessing the text file or electronic book file.

[0131] FIG. **12** is a flow diagram of some of the processes executed by the viewer **266**. Generally, the viewer **266** receives inputs from the subscriber through touch panel controls **740**. Alternately, the viewer **266** receives inputs from a touchscreen display, the attached keyboard **267**, or the remote keyboard **268**. The subscriber's information requests are then processed through an information request process **800** by the viewer **266**.

[0132] If the subscriber requests a menu of available electronic books, a select available book process **804** will select a book menu. An open file process **808** will open the electronic files which list the electronic books that are available (related to the category of topic of the menu) and display the menu with the names of the available electronic books.

[0133] If the subscriber selects a particular electronic book to read, then a select a book process **812** will process the selection and determine the electronic file that contains the specific electronic book. An open file process **816** will open the file for that specific book and normally access the first page. (If a pointer has already been set in that electronic book's file, the process may default to that page.) A decision process **820** will then determine which page needs to be displayed. The decision process **820** will determine whether a next page, previous page or a book marked page needs to be displayed. If the pointer for the electronic file is not in the correct location then a get previous page process **828** will move the pointer and obtain the previous page of data from the stored file. Otherwise, a get next page process **824** will normally obtain the next page of text from the stored electronic file. A decrypt and decompress process **832** will decrypt and decompress the text data and send the data to the video display. The video display will generally have a video display memory associated with it and the decrypt and decompress process **832** will send the data directly to that video display memory. The circuitry for the display then completes the process of displaying the page of text.

[0134] If the subscriber, through the controls **740**, requests (from the information request process **800**) that the power be turned off, then a process, **836**, of turning the power off will be initiated. A save pointer process **840** saves the pointer in memory to the page number in the book that the viewer **266** is currently reading. A close files process **844** closes all the electronic files and signals the power circuitry to shut down the power to the various circuits in the viewer **266**. The

subscriber may also use the controls **740** to access other electronic files using electronic links embedded in a particular electronic file. An electronic link system will be described later in detail.

[0135] With these examples of basic processes the viewer **266** is able to display book selections and display text from those books.

[0136] d. Menu System

[0137] Referring generally to FIG. **13**, the delivery system **200** may have a menu system **851** for selecting features and electronic books from the delivery system **200**. The operating software and memory required for the menu system **851** may be located at the viewer **266** (e.g., the instruction memory **732** and/or book memory **728**). However, it may also be located at the library unit **262** (e.g., the instruction memory **632**) or the library unit **262** and the viewer **266** can share the software and memory needed to operate the menu system **851**. Since the menus are usually displayed on the viewer **266** and it is preferred that the viewer **266** be capable of operating in the absence of the library unit **262**, the basic software and memory to create the menus is more conveniently located at the viewer **266**.

[0138] The menu system **851** allows sequencing between menus and provides menu graphics for graphical displays such as on the LCD display **602** of the viewer **266**. In a system which uses a set top converter these menus may also be displayed on a television screen. In the simplest embodiment, the menus provide basic text information from which the subscriber makes choices. In more sophisticated embodiments, the menus provide visual displays with graphics and icons to assist the subscriber.

[0139] FIG. **13** depicts a menu system **851** with sequencing. The primary menus in the system are an introductory menu **850**, a main menu **854** and various submenus **858**. In the embodiment shown, there are three levels of submenus **858**. In certain instances one or two submenus **858** is sufficient to easily direct the subscriber to the selection or information requested. However, there are features in which three or more submenus **858** make the user interface more friendly for the subscriber. Each level of submenus **858** may consist of multiple possible menus for display. The particular menu displayed depends on the selection by the subscriber on the previous shown menu. An example of this tree sequence of one to many menus are the help submenus **887**, **888**. Depending upon the specific help requested, a different level two help menu is displayed to the subscriber.

[0140] An example of an introductory menu **850** is shown on FIG. **14***a*. Generally the introductory menu **850** introduces the viewer **266** to the system and provides initial guidance, announcements and instruction. The introductory menu **850** is followed by a main menu **854**, an example of which is shown in FIG. **14***b*. The main menu provides the viewer **266** with the basic selection or features available in the system. FIG. **14***b* is an example of a main menu **854** offering many additional features and submenus **858** to the subscriber. For example, FIG. **14***b* shows that the viewer **266** is able to choose by a point and click method, many options including: (1) free previews, (2) books you can order, (3) books in your library, (4) your current book, (5) help, (6) on-line services and (6) other system features. Following a selection on the main menu **854**, a corresponding submenu **858** is shown.

[0141] FIG. **13** shows thirteen available primary or first level submenus. They are (1) account set up **862**, (2) free previews **866**, (3) book suggestion entries **855**, (4) books in your library **872**, (5) books you can order **878**, (6) your current book **884**, (7) help **887**, (8) available features **890**, (9) messages **893**, (10) account information **896**, (11) outgoing message submenu **898**, (12) show links **970**, and (13) create links **980**. FIG. **14***c* is an example of a first level submenu for electronic books in your library **872**. This "Book In Your Library" example submenu **872** shows six available electronic books by title and author and provides the subscriber with the ability to check a different shelf of books **874** or return to the main menu **854**. FIGS. **14***d* and **14***e* show example submenus **858** for electronic books that may be ordered using the "Books You Can Order" submenu **878**.

[0142] FIG. **14***f* is an example of an order selection and confirmation menu **880'**, which provides a "soft keyboard" **975** for the subscriber to use in placing an electronic book order and which confirms the subscriber's order. In this particular example, the subscriber is required to enter a PIN number to complete the subscriber's order. The "soft keyboard" **975** could be configured as a full alpha-numeric keyboard, and may be used by the subscriber to add additional information related to a book order. An alpha-numeric or similar password may be used to ensure the subscriber is an authorized subscriber. In an embodiment, the subscriber confirms an order with a PIN or password and then receives a final confirmation screen. The final confirmation screen is primarily text and may state: Your book order is now being processed via CABLE.

[0143] Your book will be delivered overnight and your VISA account will be charged $2.95.

[0144] Your book will be available for reading at 6:00 AM EST tomorrow. Make sure that:

[0145] 1. your Library Unit and Cable Connection Unit are plugged in with aerials up tonight; and

[0146] 2. you tune your cable converter to THE BOOK Channel. The TV set does not have to remain on.

or similar language.

[0147] Examples of the "Account Set Up Menu" **862** and further submenus **858** related to account set up (which provide instructions and account input **864**) are shown in FIG. **14***g* and FIG. **14***h*. These submenus **858** allow initialization of an account at the operations center **250** and orders to be charged to credit cards. The submenus **858** include the ability to enter data related to your desired PIN number or password, credit cards, phone numbers, etc. It is preferred that the account set up be performed using the telephone system. A confirmation menu verifies that the account has been properly set up with the desired PIN or password and credit card.

[0148] Free previews for books **866** are also provided by submenus (**868**, **870**). Examples of the free preview menus are shown in FIG. **14***i* and FIG. **14***j*. FIG. **14***i* shows a menu depicting various electronic books for which previews are available for viewing. Following an electronic book selection, a screen submenu showing an excerpt of the selected electronic book cover's description is provided along with an excerpt from a critic's review of the selected electronic book. In a preferred embodiment, this preview screen for a particular electronic book also allows the subscriber to select a submenu which provides information about the author. The book preview submenu may also include a still video picture or graphics portraying a book cover or a scene from the electronic book. An example of such a still video picture or graphics is shown in FIG. **14***j* which depicts a preview screen **870** about the author. The video may also be provided according to MPEG standards as a short moving video clip. Such a

clip could be an interview with the author, for example. The author's preview screen **870** shows a picture of the author, provides a short biography, and may allow the subscriber to order the author's books. The price for ordering the authors various electronic books may also be shown on the menu. Alternatively, the previews may be provided through an electronic link system, which will be described in detail later.

[0149] In addition to free previews, in more sophisticated embodiments, the delivery system **200** provides the subscriber with an electronic book suggestion feature (see 855). This is accomplished using the menu system **851** and the processor with associated memory located at the viewer **266**, library unit **262** or at the distribution point (**1020** or **250**). When necessary, information for the program suggestion feature is sent in the text data of the composite or video signal to the home system **258**. With this feature, books or authors are suggested to a subscriber based upon historical data of the subscriber's previous orders, demographics or mood of the subscriber, other indicators, and/or by text word searches.

[0150] In a book suggestion embodiment, text word searches of preview information (such as book cover descriptions, critics reviews and biographies about the author) and/or text of books or other titles are performed by the library unit **262** using databases stored in the library memory **600**. Personalized book or author suggestions are made to the subscriber by obtaining information from the subscriber indicative of general subscriber interests. Subscriber entries are solicited from the subscriber preferably using the electronic book suggestion entries submenu **855**. The system uses these subscriber entries either directly or indirectly to search for books or authors to suggest to the subscriber.

[0151] Generally, the book suggestion methods may be categorized into two categories, either responsive methods (which respond to a series of subscriber menu entries), or intelligent methods (which analyze data to suggest an electronic book). Using a responsive or intelligent method, the delivery system **200** determines a list of suggested titles or authors and creates a second or third level submenu **856**, **857** to suggest the titles for subscriber selection.

[0152] Responsive methods of suggesting titles include, for example, the use of mood questions, searching for authors, and keyword searching. Using the instruction memory **732** and menu generation hardware (e.g., **607**) of the viewer **266**, a series of mood questions can be presented on menus to determine a subscribers interest at a particular time. For this methodology, the operations center's **250** processor **404** and instruction memory **416** assign each title mood indicators (and subindicators) from a group such as light, serious, violent, short, long, dull, exciting, complex, easy-read, young theme, old theme, adventure, romance, drama, fiction, science-fiction, etc. These indicators are sent to the home system **258** with the text data and are stored in library memory **600**. Based upon the subscriber entries, the processor **404** associates a set of indicators with the subscriber's request and a set of electronic books with matching indicators are located for suggesting to the subscriber.

[0153] Responsive searches for authors or keywords (a search word provided by the subscriber) are generally performed by the library processor **628** and instruction memory **632** on data stored in the library memory **600**. For example, a keyword given by the subscriber may be searched for a match in library memory **600** storing the book reviews, critics and previews databases. Thus, if a subscriber provided an entry of the word "submarine" on an appropriate submenu, the title "Hunt For Red October" may be located by the library processor **628** using instruction from a routine in the instruction memory **632**.

[0154] Intelligent methods of suggesting programs include analyzing personal profile data on the subscriber and/or historical data about the subscriber such as past books ordered by the subscriber (or buy data). This method is preferred in a book on demand system and can be performed at the distribution point or operations center **250** by the on-site processor **404** using subscriber databases stored in memory **428**. The home system **258** receives the text data including program suggestion information from the distribution point or operations center **250** and generates the program suggestion submenus **855**, **856**, **857** using the same text data receiving **212** and viewer menu generation hardware (e.g., **607**, **621**) described above. Software routines and algorithms stored in instruction memories (e.g. **632**, **732**) are used to analyze historical data and book ordered data to determine a line of books to suggest to the subscriber.

[0155] The algorithms for this powerful feature of suggesting books or authors to subscribers are disclosed in great detail in U.S. Pat. No. 5,559,549, entitled REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, issued Sep. 24, 1996, and are incorporated herein by reference.

[0156] Referring to FIG. **13**, submenus **858** are shown on the "Books In Your Library" submenu **872** and are preferably broken into shelf numbers with submenus for each shelf **874**, **876**. The submenus **858** for the "Books You Can Order" submenu **878** is similarly broken out into submenus by shelves **880**, **882**. These shelves may each be a category or genre of books. Electronic books may be grouped into categories such as best sellers, novels, fiction, romance, etc. See FIG. **14***d*.

[0157] Referring to FIG. **13**, the submenu **858** for "Your Current Book" **884** allows a subscriber to select a current book **884** and then determine what page to view. This selection is confirmed with a level two submenu **885**. The help submenu **887** provides the subscriber with additional help screens **888**. The submenus **858** for available features **890** are preferably broken out into a sequence of separate submenus for each feature **891**, **892**.

[0158] Referring to FIG. **13**, messages can also be sent with the delivery system **200**. A level one message screen provides the subscriber with the ability to select from various messages the subscriber has pending **893**. Each message is then shown on a separate submenu screen **894**, **895**. The message may contain text and graphics.

[0159] Referring to FIG. **13**, account information is shown on a level one submenu **896** and then follow-on submenus **858** show the recent orders and your account balance **897**. There is also a level one submenu for outgoing messages **898** which has a follow-on submenu used as an input screen **899**.

[0160] In addition to the specific features and submenus described in FIG. **13** and FIG. **14***a* through FIG. **14***j*, many other variations and features are possible. When a book is finally selected for viewing the title page **886** will appear on the screen followed by a page of text.

[0161] III. The Billing and Collection System

[0162] The billing and collection system **278** (shown in FIGS. **2** and **3**) utilizes the latest technology in electronic transaction and telephone switching to track orders, authorize deliveries, bill consumers, and credit publishers automati-

cally. The telephone calls initiated by the phone connector **270** are received by the billing and collection system **278** which responds immediately without human intervention by placing the order and charging the consumers credit card account. Data is compiled periodically and publishers **282** are credited for sales of their books or other text. The billing and collection system **278** may also connect with subscribers through two-way cable connections, cellular, or other communication means.

[0163] It is preferred that the billing and collection system **278** communicate with the operations center **250** to track changes in available books and to provide statistical data to the operations center **250**.

[0164] IV. Public Library, School, and Bookstore System

[0165] The electronic book system can be modified to be used at public libraries, schools and bookstores. FIG. **15** shows one possible arrangement of components for a public library, school or bookstore location. The main unit at a public library, school or bookstore is the file server **900**. The file server **900** is a large electronic memory unit that can store thousands of electronic books. Various electronic storage means may be used in the file servers, such as hard disks, read-write CD ROMs and read-only CD ROMs. The system comprises five components; the file server **900**, a converter or video connector **904**, a controller **908**, a viewer **912**, and a catalog printer **916**. The software for controlling the system is primarily located in the controller **908**. The converter or video connector **904** is similar to those described above. In this configuration the controller unit **908** monitors the data being transferred to the file server **900** by the converter **904**. The controller **908** is preferably provided with a viewing screen and several control buttons. When it is necessary to have a larger screen to perform more sophisticated controlling of the system a viewer **266** may be connected to the controller **908** and the viewer screen and controls **740** may be used.

[0166] The controller **908** is only able to download books to public viewers **912** which are authorized to receive books from the particular file server **900**. For security reasons it is not desirable that the public viewer **912** have access to more than one file server **900**. In this way, security can be maintained over the text data for books. It is preferred that the public viewer **912** be limited to receiving one or two electronic books at a time from the controller **908**. When the subscriber of the public viewer **912** needs a new or additional electronic book, the subscriber returns the viewer **912** to the school or public library where the subscriber receives a new electronic book from the controller **908**.

[0167] In order to track the electronic books that are available on the file server **900**, the titles of the available books may be printed on a catalog printer **916**. The catalog printer **916** is connected to the library controller **908** and the titles of the electronic books are downloaded to the catalog printer **916**. None of the coded text for any of the electronic books can be printed using the controller **908** and catalog printer **916** of this system. In order to maintain security over the data, none of the electronic book data is allowed to be downloaded to the printer **916**. Once a complete printout of available electronic book titles, magazines, or other textual material is complete, a hard copy of the catalog **920** can be maintained at the file server **900**.

[0168] The system shown may also be used at bookstores. The bookstores can rent the public viewer **912** to customers with the text for one or two electronic books loaded onto the public viewer **912**. The public viewer **912** may be provided with an automatic timeout sequence. The timeout sequence would erase the textual data for the books after a certain period of time, for example, two weeks. It is expected that after a period of time (perhaps within two weeks) the renter would return the public viewer **912** to the bookstore and receive additional electronic books for viewing. Using this arrangement, it is also possible for the bookstore to (permanently) sell a viewer **912** to a regular customer. The customer then returns to the bookstore from time to time to receive textual data for an electronic book which the customer can then store permanently on the customer's own viewer **912**. Various other configurations are possible for bookstores, schools and public libraries using the file server **900** and public viewer **912** described.

[0169] V. Use of a Set Top Converter

[0170] Existing set top converters such as those made by Scientific Atlanta or General Instruments are presently unequipped to handle the delivery system **200** of the present invention. Although set top converters may be built which include the library functions, hardware modifications are necessary in order to use the delivery system **200** with existing set top converter technology.

[0171] FIGS. **16***a* and **16***b* are examples of hardware modifications or upgrades. A port is used to attach hardware upgrades described below to a set top terminal. Two upgrades are possible to set top converters **601** to assist in receiving and selecting electronic books. A menu generation card upgrade (FIG. **16***a*) and an information download unit (FIG. **16***b*). Each of these upgrades may be connected to the set top terminal unit through an upgrade port. A four wire cable, ribbon cable, IEEE 1394 firewire interface, USB interface, or the like may be used to connect the upgrade to the set top converter **601**.

[0172] A card addition **950** to a set top converter **601** is depicted in FIG. **16***a*. The card **950** shown provides the additional functionality needed to utilize the book selection system with existing set top converter **601** technology. The card **950** may be configured to slip inside the frame of a set top terminal and become part of the set top terminal, an advanced set top terminal. The primary functions the card **950** adds to the set top converter **601** are the interpreting of data signals, generating of menus, sequencing of menus, and, ultimately, the ability of the subscriber to select an electronic book using either the television or a viewer **266**. The card **950** also provides a method for a remote location, such as the cable headend, to receive information on electronic books ordered. The electronic books ordered information and control commands may be passed from the cable headend to the card **950** using telephone lines.

[0173] The primary components of the card **950** are a PC chip CPU **952**, a VGA graphic controller **954**, a video combiner **956**, logic circuitry **958**, NTSC encoder **960**, a receiver **962**, demodulator (not shown), and a dialer **611'**. The card **950** operates by receiving the data text signal from the cable headend through the coaxial cable. The logic circuitry **958** of the card **950** receives data **964**, infrared commands **966**, and synchronization signals (not shown) from the set top converter **601**. Menu selections made by the viewer **266** on the remote control are received by the set top converter's **601** IR equipment and passed through to the card **950**. The card **950** interprets the IR signal and determines the electronic book (or menu) the subscriber has selected. The card **950** modifies the IR command to send the information to the set top converter **601**. The modified IR command contains the channel infor-

mation needed by the set top converter **601**. Using the phone line **968** and dialer **611'**, the card **950** is able to transmit electronic books ordered information to the cable headend. It is also possible to receive the electronic books over the telephone lines and by-pass the video distribution system. In this embodiment, the telephone system may be used to provide access to an Internet web site to order and receive electronic books.

[0174] These commands are passed through the interface linking the set top terminal's microprocessor with the microprocessor of the hardware upgrades. In this way, subscriber inputs, entered through the set top terminal keypad or remote control, can be transferred to any of the hardware upgrades for processing and responses generated therein can then be sent back to the set top terminal for display. In a preferred embodiment the IR commands **966** are transferred from set top terminal **601** to hardware upgrade.

[0175] Hardware upgrades may include a microprocessor, interactive software, processing circuitry, bubble memory, and a long-term memory device. In addition to these basic components, the hardware upgrade may make use of an additional telephone modem or CD-ROM device.

[0176] The information download hardware upgrade **1001** (shown in FIG. **16***b*) allows the subscriber to download large volumes of information from the operations center **250** or cable headend using the set top converter **601**. The hardware upgrade **1001** will enable subscribers to download data, such as electronic books and magazines, to local storage. Primarily, the hardware upgrade **1001** is an additional local storage unit **1003** (e.g., hard disk, floppy, optical disk or magnetic cartridge and may include a microprocessor **1005**, instruction memory **1007**, and a random access memory **1009**, as shown in FIG. **16***b*). Preferably, a small portable viewer **266** is also provided with the upgrade **1001** to enable downloaded text to be read without the use of a TV.

[0177] The downloadable information may be text or graphics supplied by the operations center **250** or cable headend. With this upgrade, electronic books may be downloaded and read anywhere with the portable viewer **266**. Using this upgrade, books may be downloaded and stored in compressed form for later decompression. The electronic books would be decompressed only at the time of viewing. Important text that the public desires immediate access may made available through this system. Text such as the President's speech, a new law, or a recent abortion decision rendered by the Supreme Court may be made immediately available.

[0178] In one embodiment, electronic book ordering information is stored at each set top terminal until it is polled by the cable headend using a polling request message format. An example of a polling request message format consists of six fields, namely: (1) a leading flag at the beginning of the message, (2) an address field, (3) a subscriber region designation, (4) a set top terminal identifier that includes a polling command/response (or P/F) bit, (5) an information field, and (6) a trailing flag at the end of the message. A similar response frame format for information communicated by the set top terminal to the cable headend in response to the polling request may be used.

[0179] FIG. **17** shows a preferred set top converter that includes a data receiver **617'** and a data transmitter **1011**. The data transmitter provides upstream data communications capability between the set top converter **601** and the cable headend. Upstream data transmissions are accomplished using the polling system described and, using a data transmitter **1011**. Both receiver **617'** and transmitter **1011** may be built into the set top converter **601** itself or added through an upgrade module. Regardless of the specific hardware configuration, the set top terminal's data transmission capabilities may be accomplished using the hardware shown in FIG. **17**.

[0180] FIG. **17** shows RF signals, depicted as being received by a data receiver **617'** and tuner **613** working in unison. Both of these devices are interfaced with the microprocessor **1013**, which receives inputs **1015**, from the subscriber, either through a set top converter's keypad, a remote control unit or the viewer **266**. All cable signals intended for reception on the subscriber's TV are accessed by the tuner **613** and subsequently processed by the processing circuitry **1017**. This processing circuitry **1017** typically includes additional components (not shown) for descrambling, demodulation, volume control and remodulation on a Channel 3 or 4 TV carrier.

[0181] Data targeted to individual set top converters is received by the data receiver **617'** according to each set top converter's specific address or ID. In this way, each addressable set top converter only receives its own data. The data receiver **617'** may receive set top converter **601** specific data in the information field of the signal frame described or on a separate data carrier located at a convenient frequency in the incoming spectrum.

[0182] The received data includes information regarding electronic books and menus available for selection. The subscriber may enter a series of commands **1015** using a keypad or remote control in order to choose an electronic book or menu. Upon receipt of such commands, the microprocessor **1013** instructs the tuner to tune to the proper frequency of the channel carrying data and subsequently instructs the processing circuitry **1017** to begin descrambling of this data.

[0183] Upon selection of the electronic book, the microprocessor **1013** stores any selection information in local memory (not shown) for later data transmission back to the cable headend, The microprocessor **1013** coordinates all CATV signal reception and also interacts with various upstream data transmission components. Typically, the data transmitter **1011** operates in the return frequency band between 5 and 30 MHZ. In an alternative embodiment, the frequency band of 10 to 15 MHZ may be used. Regardless, however, of the frequency band used, the data transmitter **1011** sends information to the cable headend in the information field of the response frame described. Those skilled in the art will recognize that a number of variations and combinations of the above-described set top terminal hardware components may be used to accomplish upstream data transmissions.

[0184] VI. Books-On-Demand System

[0185] The electronic book system **200** described may also be configured in a book-on-demand style. FIG. **18***a* shows one example of a configuration for a books-on-demand system. A books-on-demand system requires more powerful two-way communications between the consumer's home, bookstore, school or public library and either the operations center **250** or a distribution site **1020** such as the cable headend. This type of two-way communication can be provided by the hardware shown in FIG. **17** and described above.

[0186] Referring to FIG. **18***a*, in a books-on-demand system, the subscriber selects the electronic book to be download from an available menu of electronic books (see for example

FIGS. **14***d* and **14***e*). The data for menus of available books is usually sent to the subscriber location by the distribution site **1020**. After the subscriber's menu selection, information about the subscriber selection (or request) is then communicated to either a distribution point **1020** (such as a cable headend or an Internet web site) or the operations center **250**. Upon receipt of this request, the needed textual and graphical information for the book is spooled and sent to the subscriber. In this manner, books are only sent when requested by the subscriber and are sent immediately upon demand for the book (or text).

[0187] In order to support such a books-on-demand system, the text delivery and distribution must be conducted on a strong nodal architectured distribution system, such as, a video-on-demand cable or telephone television system, an Internet web site, or through use of individual telephone access on the public telephone system.

[0188] The books-on-demand system allows for a greater selection of electronic books to the subscriber and limits the amount of communicated book data that is unnecessary or unneeded. It also provides the electronic book to the subscriber in a much timelier fashion.

[0189] In addition to a stronger distribution system, a books-on-demand system requires a distribution point **1020** to have more sophisticated equipment to access and "spool out" the textual information. This can be accomplished using file server technology **1024** for storing the electronic books and ATM **1028** or telephone-type switching (not shown) to distribute the textual information. The file server **1024** and distribution technology that can be used in configuring such a books-on-demand system is described in U.S. Pat. No. 5,262,875 and U.S. Pat. No. 5,218,695, cited above.

[0190] FIG. **18***a* shows an embodiment for a books-on-demand system that utilizes file server technology. In addition to electronic books, the embodiment of FIG. **18***a* will support distribution of nearly any digital data. Electronic books or textual files are received from publishers **282** and other sources through local feeds **1032**, ATM **1028**, or by satellite dish **1036**. The data is then stored in memory **1040** at the file server **1024**. The distribution point **1020** may be a cable headend that receives requests from subscribers and delivers text to subscribers over a two-way communication system (such as a video-on-demand system (VOD) **1044**). Alternately, an Internet web site may serve as the distribution point **1020**.

[0191] The library unit **262** can be connected to either a basic premium-type service cable system **1048**, a near video-on-demand type cable system (or pay-per-view (PPV) **1052**) or a video-on-demand cable system **1044**. In connecting with either of these three systems the library unit **262** may access the cable directly or may access the system through a set top terminal **601'**, **601"**, or **601'"**.

[0192] Using the two-way video-on-demand system **1044**, a subscriber is able to request a specific electronic book title and receive that text immediately following its request. To accomplish this, the distribution point **1020** transmits a list of available electronic books through the cable delivery system to the library unit **262**. The library unit **262** displays the list of available electronic books on a menu or similar format. As described earlier, it is preferred that the library unit **262** use menus which list categories of available electronic books to form its request from the distribution point **1020**. After selecting an electronic book, the library unit **262** sends a request signal on the two-way communication system **1044** back to the distribution point **1020**. This request signal can be handled in two ways. The library unit **262** either initiates the request or the distribution point **1020** polls the various libraries on to the two-way system **1044**. Upon receiving the request for the electronic book title, the text associated with that book title is transmitted to the library unit **262** using the two-way cable system **1044**.

[0193] FIG. **18***b* is an expanded view of a preferred operations center **250** that supports a regional or national books-on-demand system. In fact, the operations center **250** shown supports distribution of nearly any digital data. The operations center **250** supports multiple feeds to receive digital information by tape **1060**, **1060'**, ATM **1028**, or satellite **1036**. The information is processed through an input MUX **1064** and a small file server **1068** before reaching the master file server **1072**. Digital data such as electronic books received from publishers **282** is then stored on the master file server **1072**. It is preferred that the digital data is stored compressed in a standard format such as MPEG2.

[0194] A system controller **1076** provides control over the regional or national books-on-demand system. Electronic books may be packaged into groups to provide feeds to various cable headends. In addition, scheduling and marketing research are conducted at the operations center **250**. In order to handle the scheduling and market research, electronic book buy data is received at the operations center **250** through a multiplexer **1082**. Electronic book buy information can be provided by the operation center **250** to the billing and collection system **278**.

[0195] The operations center **250** is also equipped to insert messages or advertisements into the file server. These messages or advertisements will eventually be received by the subscribers.

[0196] The master file server **1072** uses an output multiplexer **1080** and ATM **1028** as well as satellite connections to distribute digital data. In a preferred embodiment, cable headends receive text data on electronic books from the master file server **1080** through the output multiplexer **1028** and an ATM system **1028**. After receiving the electronic book data, the cable headends store the books in a local file server **1024**. FIG. **18***a*'s distribution point **1020** is an example of a cable headend which may receive data from the operations center **250** of FIG. **18***b* through an ATM hookup **1088** or satellite hookup.

[0197] VII. Voice Emulation Features for Electronic Books

[0198] FIG. **19** is a diagram of a main menu screen **1100** for presenting on the viewer **266** voice emulation options for electronic books. Main menu **1100** may be displayed on the viewer **266** for permitting a user to select various options relating to voice emulation in electronic books. Main menu **1100** has a number of sections for permitting the user to select the options by selecting an appropriate section. The term section refers to a definable portion of the screen, and the act of selecting a section may involve, for example, positioning the cursor or a pointer over the section using trackball **743** and depressing selection button **745** to "click on" the section; other cursor-control devices, including peripheral devices, may be used to select a section either by positioning the cursor or by entering a particular command. The sections in main menu **1100**, and other described screens, may alternatively have different shapes and may be displayed in a different configuration than that shown. In addition, the screens may have more or fewer sections depending upon, for example, desired functions or displayed information. Also, main menu

1100 and the other described screens may be generated for display on the viewer **266**, or retrieved from memory for display, by library processor **628** operating under control of software modules residing within the instruction memory unit **632** or by viewer processor **621** operating under control of software residing within the instruction memory **732**, or by hardware modules, or a combination of hardware and software modules. A keyboard may be used with the viewer and key strokes may be used for commands. Alternatively, a soft keyboard may be displayed on the viewer **266** and may be used to enter commands.

[0199] A manual text-to-speech section **1102** permits the user to select an option to convert text within a displayed electronic book to corresponding speech. The phrase text-to-speech refers to conversion of text in electronic form to corresponding speech. An auto text-to-speech section **1104** with auto page turn permits a user to select an option to have the viewer continuously convert text to speech from page to page within an electronic book. An auto text-to-speech section **1106** with manual page turn permits a user to select an option to have the viewer **266** automatically convert an entire page of displayed text to speech. For the various text-to-speech conversion features, the viewer **266** may use speaker/microphone **608'** to convert text in electronic form to corresponding speech.

[0200] A view book section **1108** permits a user to select an option to view an electronic book. A settings section **1110** permits a user to select an option to view a settings menu and enter various parameters relating to the voice emulation features. Settings are various parameters relating to controls of an electronic book and associated functions. A dictation section **1112** permits a user to select an option to perform dictation into an electronic book. The term dictation refers to conversion of speech to corresponding text in electronic form capable of display on a viewer or other display device.

[0201] FIG. **20** is a flow chart of a main menu process **1120** for processing options selected by a user in main menu **1100**. Main menu process **1120** may be implemented within the viewer **266**, the library **262**, or a combination; for example, it may be implemented by software modules residing within the instruction memory unit **632** for execution by the library processor **628** or within the instruction memory **732** for execution by the viewer processor **621**, or by hardware modules, or a combination of hardware and software modules. A display process **1122** displays main menu **1100** on the viewer **266**, and a select process **1124** receives a user's selected option within main menu **1100**. A decision process **1123** determines if a voice security function has been activated and, if so, main menu process executes a voice security routine **1125**, further explained below. Voice security is a feature permitting only users with a particular voice pattern or characteristic to have access to content of the viewer **266** or electronic books stored within the viewer **266** or library **262**. As a result of voice security routine **1125**, an authorization routine **1127** determines if the user has authorization for the requested function.

[0202] If the user has authorization, an option process **1126** executes processing for the selected option. In particular, depending upon which option the user selected, various routines are performed. If the user selected manual text-to-speech section **1102**, a speech process **1128** executes a manual text-to-speech routine **1130**. If the user selected auto text-to-speech section **1104**, a speech process **1132** executes an auto text-to-speech (auto page turn) routine **1134**. If the user selected auto text-to-speech section **1106**, a speech process **1136** executes an auto text-to-speech (manual page turn) routine **1138**. If the user selected setting section **1110**, a settings process **1140** executes a settings routine **1142**. If the user selected dictation section **1112**, a dictation process **1144** executes a dictation routine **1146**. If the user selected view book section **1108**, a view book process **1148** executes a view book routine **1150**.

[0203] FIG. **21** is a flow chart of manual text-to-speech routine **1130**. Manual text-to-speech routine **1130** may be implemented within the viewer **266**, the library **262**, or a combination; for example, it may be implemented by software modules residing within the instruction memory unit **632** for execution by the library processor **628** or within the instruction memory **732** for execution by the viewer processor **621**, or by hardware modules, or a combination of hardware and software modules. In routine **1130**, a display process **1160** displays a book menu. FIG. **22** illustrates a book menu screen **1190** for display on the viewer **266** and for displaying a book menu on the viewer **266**. Book menu screen **1190** includes sections **1192**, **1194**, and **1196** identifying stored electronic books. A selection process **1162** receives a user's selected electronic book from book menu screen **1190**, and a display process **1164** displays the selected electronic book on the viewer **266**. A user may select an electronic book by positioning the cursor on a section identifying the electronic book and selecting the section or by entering a particular command. In using a voice commands mode, a user may speak the title of a particular electronic book, or other identifying information, in order to select it.

[0204] FIG. **23** illustrates a text screen **1200** for display on the viewer **266** and for displaying a page of an electronic book. The text screen **1200** also includes various sections for a user to enter commands. In particular, a user may select a page section **1208** and enter a page number into the section in order to jump to another page of the displayed electronic book. The user may select page turn sections **1210** and **1212** to page backward and forward, respectively, in the displayed electronic book. The user may select a convert section **1206** to convert selected text to speech and select a pause section **1202** and a resume section **1204** to pause and resume, respectively, the text-to-speech with manual page turn conversion. A define section **1207** permits the user to receive definitions, in speech form, of words selected in the text.

[0205] A display pages process **1166** displays pages of the electronic book as selected by the user by selecting, for example, a page section **1208** and page turn sections **1210** and **1212**. An indication process **1168** indicates any text selected by a user. FIG. **24** illustrates an example of selected text **1214** in the text screen **1200**. Although selected text is shown as shaded in the text screen **1200**, selected text may be indicated in other ways such as by showing it underlined, in a different color than surrounding text, in reverse video, in a different font than surrounding text, in bold, or in another manner that distinguishes the selected text from surrounding text or information. A selection process **1170** receives the user's selection of convert section **1206** and, in response, a decision process **1172** determines if the user has selected text. If no text is selected, a display process **1174** may optionally display an error message indicating that text must be selected for conversion to speech in this mode. If text is selected, a conversion process **1176** converts the selected text to speech using, for example, a text-to-speech conversion program. Text-to-speech conversion programs are known in the art and

examples include those programs disclosed in the following U.S. patents, which are incorporated herein by reference: U.S. Pat. No. 5,848,390, entitled SPEECH SYNTHESIS SYSTEM AND ITS METHOD; U.S. Pat. No. 5,774,854, entitled TEXT TO SPEECH SYSTEM; U.S. Pat. No. 5,682,501, entitled SPEECH SYNTHESIS SYSTEM; U.S. Pat. No. 5,220,629, entitled SPEECH SYNTHESIS APPARATUS AND METHOD; and U.S. Pat. No. 5,113,449, entitled METHOD AND APPARATUS FOR ALTERING VOICE CHARACTERISTICS OF SYNTHESIZED SPEECH. Other examples include products developed by the AT&T Advanced Speech Products Group. The Advanced Speech Products Group can be accessed at www.research.att.com/projects/watson/index.html.

[0206] Alternatively, underlying pointers tied to text can correspond to pointers in a pre-recorded and stored audio version of the text, avoiding the need for real-time text-to-speech conversion. In that example, an electronic book file may contain both the text and corresponding audio files or links to them. The audio files or links to them may be stored within a header file for each electronic book. The information contained in the header file is used to identify and categorize each electronic book for display and other purposes, such as searching. As new electronic books are loaded on the viewer **266** or library unit **262**, this header information is extracted from the header file and stored in a database resident on the viewer **266** or library unit **262**, such as in memory **600** or **600'**.

[0207] The header information associated with each electronic book typically includes the information shown in Table 1 and can be stored, for example, in records or other database structures. The header file may contain a field for storing an audio file corresponding to text in the electronic book, and may alternatively contain a field identifying a link to such an audio file. The audio files may contain an audio version of the entire text of the electronic book or a portion of it. In addition, multiple audio files may be used for discrete elements or portions of text in the electronic book, and may potentially be linked together based upon text selected by a user for conversion to corresponding speech or audio.

TABLE 1

Title:	
Authors:	
Primary Author:	
Author 2:	
Author 3:	
Author 4:	
Author 5:	
ISBN #:	
Library of Congress # (LC#)	
Dewey Decimal Classification # (DDC#)	
Publisher:	
Edition Number:	
Date of Publishing:	
Related Categories:	
Category 1	Category 6
Category 2	Category 7
Category 3	Category 8
Category 4	Category 9
Category 5	Category 10
Related Keywords:	
Keyword 1	Keyword 6
Keyword 2	Keyword 7
Keyword 3	Keyword 8
Keyword 4	Keyword 9
Keyword 5	Keyword 10
User Defined Criteria 1:	
User Defined Criteria 2:	
User Defined Criteria 3:	
User Defined Criteria 4:	
User Defined Criteria 5:	
Book Summary/Description:	
User Entered Notes:	
Audio file:	
Link to audio file:	

[0208] During the conversion, a selection process **1178** detects if the user has selected pause section **1202**. In response, a halt process **1180** stops the text-to-speech conversion of the selected text. When the user selects a resume section **1204**, as detected by a selection process **1182**, the conversion process **1176** resumes the text-to-speech conversion of the selected text at a point where it was stopped. A decision process **1184** determines if the user has closed the displayed electronic book and, if so, a return process **1186** returns to the main menu to the display screen **1100**. A user may close a displayed electronic book by selecting an icon displayed on the screen, for example, or by entering via a keyboard or other device a particular command.

[0209] In addition, a user may request and receive a definition, in speech form, of a word selected in the text. After selecting a word or words in the selection process **1168**, a user selection process **1161** receives a user's selection of a define section **1207**. In response, a decision process **1163** determines if text is selected; if not, display process **1174** displays the optional error message. If text is selected, a retrieve process **1165** retrieves a definition for the selected word or words from an electronic dictionary, and a conversion process **1167** converts the definitions from an electronic dictionary to speech form. Electronic dictionaries are known in the art and an example includes the system disclosed in U.S. Pat. No. 4,831,654, entitled APPARATUS FOR MAKING AND EDITING DICTIONARY ENTRIES IN A TEXT TO SPEECH CONVERSION SYSTEM, which is incorporated herein by reference. During the conversion, a user may select the pause section **1202**, as detected by the selection process **1169**, and in response a halt process **1171** stops the speech-form definition. When a user selects the resume section **1204**, as detected by a selection process **1173**, the conversion process **1167** continues to provide the speech-form definition of the selected word or words at a point where it was stopped.

[0210] FIG. **25** is a flow chart of auto text-to-speech routine **1134** with an auto page turn feature. Auto text-to-speech routine **1134** may be implemented within the viewer **266**, the library **262**, or a combination; for example, it may be implemented by software modules residing within the instruction memory unit **632** for execution by the library processor **628** or within the instruction memory **732** for execution by the viewer processor **621** using software modules, or by hardware modules, or a combination of hardware and software modules. In the auto text-to-speech routine **1134**, a display process **1220** displays a book menu, such as the book menu screen **1190**. A selection process **1222** receives a user's selected book from the book menu, and in response a display process **1224** displays the selected electronic book such as in the text screen **1200** shown.

[0211] A conversion process **1226** continuously converts text to speech in the displayed book from page to page using, for example, a text-to-speech conversion program. In addition, the conversion process **1226** automatically turns the pages to display a current page for which text-to-speech con-

version occurs. Text-to-speech conversion programs are known in the art and examples include those programs disclosed in the text-to-speech conversion program patents identified above and the products developed by the AT&T Advanced Speech Products Group. Alternatively, the header file for the electronic book may contain an audio file of the text of the electronic book, or a link to such a file, for presentation of the text in speech form. During the conversion, a user may select the pause section **1202**, as detected by a selection process **1228**, and in response a halt process **1230** stops the text-to-speech conversion. If a user selects the resume section **1204**, as detected by a selection process **1232**, the conversion process **1226** resumes the text-to-speech conversion at a point where it was stopped. Once the entire electronic book has been converted, or the user closes the electronic book as determined by a close book process **1227**, a return process **1234** returns to the main menu to display the main menu screen **1100** (shown in FIG. **9**).

[0212] FIG. **26** is a flow chart of auto text-to-speech routine **1138** with a manual page turn feature. Auto text-to-speech routine **1138** may be implemented within the viewer **266**, the library **262**, or a combination; for example, it may be implemented by software Modules residing within the instruction memory unit **632** for execution by the library processor **628** or within the instruction memory **732** for execution by the viewer processor **621**, or by hardware modules, or a combination of hardware and software modules. In the auto text-to-speech routine **1138**, a display process **1240** displays a book menu, such as book menu screen **1190**. A selection process **1242** receives a user's selected book from the book menu, and in response a display process **1244** displays the selected electronic book such as in the text screen **1200**.

[0213] A conversion process **1246** continuously converts text to speech in the displayed book from the displayed page using, for example, a text-to-speech conversion program. Text-to-speech conversion programs are known in the art and examples include those programs disclosed in the text-to-speech conversion program patents identified above and the products developed by the AT&T Advanced Speech Products Group. Alternatively, the header file for the electronic book may contain a separate audio file of the text of each page of the electronic book, or links to such files, for presentation of the text in speech form for the pages as selected by a user. In particular, when a user selects a particular page, the conversion process **1246** may retrieve the corresponding audio file to present the text on that page in speech form. A decision process **1254** determines if the text-to-speech conversion has reached the end of the displayed page and, if not, the conversion continues for the displayed page. During the conversion, the user may select pause section **1202**, as detected by a selection process **1248**, and in response a halt process **1250** stops the text-to-speech conversion. If a user selects the resume section **1204**, as detected by a selection process **1252**, the conversion process **1246** resumes the text-to-speech conversion at a point where it was stopped.

[0214] Once the textual content of the current page of the displayed electronic book has been converted, as determined by decision process **1254**, a decision process **1256** determines if the end of the book is displayed. If the electronic book has more pages for display, a wait process **1258** waits for the user to select another page. A selection process **1260** receives the user's next selected page and in response returns to conversion process **1246** to perform text-to-speech conversion for the next displayed page using, for example, a text-to-speech program, as are known in the art, or using corresponding audio files. If the end of the book is displayed, as determined by decision process **1256**, or if the user closes the book as determined by a close book process **1253**, a return process **1262** returns to the main menu to display the main menu screen **1100**.

[0215] FIG. **27** is a flow chart of a settings routine **1142**. The settings routine **1142** may be implemented within the viewer **266**, the library **262**, or a combination; for example, it may be implemented by software modules residing within the instruction memory unit **632** for execution by the library processor **628** or within the instruction memory **732** for execution by the viewer processor **621**, or by hardware modules, or a combination of hardware and software modules. In the settings routine **1142**, a display process **1270** displays a settings menu.

[0216] FIG. **28** illustrates an example of a settings menu screen **1280** for display on the viewer **266**. The settings menu screen **1280** includes a voice commands section **1282** to activate and deactivate voice commands by selecting certain activate and deactivate sections **1284** and **1286**, respectively. A user may select the activate or deactivate options by, for example, positioning a cursor over the corresponding section next to the desired option and selecting the section, or by entering various other commands such as a particular selection of input keys. Voice or audible commands are the ability of the viewer **266** to execute a function corresponding to a command provided by a user in speech form. The settings menu screen **1280** also includes an available voice commands section **1311**, identifying voice or audible commands available to a user and the following exemplary speech required to execute the command: "page forward" command **1303**; "page backward" command **1305**; "open book" command **1307**; and other functions **1309**.

[0217] The settings menu screen **1280** also includes a rate section **1288** for setting a rate of text-to-speech conversion by manipulating a marker **1290** and moving the marker along the displayed rate scale. The term rate refers to the relative speed at which text is converted into corresponding speech. The machine speech conversion can be done electronically in advance, but the speech is provided at a certain pace determined by the user. Text-to-speech conversion programs, along with the ability to change a rate of the conversion, are known in the art and examples include the text-to-speech conversion program patents identified above and the products developed by the AT&T Advanced Speech Products Group.

[0218] A voice security section **1287** permits a user to activate and deactivate a voice security feature by selecting, respectively, sections **1289** and **1291**. A voice security feature provides for activation of the viewer **266** and access to stored electronic books only in response to a voice command from a particular user or particular users.

[0219] The settings menu screen **1280** also includes a voice options section **1301** permitting a user to select various options for speech used to convert text. These options include, for example, a male voice **1313**; a female voice **1315**; a child's voice **1317**; voice option **1** (**1319**); and voice option N (**1321**). A user may select one of these options by, for example, positioning a cursor over the corresponding section next to the desired option and selecting the section, or by entering various other commands such as a particular selection of input keys. Other options **1319** and **1321** may represent other types of voices such as user-defined voices, voices with particular characteristics, or the actual author's voice, for

example. The other options **1319** and **1321** could also include the voice of a famous person, such as James Earl Jones or an imitation of James Earl Jones, for example. Text-to-speech conversion programs, along with varying types of voices for the conversion, are known in the art and examples include the text-to-speech conversion program patents identified above and the products developed by the AT&T Advanced Speech Products Group.

[0220] Once the text-to-speech process is executed in the viewer **266**, the viewer may display a fixed (JPEG) or moving (MPEG 2) image. The displayed image may be retrieved by the viewer **266** from a specific database related to the electronic book being viewed. Alternatively, the viewer may access such an image using an electronic link. Use of electronic links in an electronic book are described in detail in co-pending patent application Ser. No. 09/237,828, entitled ELECTRONIC BOOKS ELECTRONIC LINKS, filed Jan. 27, 1999, the disclosure of which is hereby incorporated by reference.

[0221] As shown in FIG. **27**, a receive process **1272** receives a user's selected settings in settings menu screen **1280**. In response, a save process **1274** saves the selected settings for later use in providing text-to-speech functions or receiving voice commands. The settings may be saved in a table or other data structure in the instruction memory unit **632** or within the instruction memory **732** for use in controlling functions related to the electronic books. A decision process **1276** determines if the user closes settings menu screen **1280** and, if so, a return process **1278** returns to the main menu to display the main menu screen **1100**.

[0222] FIG. **29** is a flow chart of a dictation routine **1146**. The dictation routine **1146** may be implemented within the viewer **266**, the library **262**, or a combination; for example, it may be implemented by software modules residing within the instruction memory unit **632** for execution by the library processor **628** or within the instruction memory **732** for execution by the viewer processor **621**, or by hardware modules, or a combination of hardware and software modules. In the dictation routine **1146**, a display process **1300** displays a book menu, such as book menu screen **1190**. A selection process **1302** receives a user's selected book from the book menu, and in response a display process **1304** displays the selected electronic book. A display pages process **1306** displays pages of the electronic book as selected by the user.

[0223] FIG. **30***a* illustrates a text dictation screen **1330** for display on the viewer **266** and for use with a dictation routine **1146**. The text dictation screen includes a page section **1336** for permitting the user to enter a page number and have that page displayed. Page turn sections **1338** and **1340** permit a user to page backward and forward, respectively, in the displayed electronic book. A begin dictation section **1332** permits a user to begin speech-to-text conversion, and an end dictation section **1334** permits a user to end speech-to-text conversion. Text dictation screen **1330** indicates that, when an insertion point is chosen by the user, speech is converted to text directly within the page of the displayed electronic book at, for example, location **1341**. The text insertion point may be indicated by the user positioning a cursor **1343** to a desired location on the page. FIG. **30***b* illustrates that text dictation screen **1330** may also include a separate section **1342** for displaying text converted from speech, particularly when the user does not specify an insertion point.

[0224] A selection process **1308** detects when a user has selected the begin dictation section **1332**. In response, a conversion process **1310** receives speech and converts it to corresponding text, and it may receive the speech from the user via speaker/microphone **608***s*. Speech-to-text and speech recognition programs are known in the art and examples include those programs disclosed in the following U.S. patents, which are incorporated herein by reference: U.S. Pat. No. 5,864,805, entitled METHOD AND APPARATUS FOR ERROR CORRECTION IN A CONTINUOUS DICTATION SYSTEM; U.S. Pat. No. 5,799,278, entitled SPEECH RECOGNITION SYSTEM AND METHOD USING A HIDDEN MARKOV MODEL; U.S. Pat. No. 5,615,299, entitled SPEECH RECOGNITION USING DYNAMIC FEATURES; U.S. Pat. No. 5,325,462, entitled SYSTEM AND METHOD FOR SPEECH SYNTHESIS EMPLOYING IMPROVED FORMAT COMPOSITION; U.S. Pat. No. 5,313,531, entitled METHOD AND APPARATUS FOR SPEECH ANALYSIS AND SPEECH RECOGNITION; U.S. Pat. No. 5,054,074, entitled OPTIMIZED SPEECH RECOGNITION SYSTEM AND METHOD; U.S. Pat. No. 5,050,215, entitled SPEECH RECOGNITION METHOD; and U.S. Pat. No. 4,430,726, entitled DICTATION/TRANSCRIPTION METHOD AND ARRANGEMENT. Other examples include products developed by the AT&T Advanced Speech Products Group.

[0225] A decision process **1312** determines if the user has selected an insertion point for the text, which may be indicated by positioning the cursor. If the user has selected an insertion point, an insert process **1316** inserts the text at the user-selected point. Otherwise, if the user has not selected an insertion point, an insertion process **1314** may insert the text in the separate displayed section **1342**. A decision process **1318** determines if the user has selected the end dictation section **1334**. Until the user selects the end dictation section **1334**, conversion process **1310** continues converting speech into text. When the user selects the end dictation section **1334**, a decision process **1320** determines if the user has closed the book and, if not, the dictation routine **1146** returns to display pages process **1306** in order to continue displaying pages and converting speech into text as requested by the user. If the user closes the book, a return process **1322** returns to the main menu to display the main menu screen **1100**.

[0226] FIG. **31** is a flow chart of a view book routine **1150**. The view book routine **1150** may be implemented within the viewer **266**, the library **262**, or a combination; for example, it may be implemented by software modules residing within the instruction memory unit **632** for execution by the library processor **628** or within the instruction memory **732** for execution by the viewer processor **621**, or by hardware modules, or a combination of hardware and software modules. In the view book routine **1150**, a display process **1350** a displays book menu, such as book menu screen **1190**. A selection process **1352** receives a user's selected book from the book menu, and in response a display process **1354** displays the selected electronic book.

[0227] FIG. **32** illustrates an example of a view book screen **1370** for displaying on the viewer **266** a cover page **1372** of the selected electronic book. The view book screen **1370** also includes page backward section **1374** and page forward section **1376** for permitting a user to page backward and forward, respectively, within the displayed electronic book. A display pages process **1356** displays pages of the selected electronic book as requested by the user. A decision process **1358** determines if the user has closed the displayed electronic book and, if the user closes the book, a return process **1360** returns to the main menu to display the main menu screen **1100**.

[0228] The viewer **266** may also incorporate text to speech conversion and text recognition features to guide the user through the menu system **851**, shown in FIG. **13**. For example, software resident on the viewer **266**, or on another component of the home system **258** may be used to provide audio prompts related to menu navigation. When the user activates the menu system **851** and is presented with the main menu **854**, the viewer **266** could provide an audio prompt such as: "Hello John. Do you want to order a new book or read an existing book? Please respond new book or existing book." If the user responds with "existing book," then the software operating on the viewer **266** may display the Books in Your Library submenu **872**, and may provide further audio prompts.

[0229] FIG. **33** is a flow chart of a voice commands routine **1380**. The voice commands routine **1380** may be implemented within the viewer **266**, the library **262**, or a combination; for example, it may be implemented by software modules residing within the instruction memory unit **632** for execution by the library processor **628** or within the instruction memory **732** for execution by the viewer processor **621**, or by hardware modules, or a combination of hardware and software modules. This routine permits a user to enter commands via speech, rather than manipulating the viewer controls to enter commands. In the voice commands routine **1380**, a decision process **1382** determines if the user has activated the voice commands option. If the option is activated, a receive process **1384** receives a voice command, and it may receive the voice command from a user via the microphone **634**.

[0230] A conversion process **1386** converts the voice command to a corresponding electronic signal, and a determination process **1388** determines the requested function by analyzing the electronic signal. Examples of functions corresponding to the command include a turn page forward function **1390** for the viewer **266** to display the next page in the displayed electronic book; a turn page backward function **1392** for the viewer **266** to display the previous page in the displayed electronic book; an open book function **1394** for the viewer **266** to display a particular electronic book; or other functions **1396**. After determining the requested function, an execute process **1398** executes the requested function. The viewer **266** may display typical voice command options available to assist the user in understanding the voice commands acted upon by the viewer **266** at a given point in time. The determination process **1388** may use speech recognition programs for the determination; such programs are known in the art and include those exemplary systems in the speech-to-text and speech recognition patents identified above and the products available from the AT&T Advanced Speech Products Group.

[0231] FIG. **34** is a flow chart of a voice security routine **1125**. Voice security routine **1125** may be implemented within the viewer **266**, the library **262**, or a combination; for example, it may be implemented by software modules residing within the instruction memory unit **632** for execution by the library processor **628** or within the instruction memory **732** for execution by the viewer processor **621**, or by hardware modules, or a combination of hardware and software modules. In a voice security routine **1125**, a request process **1404** requests an audible signal for security purposes, and it may be requested via a screen on the viewer **266** or in audio form. A receive process **1405** receives the requested audible signal using the microphone **634**, and a conversion process **1406** converts the audible signal to a corresponding electronic signal. A compare process **1408** compares the electronic signal with a stored signal, and a decision process **1410** determines if the electronic signal satisfies particular criteria in order to determine if the user has authorization for a requested function.

[0232] The decision process **1410** may use speech recognition programs for the determination; such programs are known in the art and include those exemplary systems in the speech-to-text and speech recognition patents identified above and the products available from the AT&T Advanced Speech Products Group. If the criteria are not satisfied, a deny process **1412** denies authorization to execute commands from the user and, if the criteria are satisfied, a grant process **1414** grants authorization to execute commands from the user. Main menu process **1120** uses the granted or denied status to determine whether to executed a user's requested function.

[0233] The viewer **266** may also include software that restricts access to specific electronic books based on recognizing a voice of a user. For example, the viewer **266** may determine that a particular user is a child, and then limit access to specific electronic books authorized by a parent for that child to view. Alternatively, the viewer could prevent access to specific electronic books designated by the parent. The same access limitation software may be used to limit access by two or more users to content in the viewer **266** or the home system **258**. For example, two adult users of a same viewer **266** may limit access by agreeing that only a first adult user views books one through ten, a second adult user only views books eleven through **20**, and that both adult users view books **21** through **30**.

[0234] While this invention has been described in conjunction with the embodiments described above, it is evident that many alterations, modifications and variations will be apparent to those skilled in the art. Accordingly, embodiments of the invention as set forth above are intended to be only illustrative. Various changes may be made without departing from the scope of the invention as defined in the following claims and their equivalents.

1. (canceled)

2. A method for inserting text into an electronic book displayed on a viewer comprising:

displaying a page of an electronic book on a screen of a viewer;

displaying a first section on the screen for permitting a user to request a speech-to-text conversion;

receiving a first indication, based on a user interaction with the first section of the screen, the first indication requesting a speech-to-text conversion;

in response to receiving the first indication, receiving speech from the user;

converting the received speech into corresponding electronic text; and

determining whether the user has provided a second indication designating a text insertion point; and

displaying the electronic text on a second section of the screen based on the determination.

3. The method of claim **2**, wherein the method further comprises:

receiving the second indication designating a text insertion point within the electronic book; and

inserting the electronic text within the electronic book at a location corresponding to the text insertion point.

4. The method of claim **3**, wherein the method further comprises displaying a text insertion cursor for designating the text insertion point.

5. The method of claim **4**, wherein the text insertion point comprises a location of the text insertion cursor within the electronic book.

6. The method of claim **2**, wherein determining whether the user has provided the second indication comprises determining that the user has not provided the second indication and wherein the second section of the screen comprises a section separate from the displayed page of the electronic book.

7. A viewer apparatus for displaying an electronic book comprising:

a display screen configured to display a page of an electronic book;

a first interface configured to receive a first indication requesting a speech-to-text conversion;

a second interface configured to receive speech from the user in response to the first interface receiving the first indication; and

a processor communicatively coupled to the display screen, the first interface, and the second interface, the processor being configured to convert speech received by the second interface into corresponding electronic text, to make a determination as to whether the user has provided a second indication via the first interface designating a text insertion point, and to cause the display screen to display the electronic text based on the determination.

8. The viewer apparatus of claim **7**, wherein the second indication designates a text insertion point within an electronic book, and wherein the text insertion point comprises a location within the electronic book.

9. The viewer apparatus of claim **8**, wherein the display screen is further configured to display a text insertion cursor for designating the text insertion point within the electronic book.

10. The viewer apparatus of claim **9**, wherein the text insertion point comprises a location of the text insertion cursor within the electronic book.

11. The viewer apparatus of claim **7**, wherein the first interface comprises a touch interface associated with the display screen and the first indication is received in response to a user touching a portion of the display screen.

* * * * *