US008660545B1

(12) **United States Patent**
Redford et al.

(10) **Patent No.: US 8,660,545 B1**
(45) **Date of Patent: Feb. 25, 2014**

(54) **RESPONDING TO A VIDEO REQUEST BY DISPLAYING INFORMATION ON A TV REMOTE AND VIDEO ON THE TV**

(75) Inventors: **Peter Redford**, Saratoga, CA (US); **Bala Chander**, Saratoga, CA (US)

(73) Assignee: **ILook Corporation**, San Jose, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 541 days.

(21) Appl. No.: **12/683,405**

(22) Filed: **Jan. 6, 2010**

(51) **Int. Cl.**
H04M 3/00 (2006.01)

(52) **U.S. Cl.**
USPC **455/418**; 455/414.1; 455/556.1; 725/39; 348/552

(58) **Field of Classification Search**
USPC 455/418, 414.1, 556.1; 725/39; 348/552
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,567,984	B1	5/2003	Allport	
6,741,684	B2	5/2004	Kaars	
7,428,023	B2	9/2008	Allen et al.	
7,479,949	B2	1/2009	Jobs et al.	
7,643,095	B2 *	1/2010	Yoshii	348/687
2002/0031120	A1 *	3/2002	Rakib	370/386
2006/0123076	A1	6/2006	Raiyat	
2007/0250863	A1 *	10/2007	Ferguson	725/46
2008/0092198	A1 *	4/2008	Hutten	725/133
2008/0122796	A1	5/2008	Jobs et al.	
2008/0281718	A1 *	11/2008	Morgan	705/26
2009/0007198	A1 *	1/2009	Lavender et al.	725/91
2009/0204493	A1	8/2009	Kim	
2010/0095345	A1 *	4/2010	Tran et al.	725/131
2010/0321095	A1 *	12/2010	Mikawa et al.	327/525
2011/0063317	A1 *	3/2011	Gharaat et al.	345/545

OTHER PUBLICATIONS

Kleban, T. "A Tutorial on Watching YouTube Videos From an iPhone", published on Ezine on Oct. 19, 2007, pp. 2.
Wilson, B. "Possibly the Best iPhone Web app yet: vtap trumps built-in iPhone YouTube app", published on CNET on Nov. 2, 2007, p. 1.
Maltais, M. "Appiphilia: i.TV app tunes in new features for iPhone", published of the Los Angeles Times on Dec. 23, 2008, pp. 6.
Lowensohn, J. "i.TV's iPhone app gets deep Netflix integration", published on CNET on Nov. 10, 2008, pp. 2.
Sadun, E. "i.TV for iPhone: Cluttered but promising entertainment guide", published on Aug. 17, 2009 of Weblogs, Inc., pp. 2.
vTap—Frequently Asked Questions, Recently Raised questions (Mobiles using m.vtap.com), retrieved from http://vtap.com/faq.html on Nov. 22, 2009, pp. 7.
Katzmaier, D. "Could an Apple HDTV plus an iPhone remote equal living room bliss?", retrieved from http://news.cnet.com/8301-17938_105-10314746-1.html, Aug. 21, 2009, pp. 4.
Chen, B. X. "Flash Lands on iPhone—One App at a Time", retrieved from http://www.wired.com/gadgetlab/2009/10/iphone-flash/, Oct. 5, 2009, pp. 13.

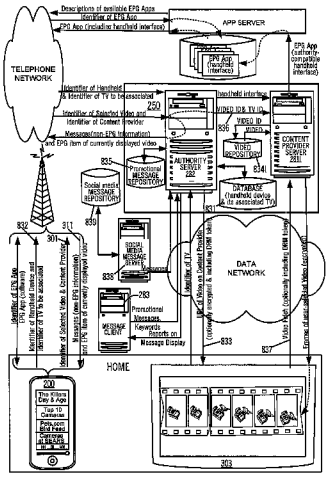
* cited by examiner

Primary Examiner — Danh Le
(74) *Attorney, Agent, or Firm* — Silicon Valley Patent Group LLP

(57) **ABSTRACT**

A handheld device displays multiple applications ("apps"), from which a user selects one app. The selected app displays multiple descriptions of videos, from which the user selects one video. The handheld device transmits a video request containing an identification of the user-selected video. The computer system transmits the user-selected video to the television and transmits a signal to the handheld device, based on the video request. The television responds by automatically displaying on a television screen, a series of frames in the video, on receipt therein. The handheld device automatically displays on a handheld screen, information that is directly or indirectly based on the video request, as the signal is received from the computer system. Two displays based on a single video request, provide a richer viewing experience than a single display.

50 Claims, 42 Drawing Sheets



Comcast, Ex. 1005

FIG. 1A (prior art)

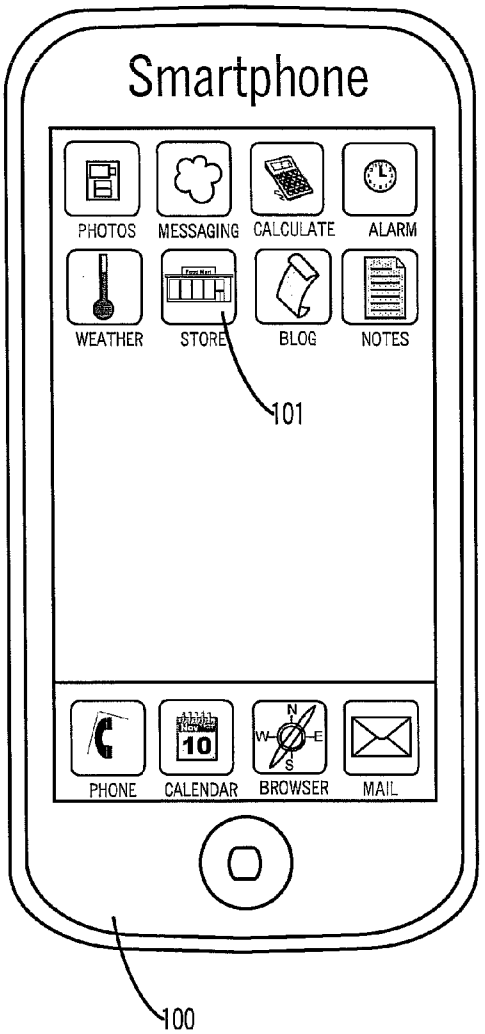


FIG. 1B (prior art)

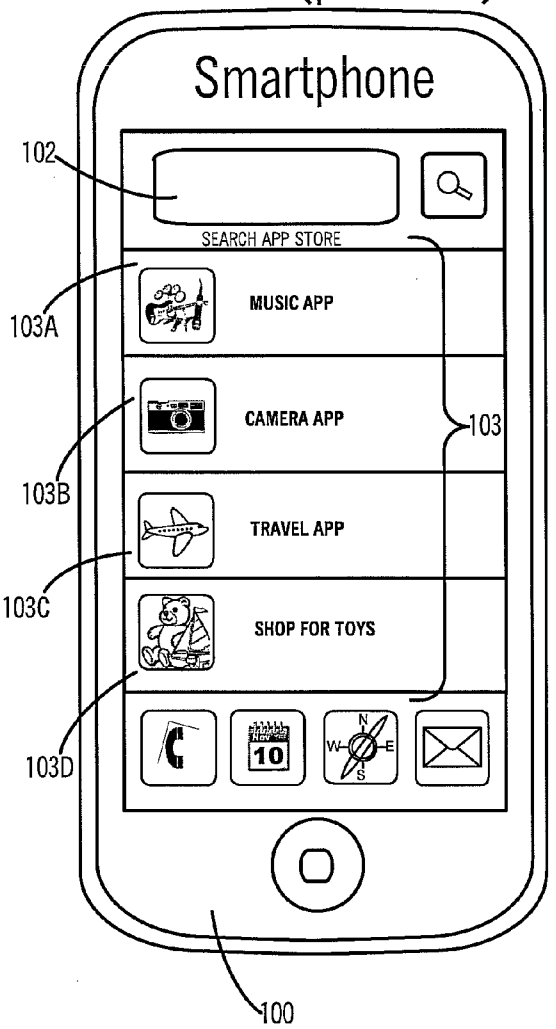


FIG. 2A

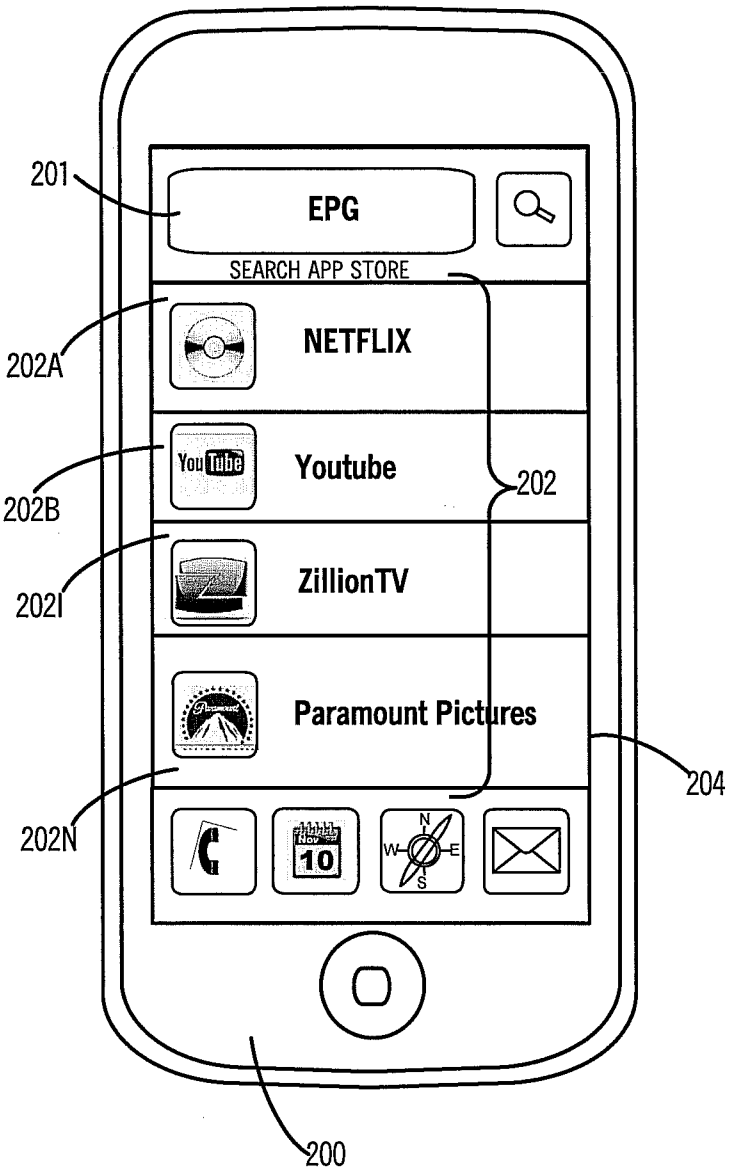

201
EPG
SEARCH APP STORE
202A
NETFLIX
202B
Youtube
202
202I
ZillionTV
Paramount Pictures
204
202N
10
N
W
E
S
200

FIG. 2B

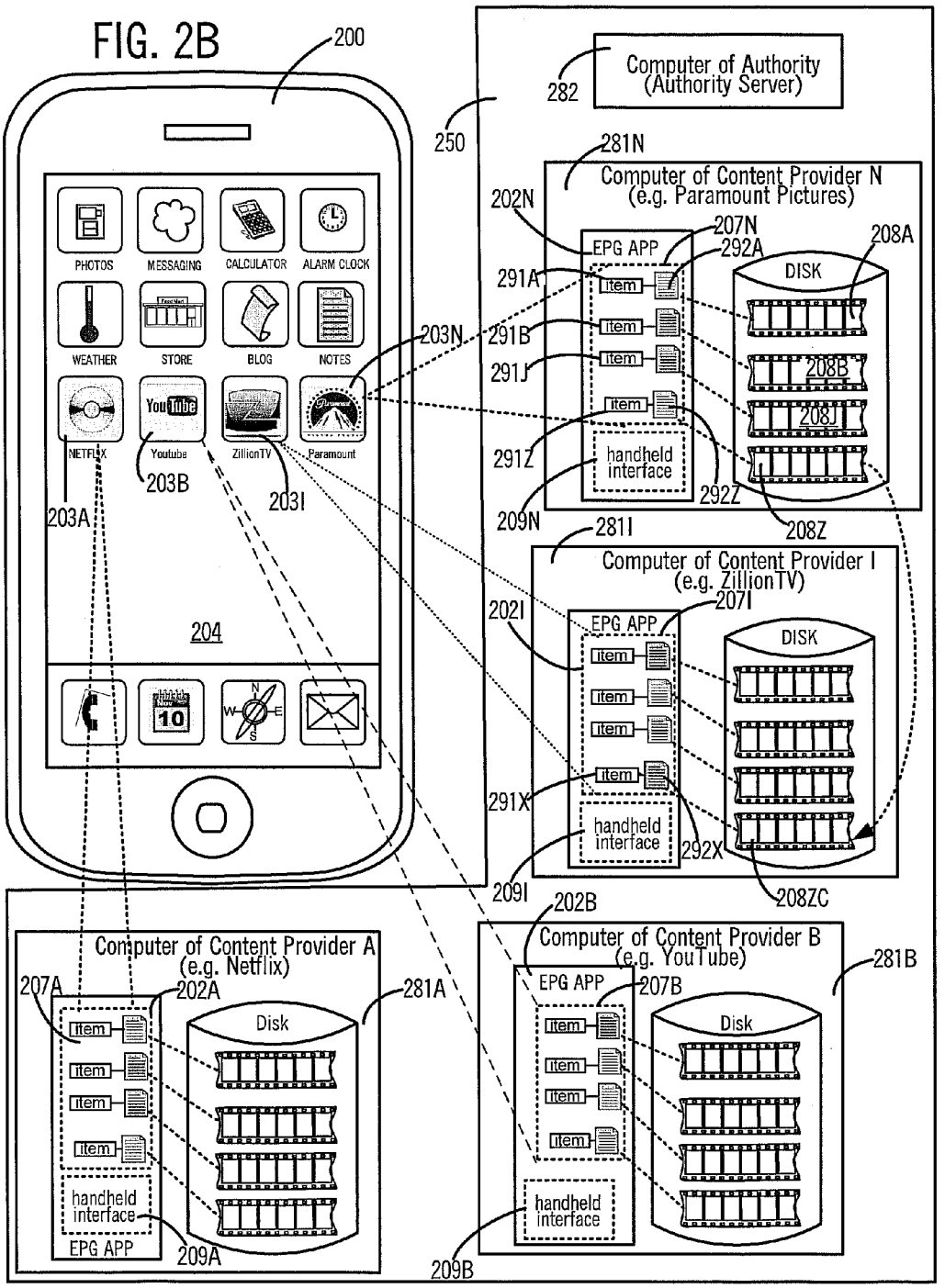

200
PHOTOS
MESSAGING
CALCULATOR
ALARM CLOCK
WEATHER
STORE
BLOG
NOTES
NETFLIX
Youtube
ZillionTV
Paramount
203A
203B
203I
203N
204
250
Computer of Authority
(Authority Server)
282
281N
Computer of Content Provider N
(e.g. Paramount Pictures)
202N
207N
EPG APP
292A
208A
DISK
291A
291B
291J
291Z
item
handheld interface
208B
208J
292Z
209N
208Z
281I
Computer of Content Provider I
(e.g. ZillionTV)
202I
207I
291X
292X
209I
208ZC
Computer of Content Provider A
(e.g. Netflix)
207A
202A
281A
Disk
209A
Computer of Content Provider B
(e.g. YouTube)
202B
207B
281B
209B

FIG. 2C

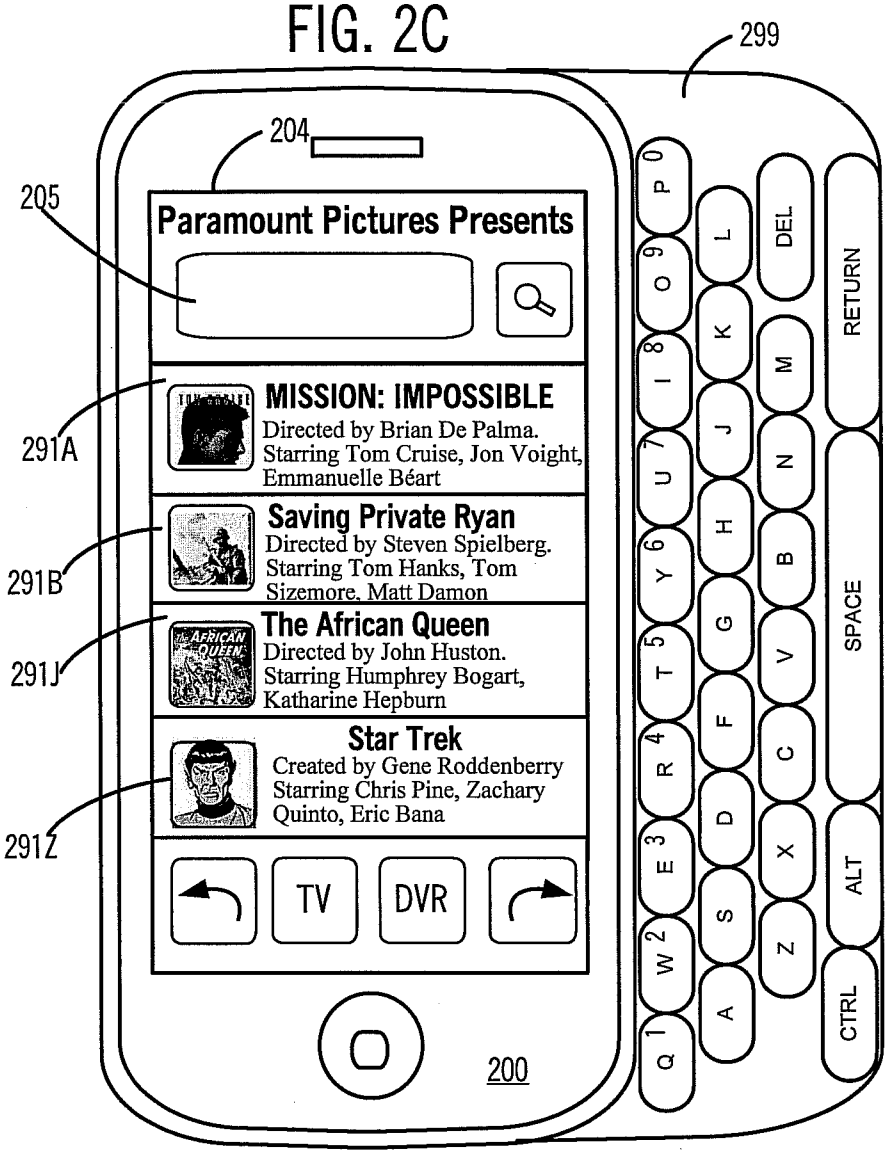

299
204
205
Paramount Pictures Presents
291A
MISSION: IMPOSSIBLE
Directed by Brian De Palma.
Starring Tom Cruise, Jon Voight,
Emmanuelle Béart
291B
Saving Private Ryan
Directed by Steven Spielberg.
Starring Tom Hanks, Tom
Sizemore, Matt Damon
291J
The African Queen
Directed by John Huston.
Starring Humphrey Bogart,
Katharine Hepburn
291Z
Star Trek
Created by Gene Roddenberry
Starring Chris Pine, Zachary
Quinto, Eric Bana
TV
DVR
200
Q 1
W 2
E 3
R 4
T 5
Y 6
U 7
I 8
O 9
P 0
A
S
D
F
G
H
J
K
L
Z
X
C
V
B
N
M
DEL
RETURN
SPACE
ALT
CTRL

FIG. 2D

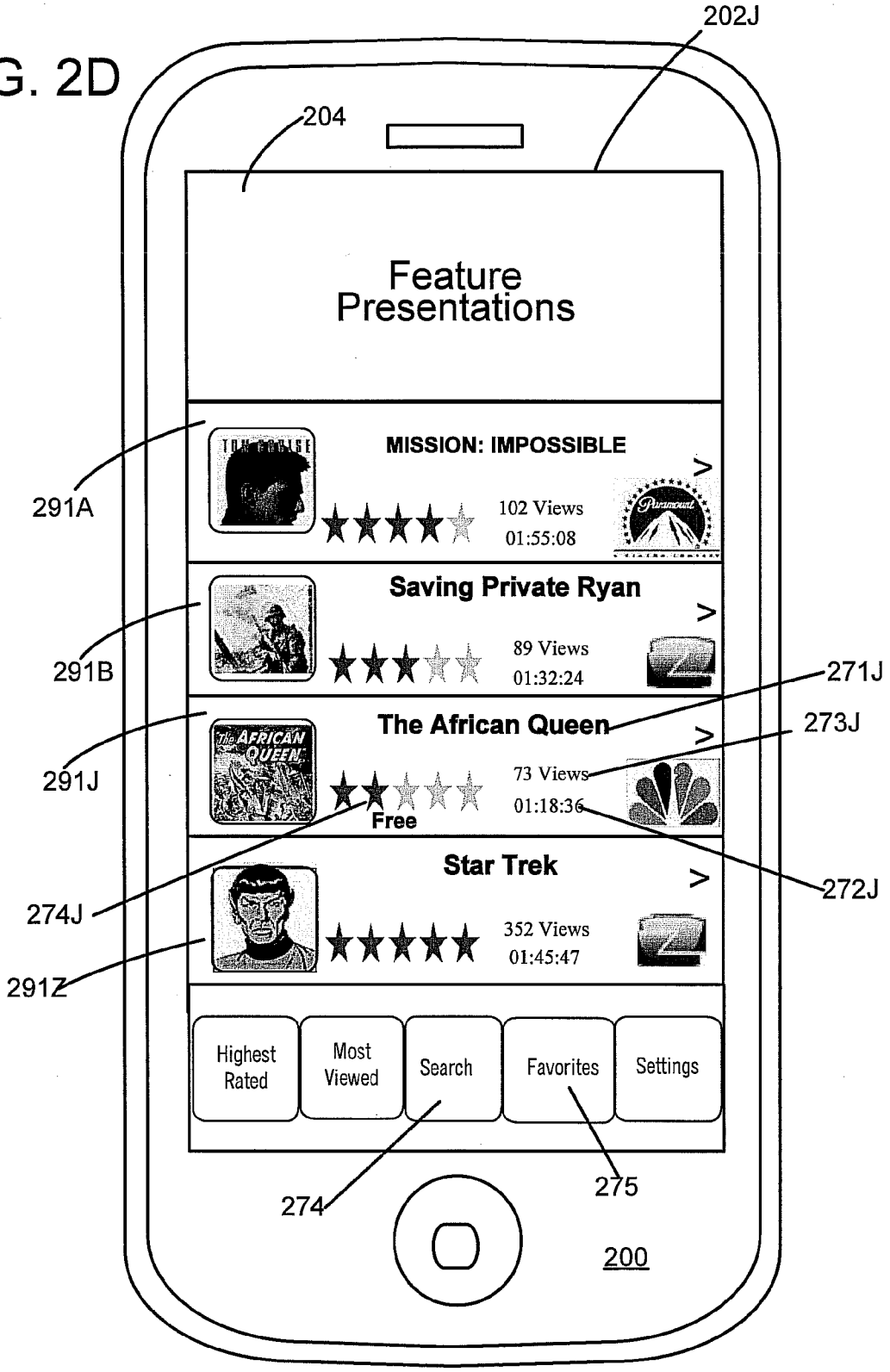

202J
204
Feature Presentations
MISSION: IMPOSSIBLE
102 Views
01:55:08
Paramount
Saving Private Ryan
89 Views
01:32:24
The African Queen
73 Views
01:18:36
Free
Star Trek
352 Views
01:45:47
Highest Rated
Most Viewed
Search
Favorites
Settings
291A
291B
291J
291Z
271J
273J
272J
274J
274
275
200

FIG. 2E

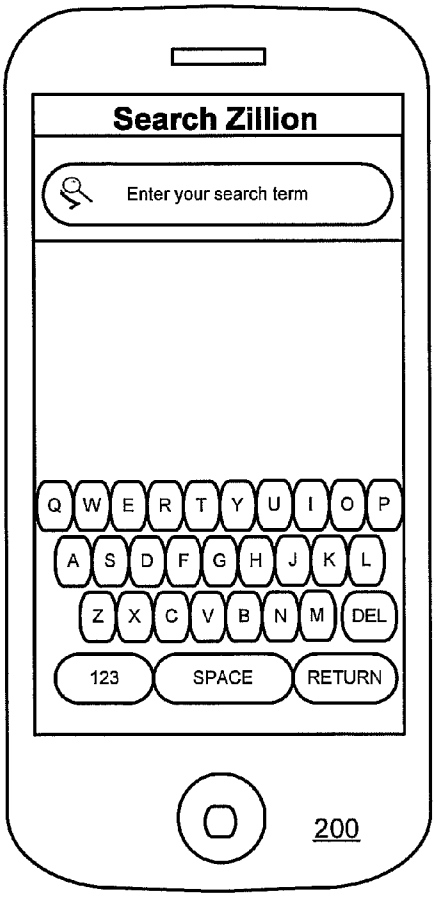

Search Zillion
Enter your search term
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M DEL
123 SPACE RETURN
200

FIG. 2F

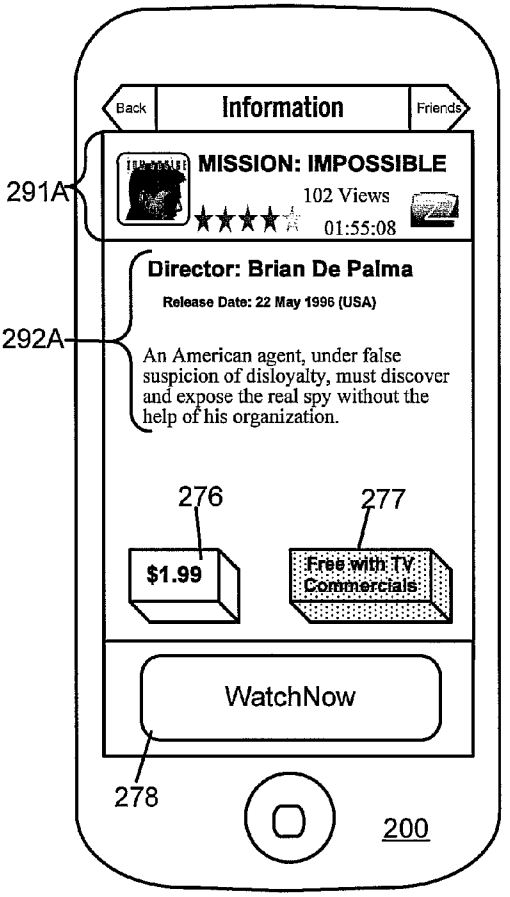

Back
Information
Friends
291A
MISSION: IMPOSSIBLE
102 Views
01:55:08
Director: Brian De Palma
Release Date: 22 May 1996 (USA)
292A
An American agent, under false suspicion of disloyalty, must discover and expose the real spy without the help of his organization.
276
277
$1.99
Free with TV Commercials
WatchNow
278
200

FIG. 2G

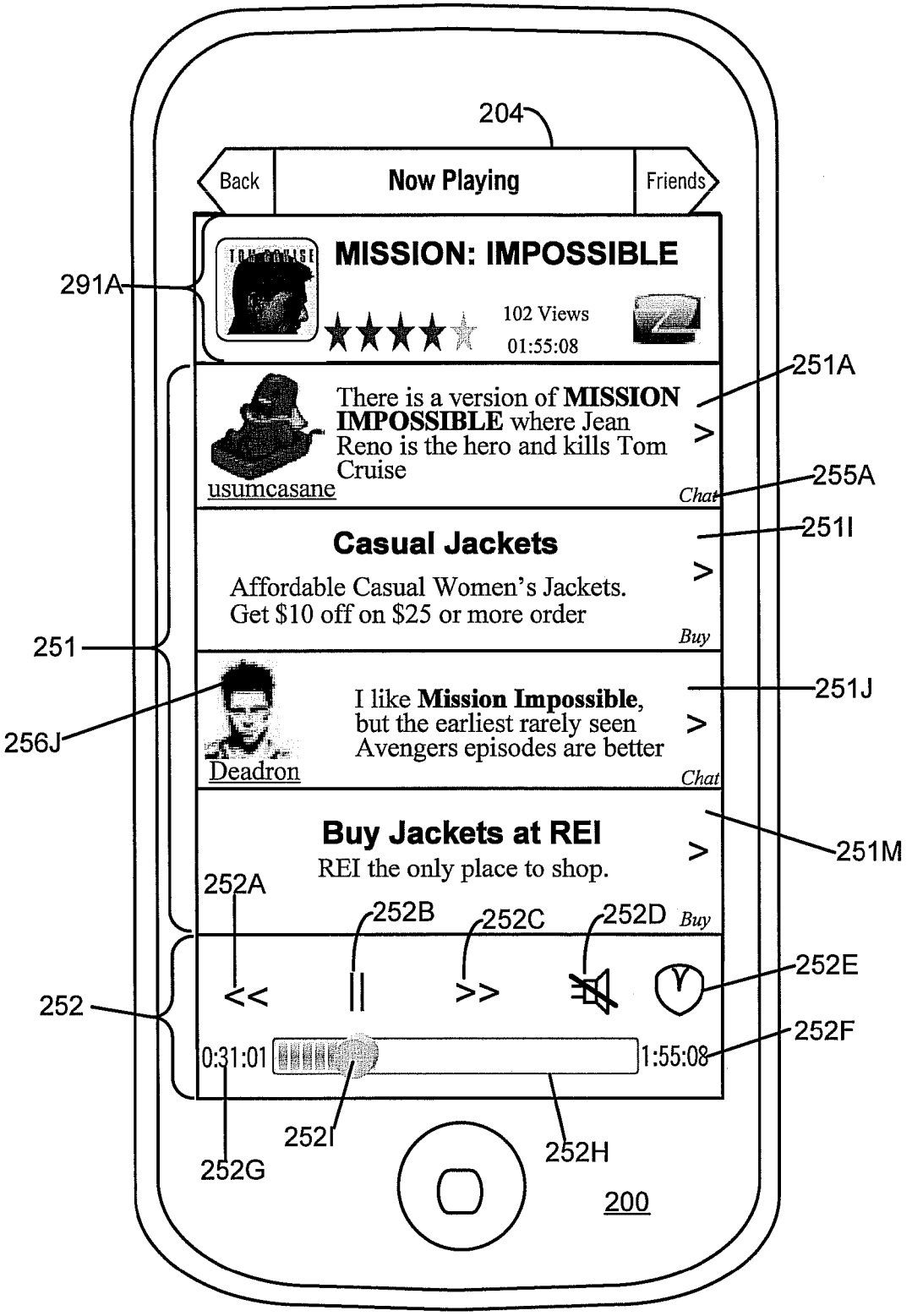

204
Back
Now Playing
Friends
MISSION: IMPOSSIBLE
102 Views
01:55:08
291A
There is a version of MISSION IMPOSSIBLE where Jean Reno is the hero and kills Tom Cruise
usumcasane
Chat
251A
255A
Casual Jackets
Affordable Casual Women's Jackets. Get $10 off on $25 or more order
Buy
251I
251
I like Mission Impossible, but the earliest rarely seen Avengers episodes are better
Deadron
Chat
251J
256J
Buy Jackets at REI
REI the only place to shop.
Buy
251M
252A
252B
252C
252D
252E
252
<<
>>
0:31:01
1:55:08
252F
252I
252H
252G
200

FIG. 2H

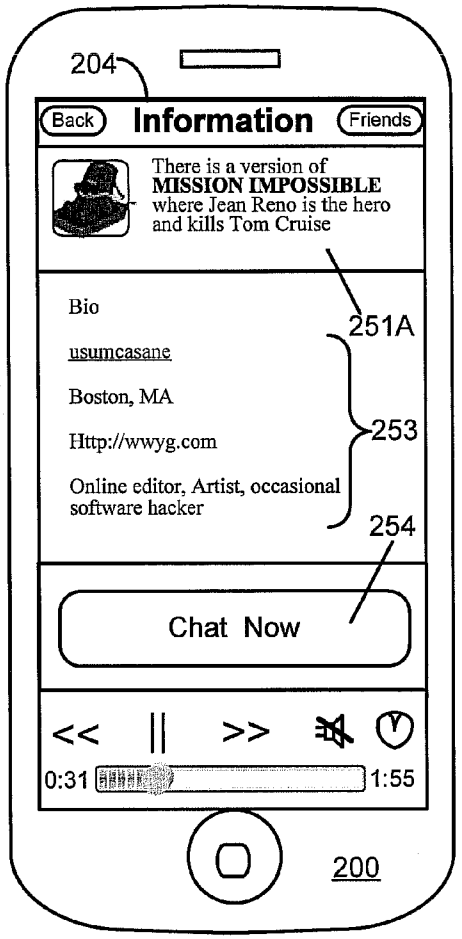

204
Back
Information
Friends
There is a version of
MISSION IMPOSSIBLE
where Jean Reno is the hero
and kills Tom Cruise
Bio
usumcasane
Boston, MA
Http://wwyg.com
Online editor, Artist, occasional
software hacker
251A
253
254
Chat Now
<<
||
>>
0:31
1:55
200

FIG. 2I

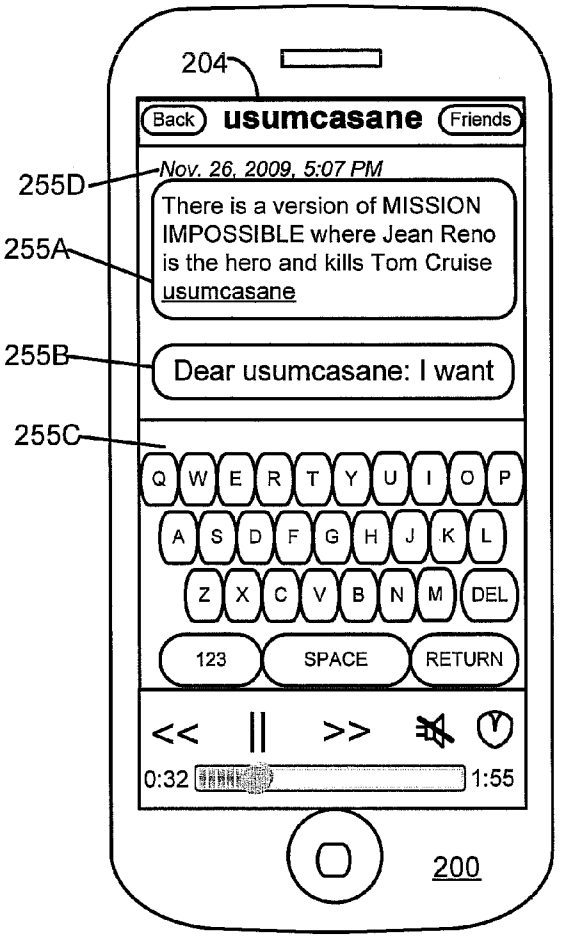

204
Back
usumcasane
Friends
255D
Nov. 26, 2009, 5:07 PM
255A
There is a version of MISSION
IMPOSSIBLE where Jean Reno
is the hero and kills Tom Cruise
usumcasane
255B
Dear usumcasane: I want
255C
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M DEL
123 SPACE RETURN
<<
||
>>
0:32
1:55
200

FIG. 2J

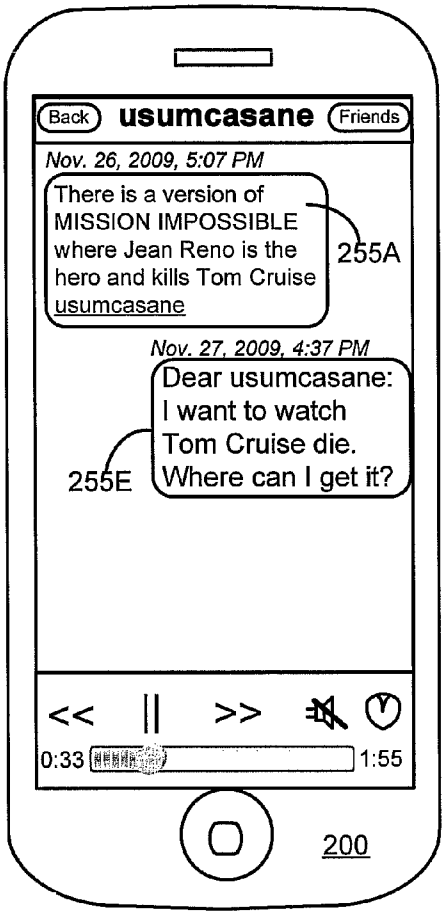

Back
usumcasane
Friends
Nov. 26, 2009, 5:07 PM
There is a version of MISSION IMPOSSIBLE where Jean Reno is the hero and kills Tom Cruise usumcasane
255A
Nov. 27, 2009, 4:37 PM
Dear usumcasane: I want to watch Tom Cruise die. Where can I get it?
255E
<< || >>
0:33
1:55
200

FIG. 2K

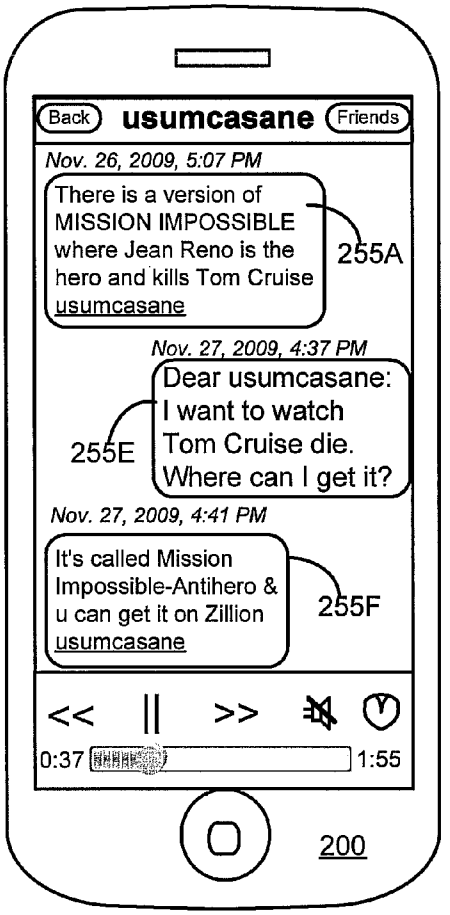

Back
usumcasane
Friends
Nov. 26, 2009, 5:07 PM
There is a version of MISSION IMPOSSIBLE where Jean Reno is the hero and kills Tom Cruise usumcasane
255A
Nov. 27, 2009, 4:37 PM
Dear usumcasane: I want to watch Tom Cruise die. Where can I get it?
255E
Nov. 27, 2009, 4:41 PM
It's called Mission Impossible-Antihero & u can get it on Zillion usumcasane
255F
<< || >>
0:37
1:55
200

FIG. 2L

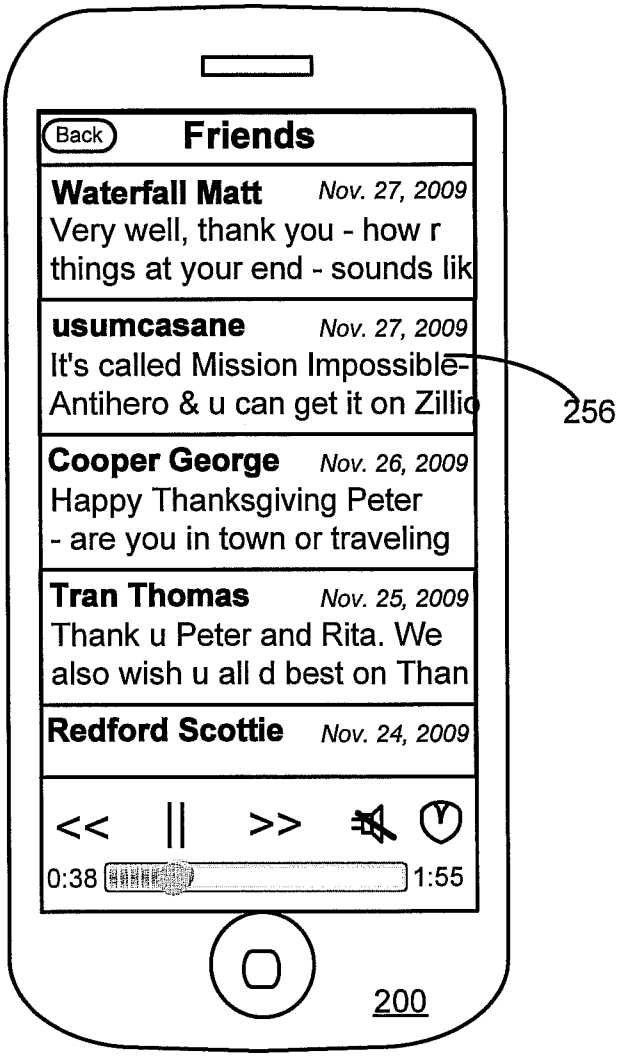

Back
Friends
Waterfall Matt
Nov. 27, 2009
Very well, thank you - how r
things at your end - sounds lik
usumcasane
Nov. 27, 2009
It's called Mission Impossible-
Antihero & u can get it on Zillio
256
Cooper George
Nov. 26, 2009
Happy Thanksgiving Peter
- are you in town or traveling
Tran Thomas
Nov. 25, 2009
Thank u Peter and Rita. We
also wish u all d best on Than
Redford Scottie
Nov. 24, 2009
<<
||
>>
0:38
1:55
200

FIG. 2M

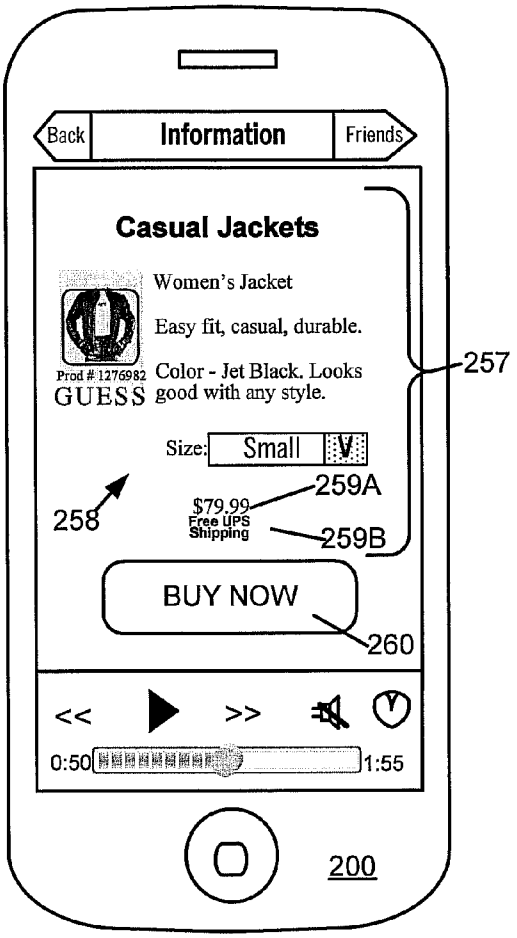

Back
Information
Friends
Casual Jackets
Women's Jacket
Easy fit, casual, durable.
Prod # 1276982
GUESS
Color - Jet Black. Looks good with any style.
Size:
Small
257
258
$79.99
Free UPS Shipping
259A
259B
BUY NOW
260
<<
>>
0:50
1:55
200

FIG. 2N

Back
Information
Friends
Casual Jackets
Women's Jacket
Easy fit, casual, durable.
Prod # 1276982
GUESS
Color - Jet Black. Looks good with any style.
Size:
Small
Thank you for buying GUESS
Casual Jacket Prod# 1276982
Your Transaction ID: WXB678
A receipt has been emailed
<<
>>
0:50
1:55
200

FIG. 3A

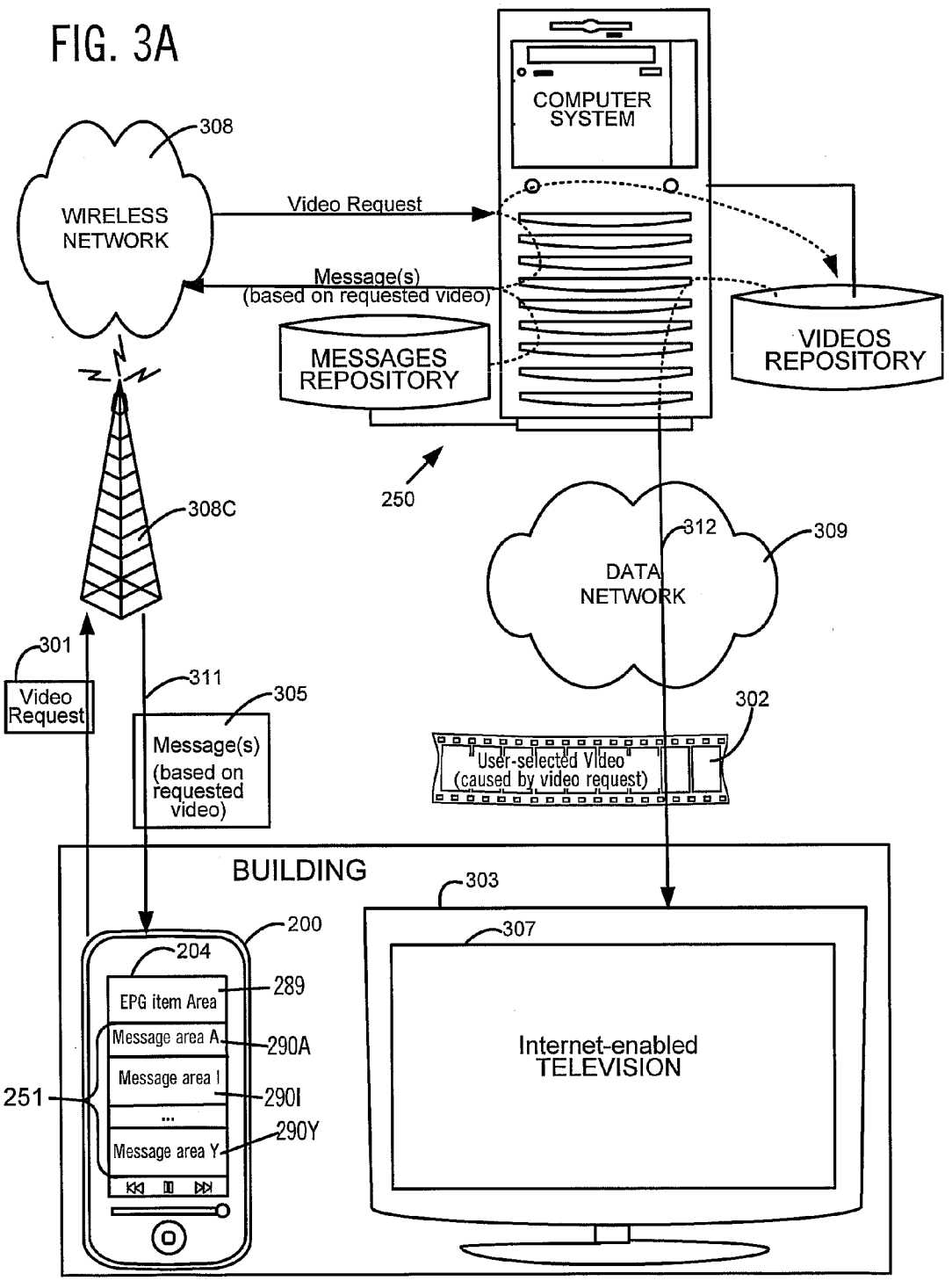

COMPUTER SYSTEM
308
WIRELESS NETWORK
Video Request
Message(s) (based on requested video)
MESSAGES REPOSITORY
VIDEOS REPOSITORY
250
308C
312
309
DATA NETWORK
301
Video Request
311
305
Message(s) (based on requested video)
302
User-selected Video (caused by video request)
BUILDING
303
200
204
307
EPG item Area
289
Message area A
290A
Message area I
290I
251
...
Message area Y
290Y
Internet-enabled TELEVISION

FIG. 3B

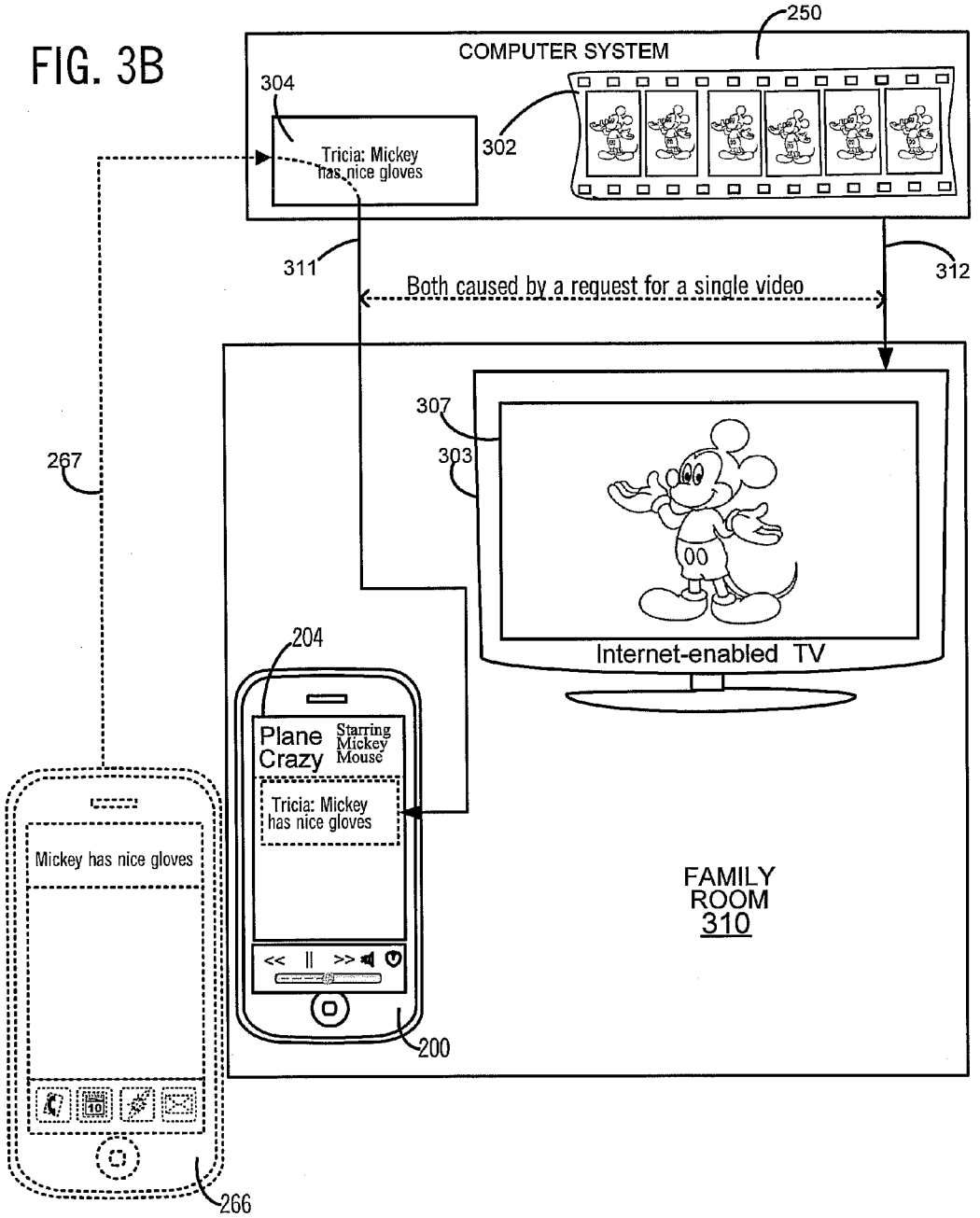

250
COMPUTER SYSTEM
304
Tricia: Mickey has nice gloves
302
311
312
Both caused by a request for a single video
307
303
267
Internet-enabled TV
204
Plane Crazy
Starring Mickey Mouse
Tricia: Mickey has nice gloves
Mickey has nice gloves
FAMILY ROOM 310
200
266

FIG. 3C

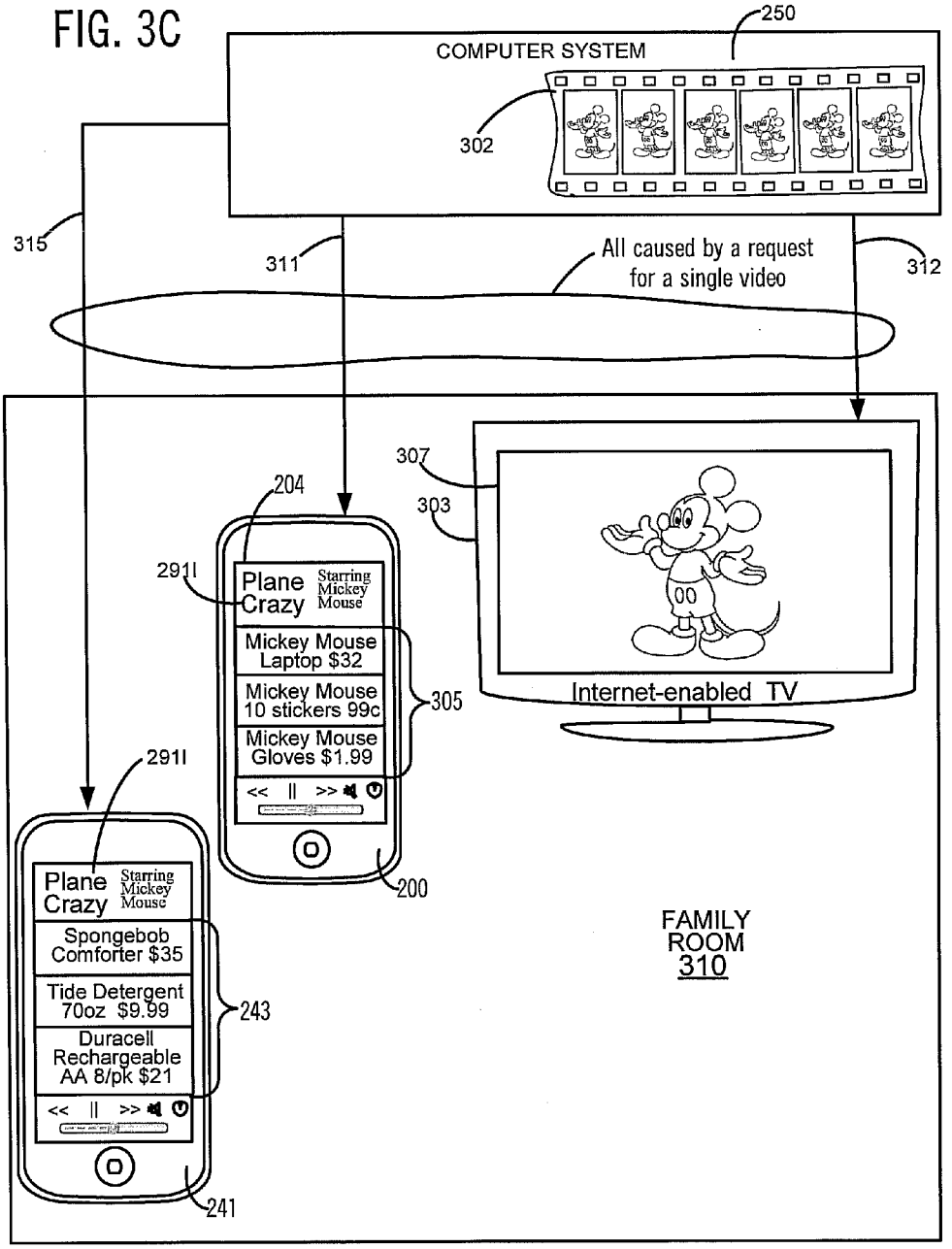
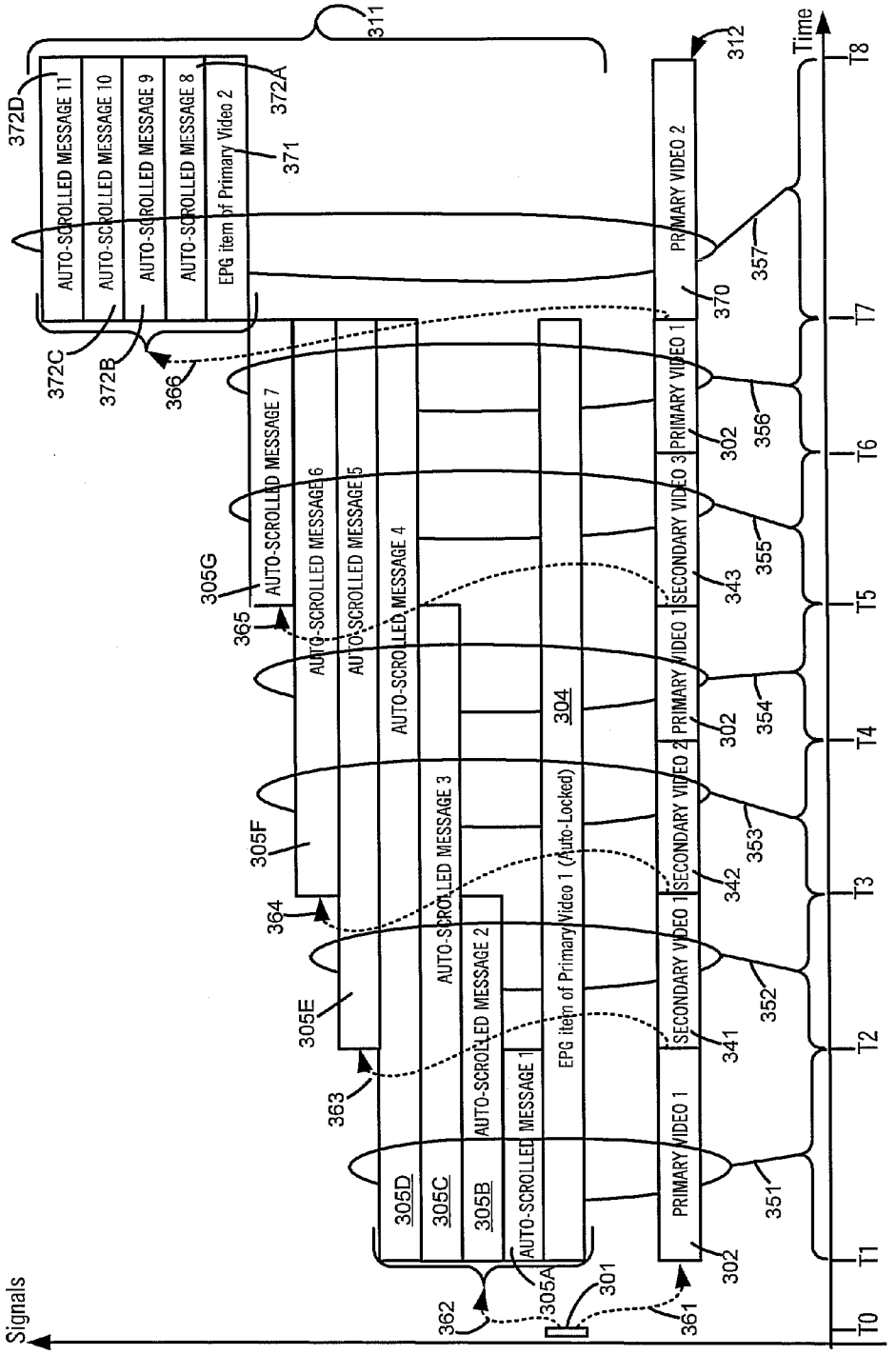

250
COMPUTER SYSTEM
302
315
311
All caused by a request for a single video
312
307
303
204
291I
Plane Crazy
Starring Mickey Mouse
Mickey Mouse Laptop $32
Mickey Mouse 10 stickers 99c
Mickey Mouse Gloves $1.99
305
Internet-enabled TV
291I
Plane Crazy
Starring Mickey Mouse
Spongebob Comforter $35
Tide Detergent 70oz $9.99
Duracell Rechargeable AA 8/pk $21
243
200
241
FAMILY ROOM 310

FIG. 3D


Signals
Time
T0
T1
T2
T3
T4
T5
T6
T7
T8
AUTO-SCROLLED MESSAGE 11
AUTO-SCROLLED MESSAGE 10
AUTO-SCROLLED MESSAGE 9
AUTO-SCROLLED MESSAGE 8
EPG item of Primary Video 2
AUTO-SCROLLED MESSAGE 7
AUTO-SCROLLED MESSAGE 6
AUTO-SCROLLED MESSAGE 5
AUTO-SCROLLED MESSAGE 4
AUTO-SCROLLED MESSAGE 3
AUTO-SCROLLED MESSAGE 2
AUTO-SCROLLED MESSAGE 1
EPG item of Primary Video 1 (Auto-Locked)
PRIMARY VIDEO 2
PRIMARY VIDEO 1
SECONDARY VIDEO 3
SECONDARY VIDEO 2
SECONDARY VIDEO 1
PRIMARY VIDEO 1
301
302
304
305A
305B
305C
305D
305E
305F
305G
311
312
341
342
343
351
352
353
354
355
356
357
361
362
363
364
365
366
370
371
372A
372B
372C
372D

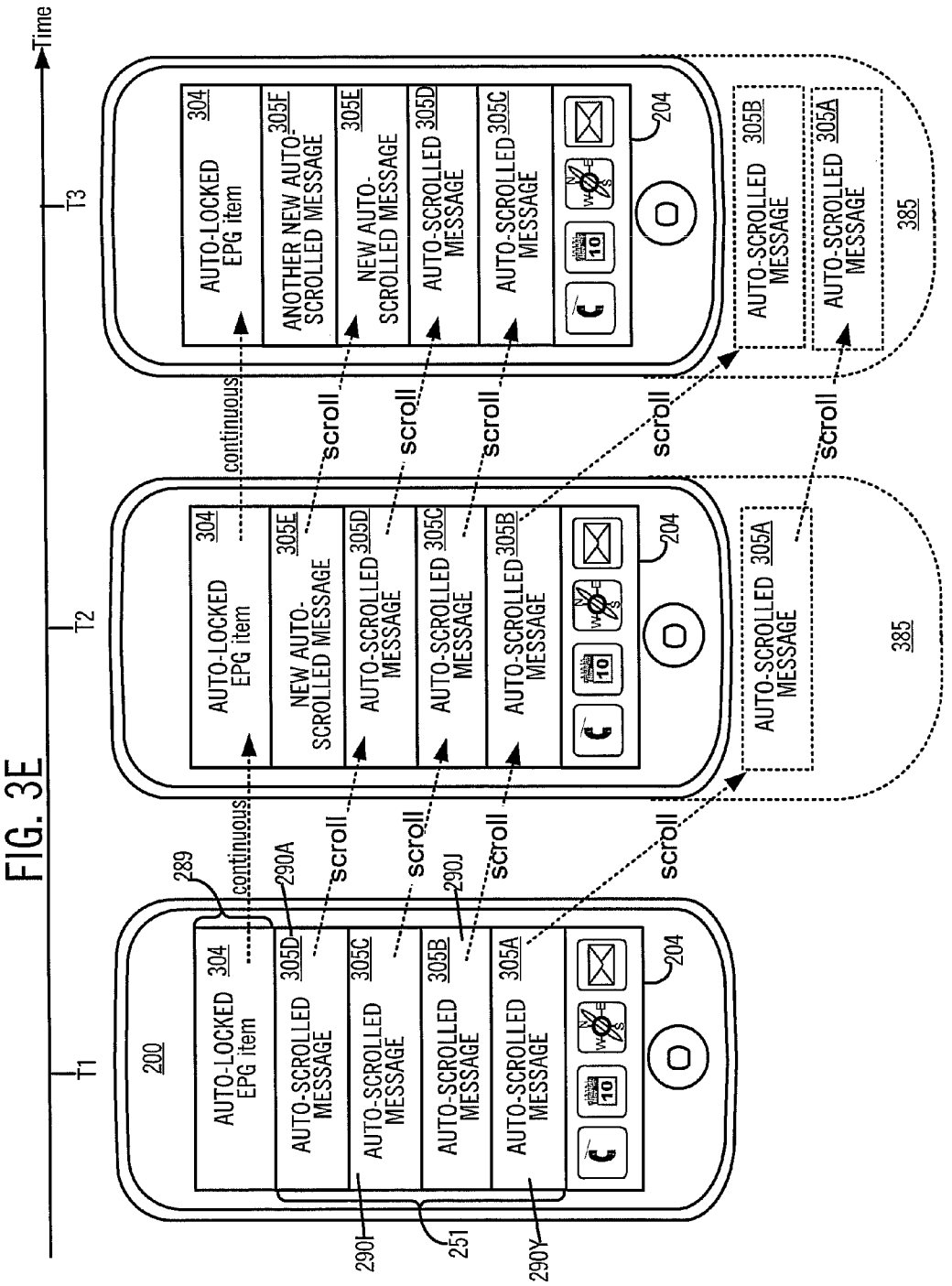

Time
T1
T2
T3
200
AUTO-LOCKED EPG item
304
AUTO-SCROLLED MESSAGE
305D
305C
305B
305A
290I
251
290Y
289
290A
290J
continuous
scroll
204
NEW AUTO-SCROLLED MESSAGE
305E
AUTO-SCROLLED MESSAGE
385
ANOTHER NEW AUTO-SCROLLED MESSAGE
305F

FIG. 3E

FIG. 4A

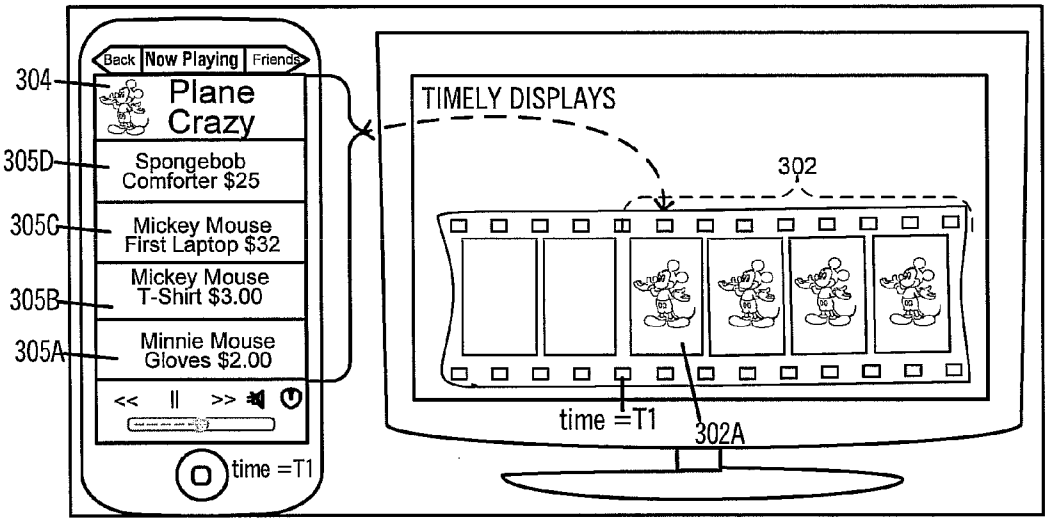

Back
Now Playing
Friends
304
Plane Crazy
305D
Spongebob Comforter $25
305C
Mickey Mouse First Laptop $32
305B
Mickey Mouse T-Shirt $3.00
305A
Minnie Mouse Gloves $2.00
<< || >>
time =T1
TIMELY DISPLAYS
302
time =T1
302A

FIG. 4B

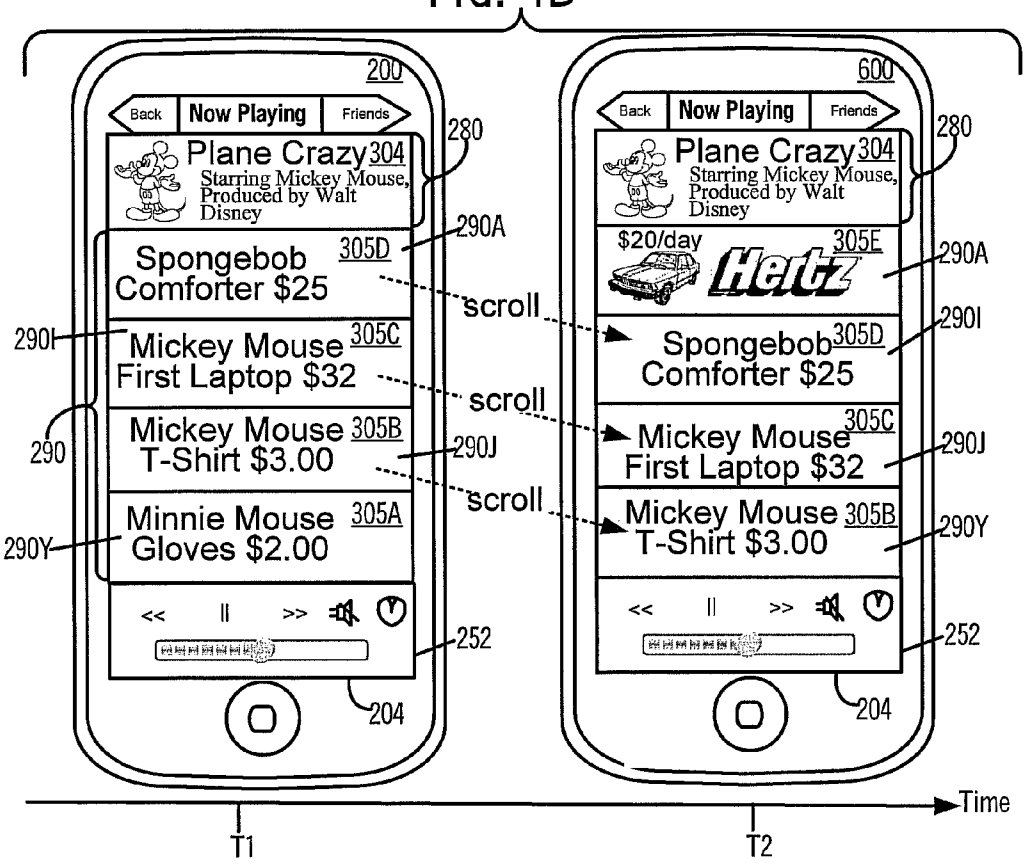

200
Back
Now Playing
Friends
Plane Crazy 304
Starring Mickey Mouse, Produced by Walt Disney
280
290A
Spongebob Comforter $25 305D
290I
Mickey Mouse First Laptop $32 305C
290
Mickey Mouse T-Shirt $3.00 305B
290J
Minnie Mouse Gloves $2.00 305A
290Y
<< || >>
252
204
scroll
scroll
scroll
600
Back
Now Playing
Friends
Plane Crazy 304
Starring Mickey Mouse, Produced by Walt Disney
280
$20/day
Hertz
305E
290A
Spongebob Comforter $25 305D
290I
Mickey Mouse First Laptop $32 305C
290J
Mickey Mouse T-Shirt $3.00 305B
290Y
<< || >>
252
204
Time
T1
T2

FIG. 4C

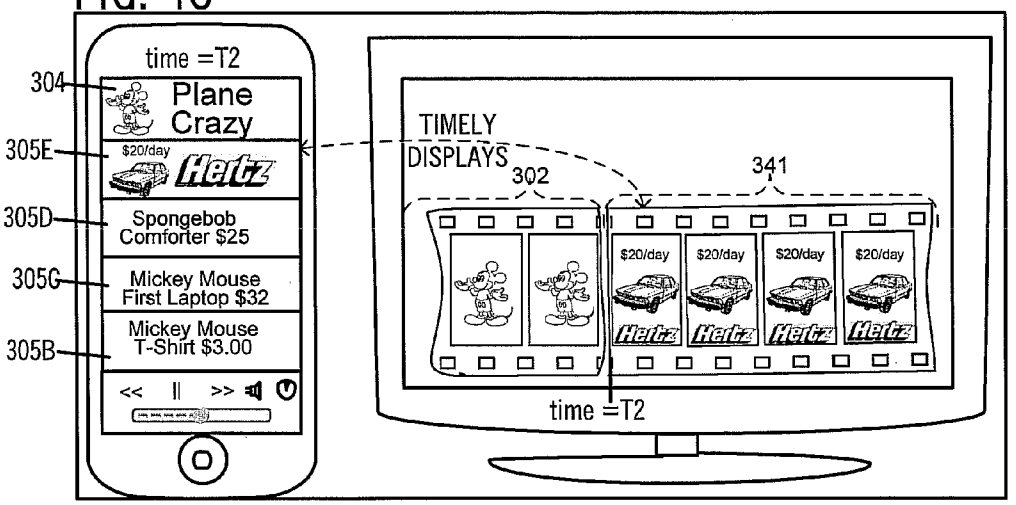

time =T2
304
Plane Crazy
305E
$20/day
Hertz
305D
Spongebob Comforter $25
305C
Mickey Mouse First Laptop $32
305B
Mickey Mouse T-Shirt $3.00
<< || >>
TIMELY DISPLAYS
302
341
$20/day
Hertz
time =T2

FIG. 4D

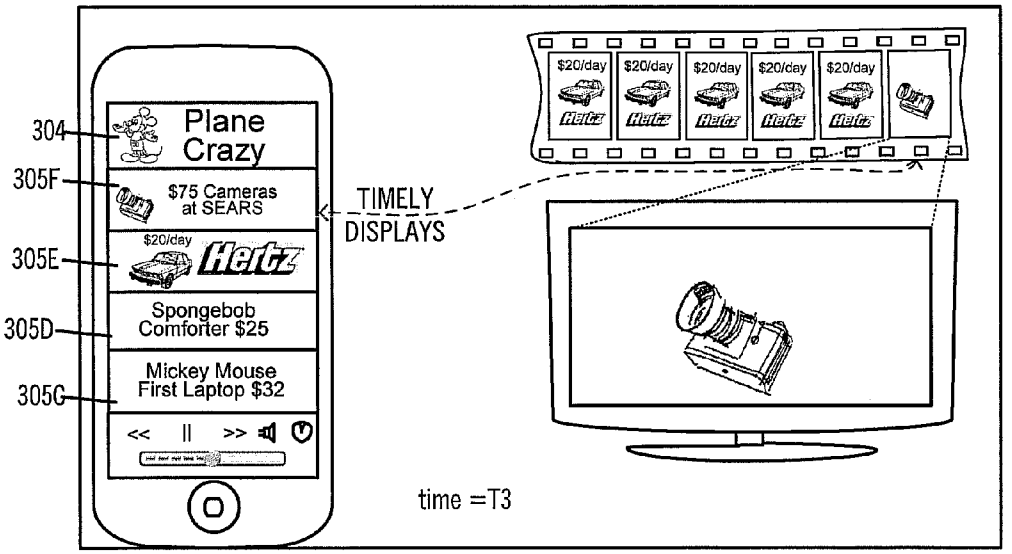

304
Plane Crazy
305F
$75 Cameras at SEARS
305E
$20/day
Hertz
305D
Spongebob Comforter $25
305C
Mickey Mouse First Laptop $32
<< || >>
TIMELY DISPLAYS
$20/day
Hertz
time =T3

FIG. 4E

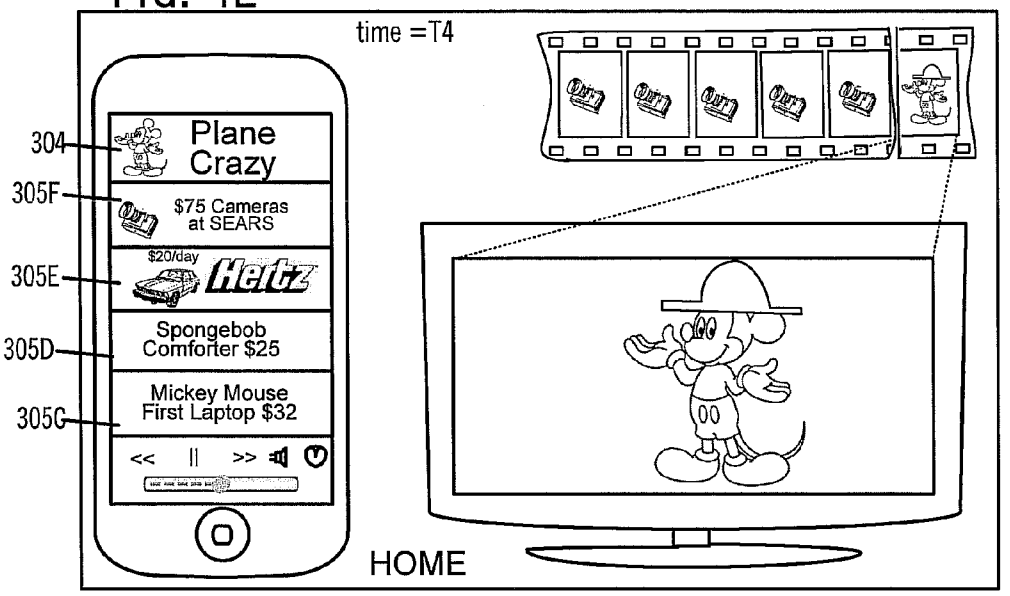

time =T4
304
Plane Crazy
305F
$75 Cameras at SEARS
305E
$20/day
Hertz
305D
Spongebob Comforter $25
305C
Mickey Mouse First Laptop $32
<< || >>
HOME

FIG. 4F

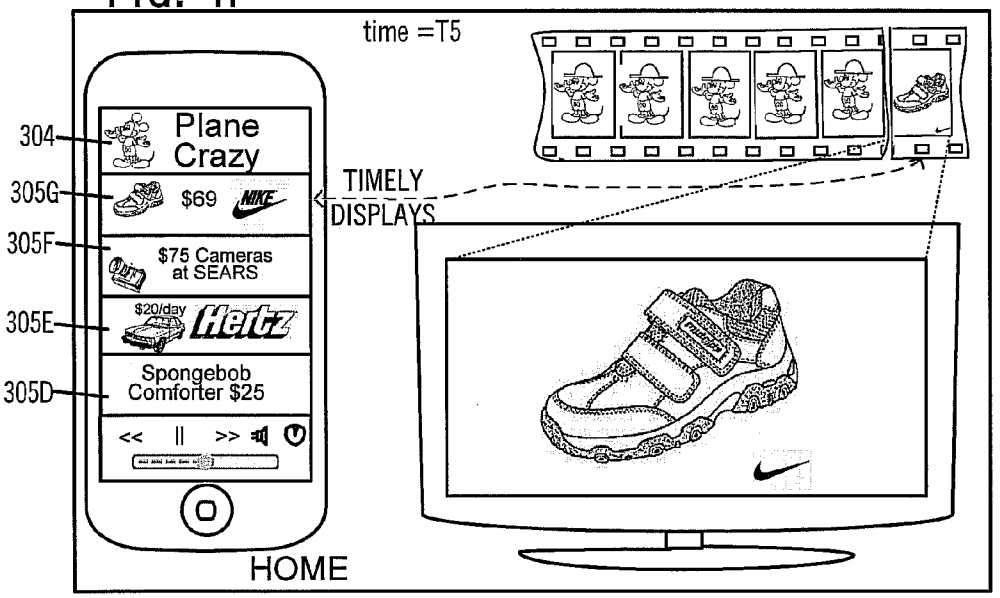

time =T5
304
Plane Crazy
305G
$69
NIKE
TIMELY DISPLAYS
305F
$75 Cameras at SEARS
305E
$20/day
Hertz
305D
Spongebob Comforter $25
<< || >>
HOME

FIG. 4G

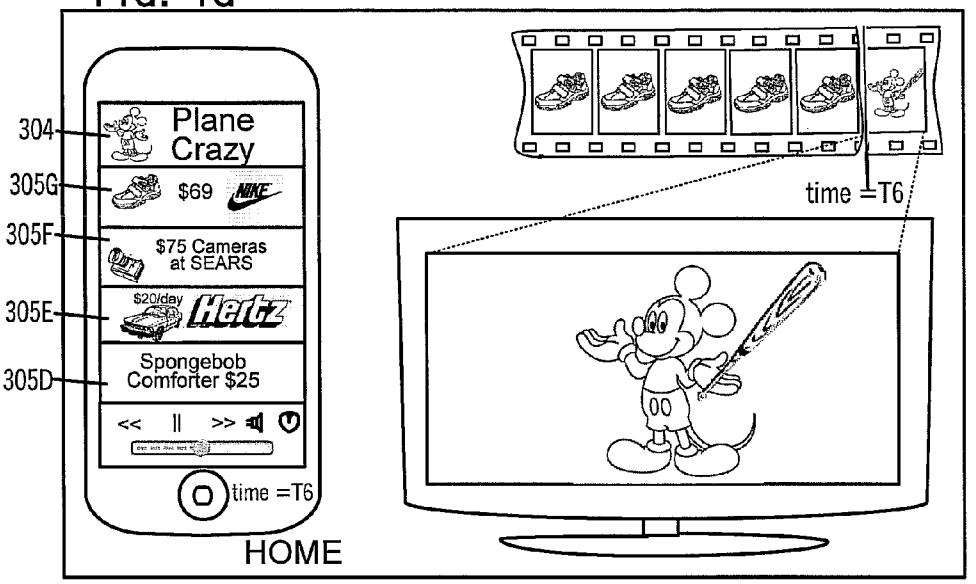
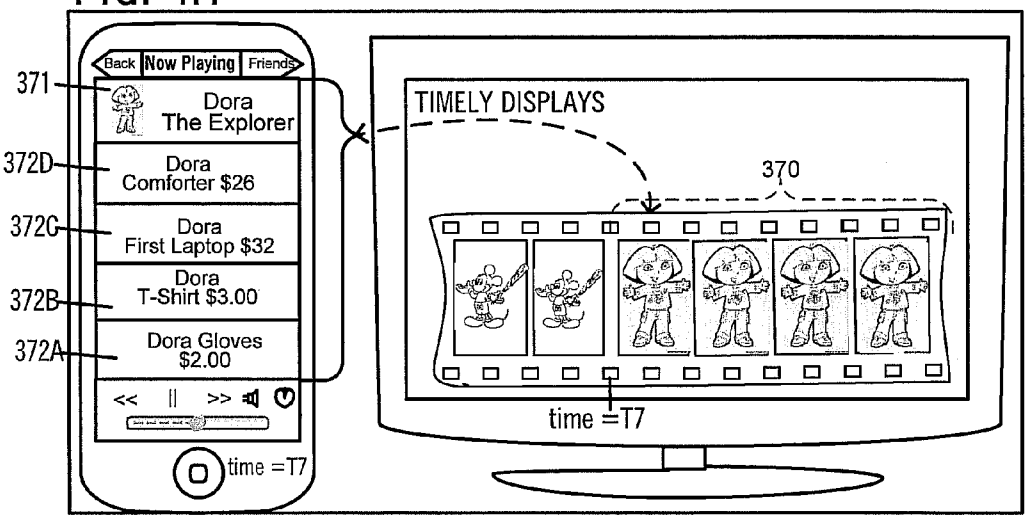

304
Plane Crazy
305G
$69
305F
$75 Cameras at SEARS
305E
$20/day
Hertz
305D
Spongebob Comforter $25
<< || >>
time =T6
HOME
time =T6

FIG. 4H


Back
Now Playing
Friends
371
Dora The Explorer
372D
Dora Comforter $26
372C
Dora First Laptop $32
372B
Dora T-Shirt $3.00
372A
Dora Gloves $2.00
<< || >>
time =T7
TIMELY DISPLAYS
370
time =T7

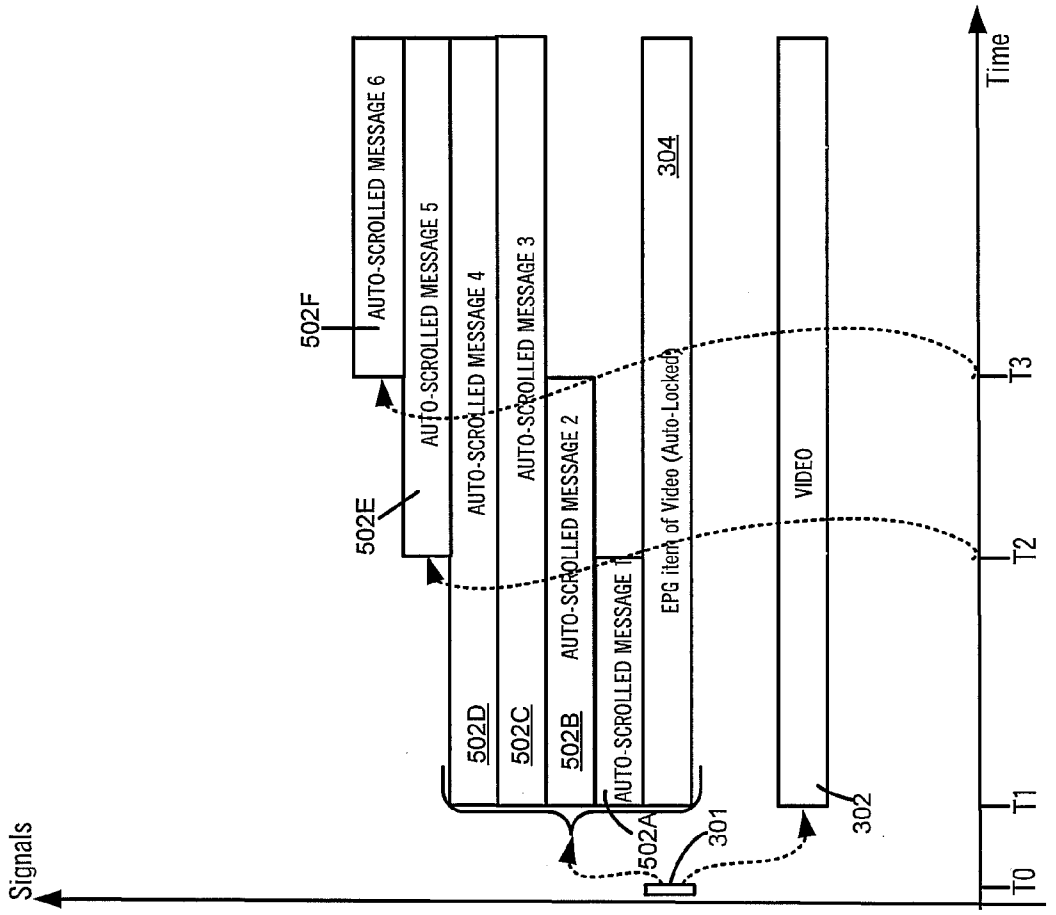

Signals
502F
502E
AUTO-SCROLLED MESSAGE 6
AUTO-SCROLLED MESSAGE 5
AUTO-SCROLLED MESSAGE 4
AUTO-SCROLLED MESSAGE 3
AUTO-SCROLLED MESSAGE 2
AUTO-SCROLLED MESSAGE 1
EPG Item of Video (Auto-Locked)
VIDEO
502D
502C
502B
502A
301
302
304
T0
T1
T2
T3
Time

FIG. 5A

FIG. 5B

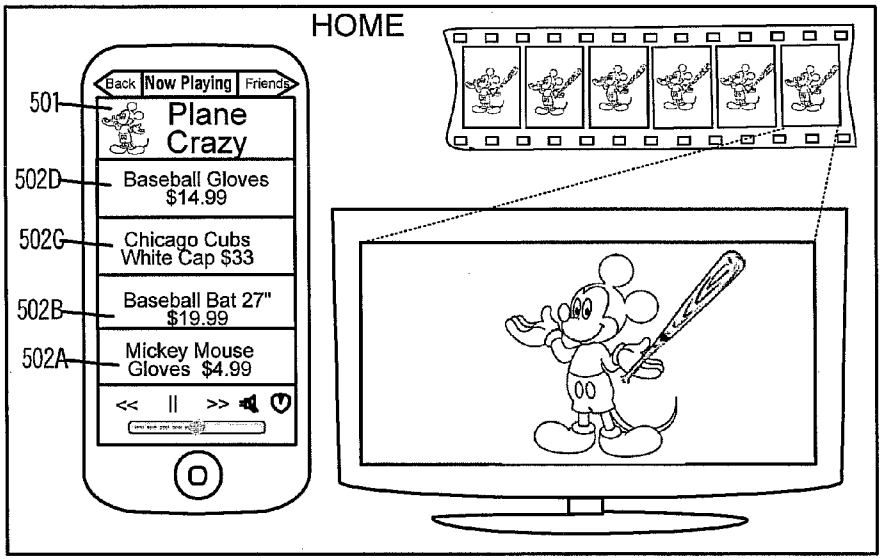
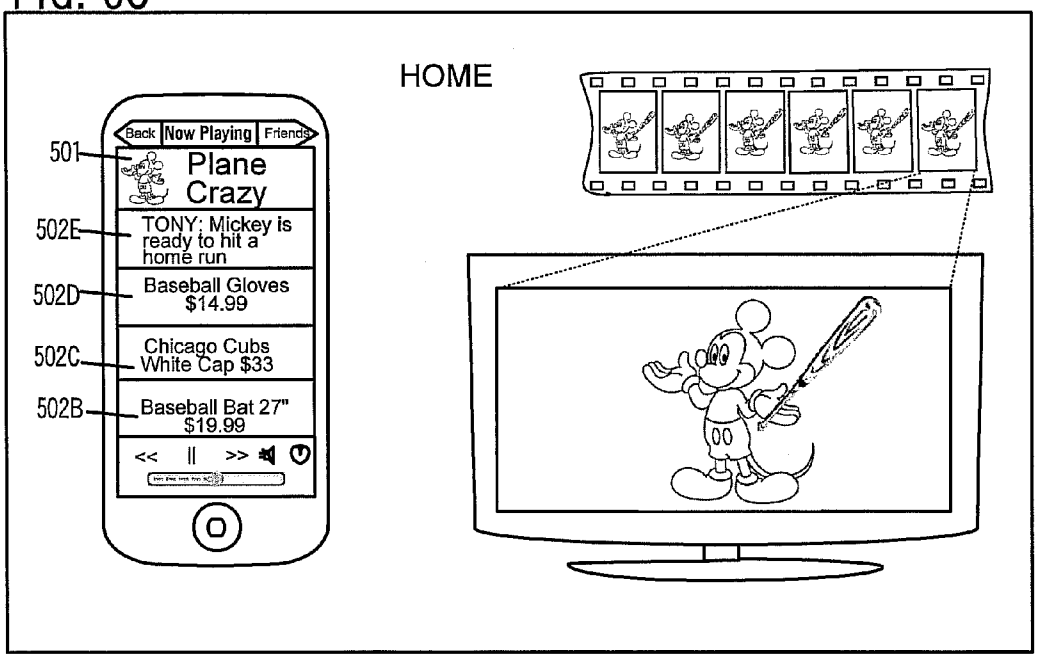

HOME
Back
Now Playing
Friends
501
Plane Crazy
502D
Baseball Gloves $14.99
502C
Chicago Cubs White Cap $33
502B
Baseball Bat 27" $19.99
502A
Mickey Mouse Gloves $4.99
<< || >>

FIG. 5C


HOME
Back
Now Playing
Friends
501
Plane Crazy
502E
TONY: Mickey is ready to hit a home run
502D
Baseball Gloves $14.99
502C
Chicago Cubs White Cap $33
502B
Baseball Bat 27" $19.99
<< || >>

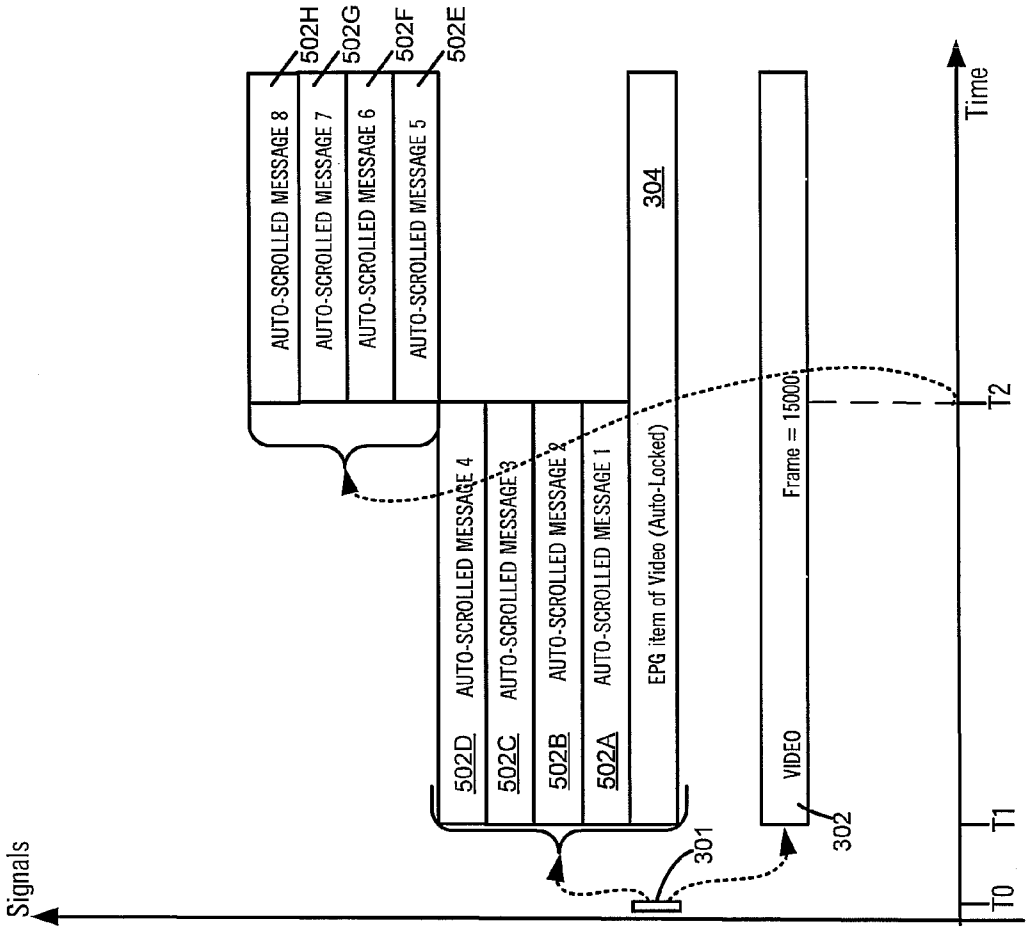

Signals
502H
502G
502F
502E
AUTO-SCROLLED MESSAGE 8
AUTO-SCROLLED MESSAGE 7
AUTO-SCROLLED MESSAGE 6
AUTO-SCROLLED MESSAGE 5
304
502D
AUTO-SCROLLED MESSAGE 4
502C
AUTO-SCROLLED MESSAGE 3
502B
AUTO-SCROLLED MESSAGE 2
502A
AUTO-SCROLLED MESSAGE 1
EPG item of Video (Auto-Locked)
301
VIDEO
Frame = 15000
302
Time
T0
T1
T2

FIG. 5D

FIG. 5E

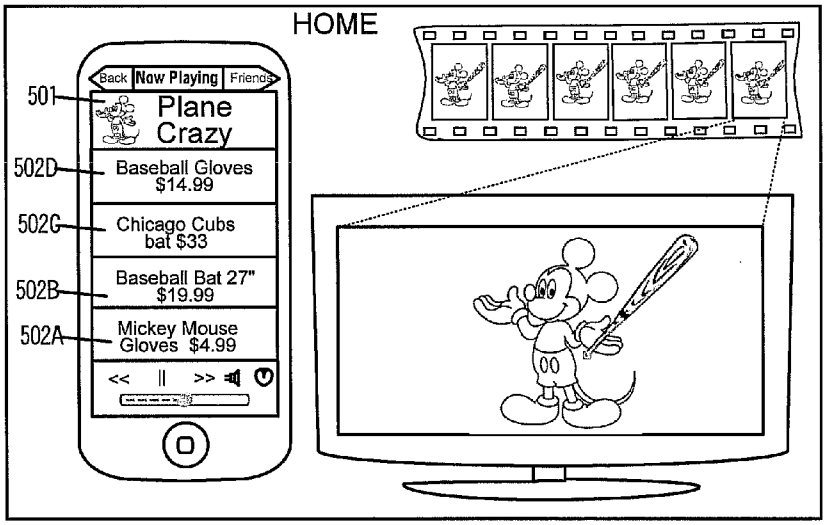

HOME
Back
Now Playing
Friends
501
Plane Crazy
502D
Baseball Gloves $14.99
502C
Chicago Cubs bat $33
502B
Baseball Bat 27" $19.99
502A
Mickey Mouse Gloves $4.99
<< || >>

FIG. 5F

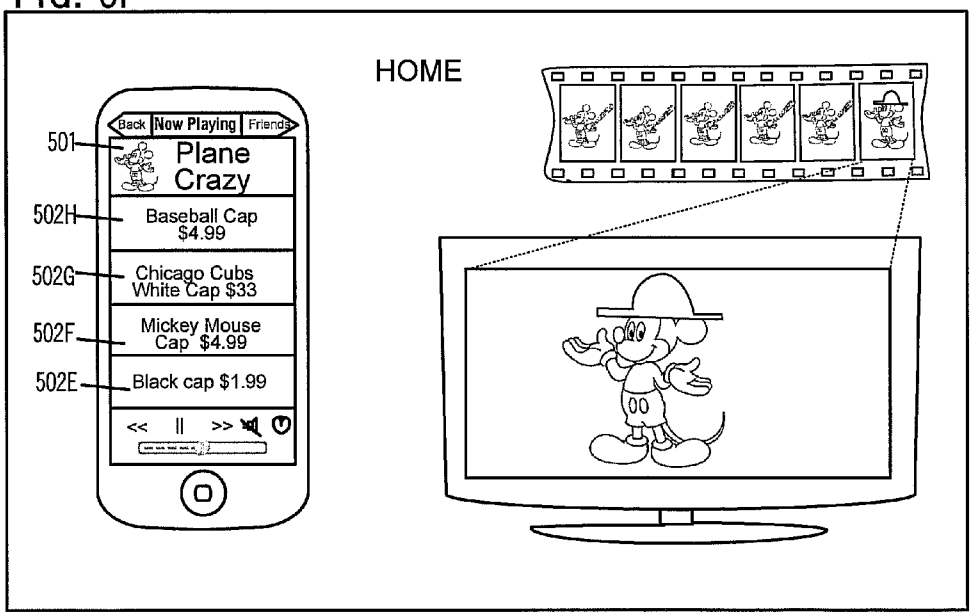

HOME
Back
Now Playing
Friends
501
Plane Crazy
502H
Baseball Cap $4.99
502G
Chicago Cubs White Cap $33
502F
Mickey Mouse Cap $4.99
502E
Black cap $1.99
<< || >>

FIG. 6A

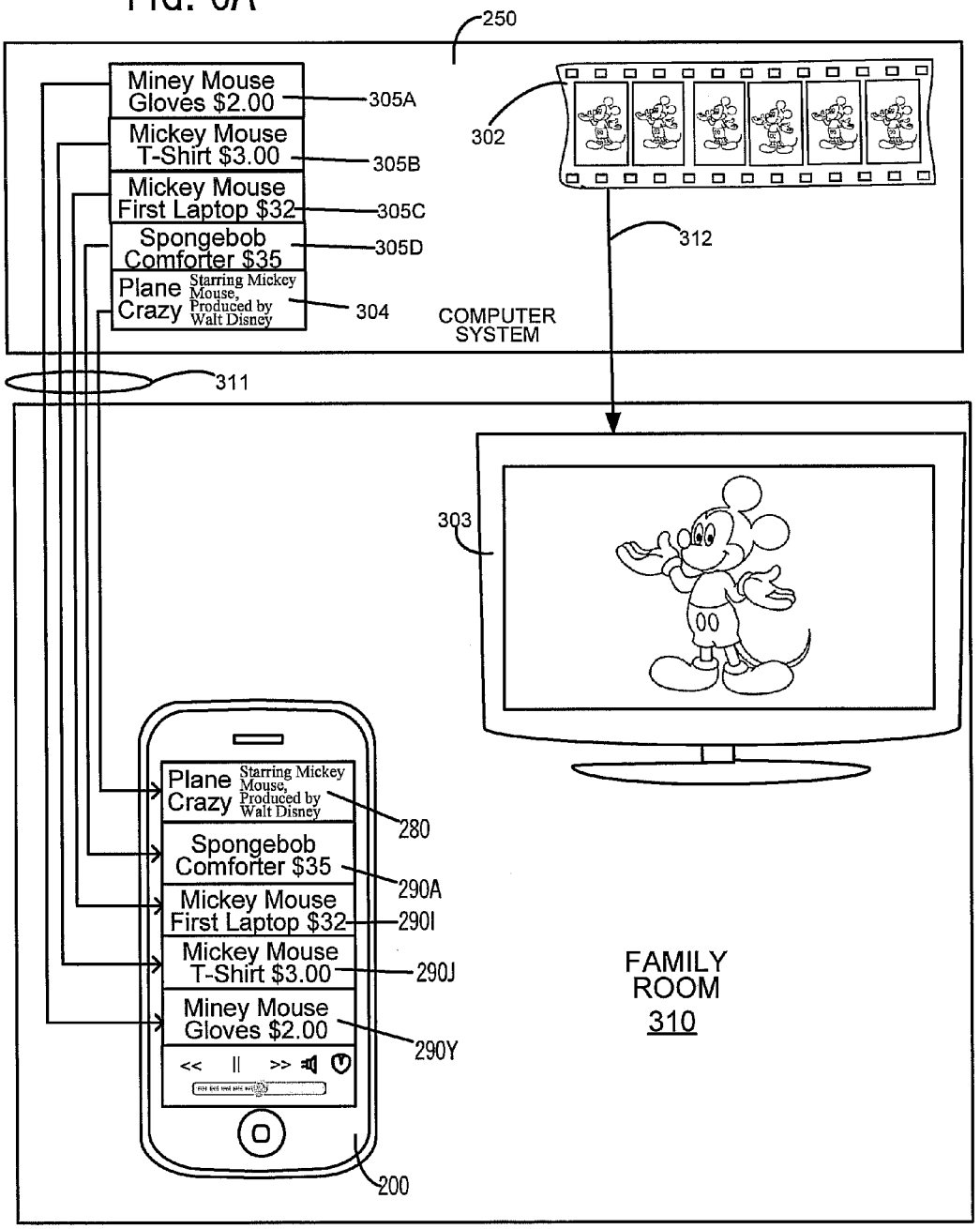

250
Miney Mouse Gloves $2.00
305A
Mickey Mouse T-Shirt $3.00
305B
Mickey Mouse First Laptop $32
305C
Spongebob Comforter $35
305D
Plane Crazy
Starring Mickey Mouse, Produced by Walt Disney
304
302
312
COMPUTER SYSTEM
311
303
Plane Crazy
Starring Mickey Mouse, Produced by Walt Disney
280
Spongebob Comforter $35
290A
Mickey Mouse First Laptop $32
290I
Mickey Mouse T-Shirt $3.00
290J
Miney Mouse Gloves $2.00
290Y
<< || >>
200
FAMILY ROOM
310

FIG. 6B

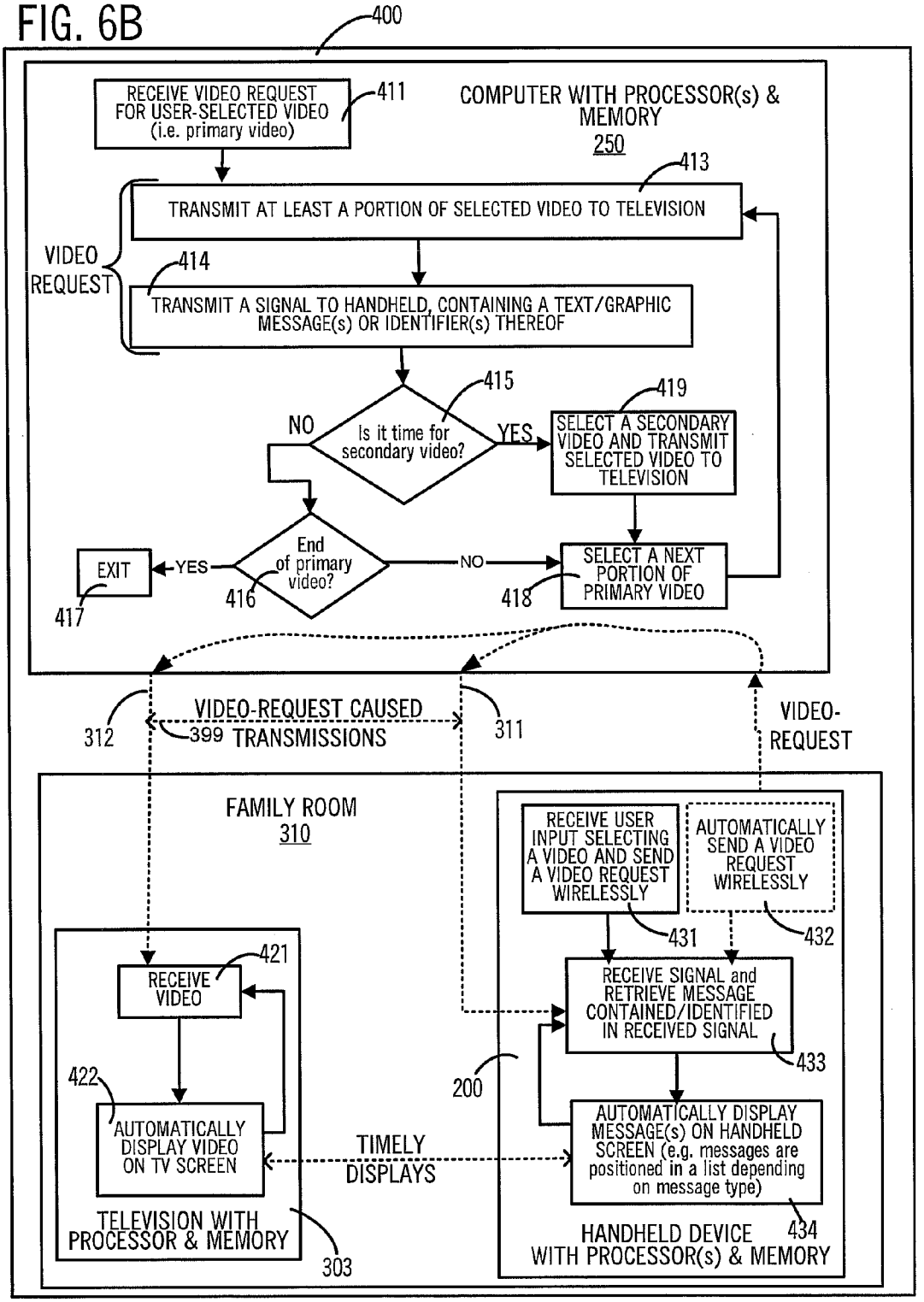

400
RECEIVE VIDEO REQUEST FOR USER-SELECTED VIDEO (i.e. primary video)
411
COMPUTER WITH PROCESSOR(s) & MEMORY
250
413
TRANSMIT AT LEAST A PORTION OF SELECTED VIDEO TO TELEVISION
VIDEO REQUEST
414
TRANSMIT A SIGNAL TO HANDHELD, CONTAINING A TEXT/GRAPHIC MESSAGE(s) OR IDENTIFIER(s) THEREOF
415
Is it time for secondary video?
NO
YES
419
SELECT A SECONDARY VIDEO AND TRANSMIT SELECTED VIDEO TO TELEVISION
End of primary video?
YES
NO
EXIT
417
416
SELECT A NEXT PORTION OF PRIMARY VIDEO
418
312
VIDEO-REQUEST CAUSED TRANSMISSIONS
399
311
VIDEO-REQUEST
FAMILY ROOM
310
RECEIVE USER INPUT SELECTING A VIDEO AND SEND A VIDEO REQUEST WIRELESSLY
AUTOMATICALLY SEND A VIDEO REQUEST WIRELESSLY
431
432
421
RECEIVE VIDEO
RECEIVE SIGNAL and RETRIEVE MESSAGE CONTAINED/IDENTIFIED IN RECEIVED SIGNAL
433
422
200
AUTOMATICALLY DISPLAY VIDEO ON TV SCREEN
TIMELY DISPLAYS
AUTOMATICALLY DISPLAY MESSAGE(s) ON HANDHELD SCREEN (e.g. messages are positioned in a list depending on message type)
TELEVISION WITH PROCESSOR & MEMORY
303
HANDHELD DEVICE WITH PROCESSOR(s) & MEMORY
434

FIG. 7

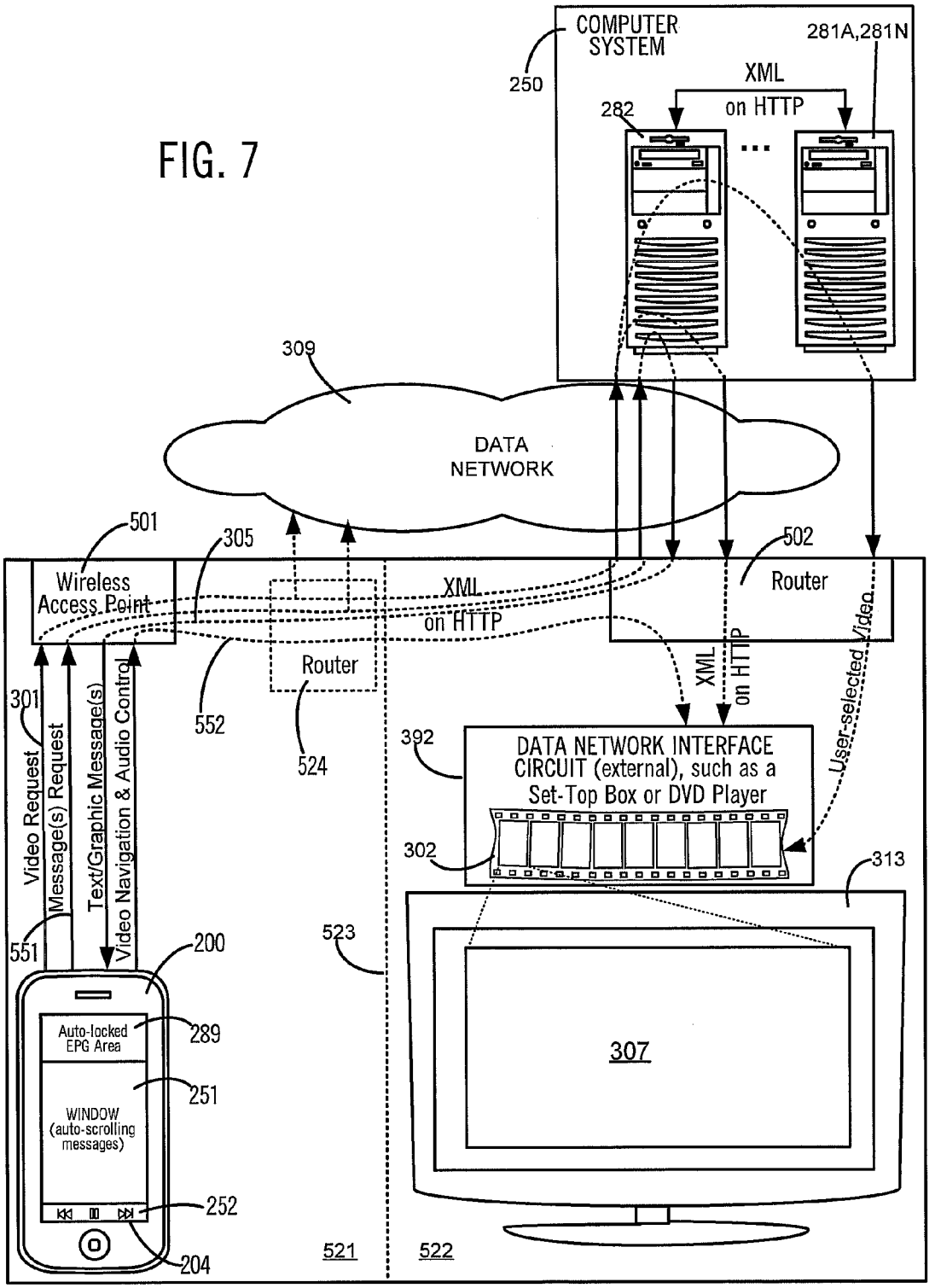
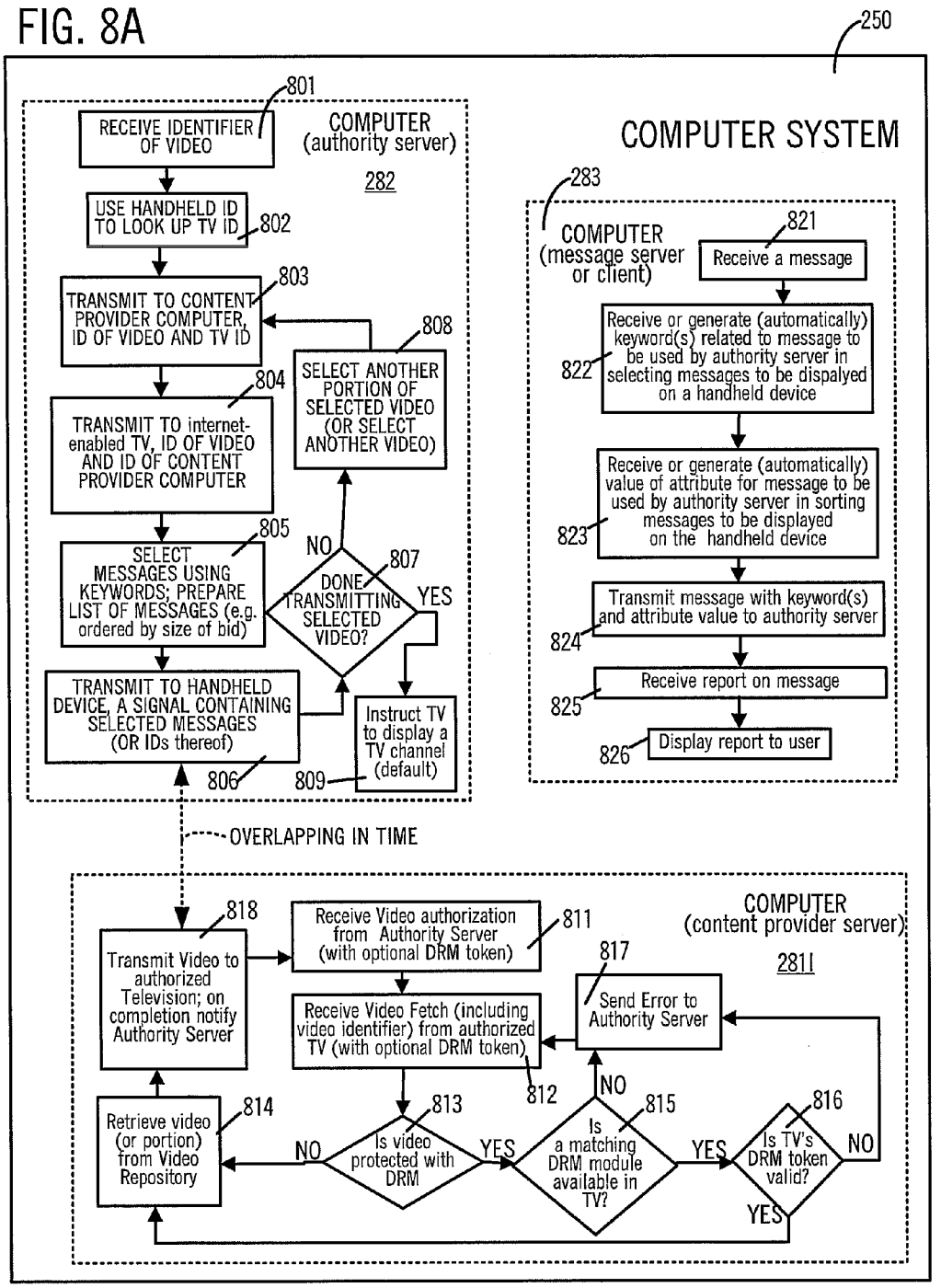

COMPUTER SYSTEM
250
281A,281N
XML on HTTP
282
309
DATA NETWORK
501
305
502
Wireless Access Point
XML on HTTP
Router
Router
524
552
301
Video Request
Message(s) Request
Text/Graphic Message(s)
Video Navigation & Audio Control
XML on HTTP
User-selected Video
392
DATA NETWORK INTERFACE CIRCUIT (external), such as a Set-Top Box or DVD Player
302
313
523
551
200
Auto-locked EPG Area
289
WINDOW (auto-scrolling messages)
251
252
204
307
521
522

FIG. 8A


250
COMPUTER SYSTEM
801
RECEIVE IDENTIFIER OF VIDEO
COMPUTER (authority server)
282
USE HANDHELD ID TO LOOK UP TV ID
802
803
TRANSMIT TO CONTENT PROVIDER COMPUTER, ID OF VIDEO AND TV ID
808
SELECT ANOTHER PORTION OF SELECTED VIDEO (OR SELECT ANOTHER VIDEO)
804
TRANSMIT TO internet-enabled TV, ID OF VIDEO AND ID OF CONTENT PROVIDER COMPUTER
805
SELECT MESSAGES USING KEYWORDS; PREPARE LIST OF MESSAGES (e.g. ordered by size of bid)
NO
807
DONE TRANSMITTING SELECTED VIDEO?
YES
TRANSMIT TO HANDHELD DEVICE, A SIGNAL CONTAINING SELECTED MESSAGES (OR IDs thereof)
Instruct TV to display a TV channel (default)
806
809
283
COMPUTER (message server or client)
821
Receive a message
822
Receive or generate (automatically) keyword(s) related to message to be used by authority server in selecting messages to be dispalyed on a handheld device
823
Receive or generate (automatically) value of attribute for message to be used by authority server in sorting messages to be displayed on the handheld device
824
Transmit message with keyword(s) and attribute value to authority server
825
Receive report on message
826
Display report to user
OVERLAPPING IN TIME
COMPUTER (content provider server)
281I
818
Transmit Video to authorized Television; on completion notify Authority Server
Receive Video authorization from Authority Server (with optional DRM token)
811
817
Send Error to Authority Server
Receive Video Fetch (including video identifier) from authorized TV (with optional DRM token)
812
NO
814
Retrieve video (or portion) from Video Repository
NO
813
Is video protected with DRM
YES
815
Is a matching DRM module available in TV?
YES
816
Is TV's DRM token valid?
NO
YES

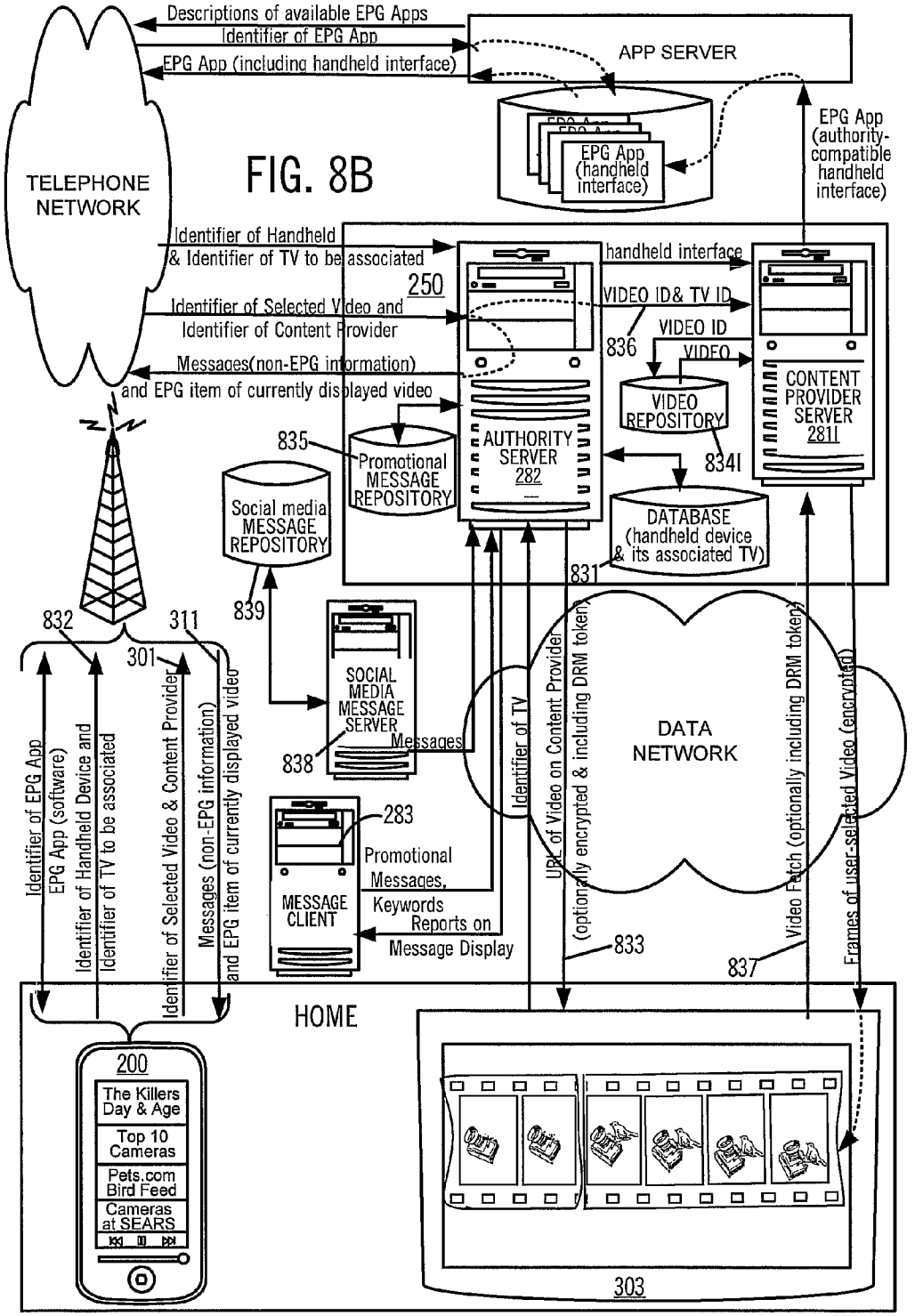


FIG. 8B
TELEPHONE NETWORK
Descriptions of available EPG Apps
Identifier of EPG App
EPG App (including handheld interface)
APP SERVER
EPG App (handheld interface)
EPG App (authority-compatible handheld interface)
Identifier of Handheld & Identifier of TV to be associated
250
handheld interface
Identifier of Selected Video and Identifier of Content Provider
VIDEO ID& TV ID
836
VIDEO ID
VIDEO
Messages(non-EPG information) and EPG item of currently displayed video
VIDEO REPOSITORY
CONTENT PROVIDER SERVER 281
835
Promotional MESSAGE REPOSITORY
AUTHORITY SERVER 282
834
Social media MESSAGE REPOSITORY
DATABASE (handheld device & its associated TV)
831
839
832
311
301
SOCIAL MEDIA MESSAGE SERVER
838
Messages
DATA NETWORK
Identifier of EPG App EPG App (software)
Identifier of Handheld Device and Identifier of TV to be associated
Identifier of Selected Video & Content Provider
Messages (non-EPG information) and EPG item of currently displayed video
Identifier of TV
URL of Video on Content Provider (optionally encrypted & including DRM token)
Video Fetch (optionally including DRM token)
Frames of user-selected Video (encrypted)
283
Promotional Messages, Keywords
MESSAGE CLIENT
Reports on Message Display
833
837
HOME
200
The Killers Day & Age
Top 10 Cameras
Pets.com Bird Feed
Cameras at SEARS
303

FIG. 9A (PRIOR ART)

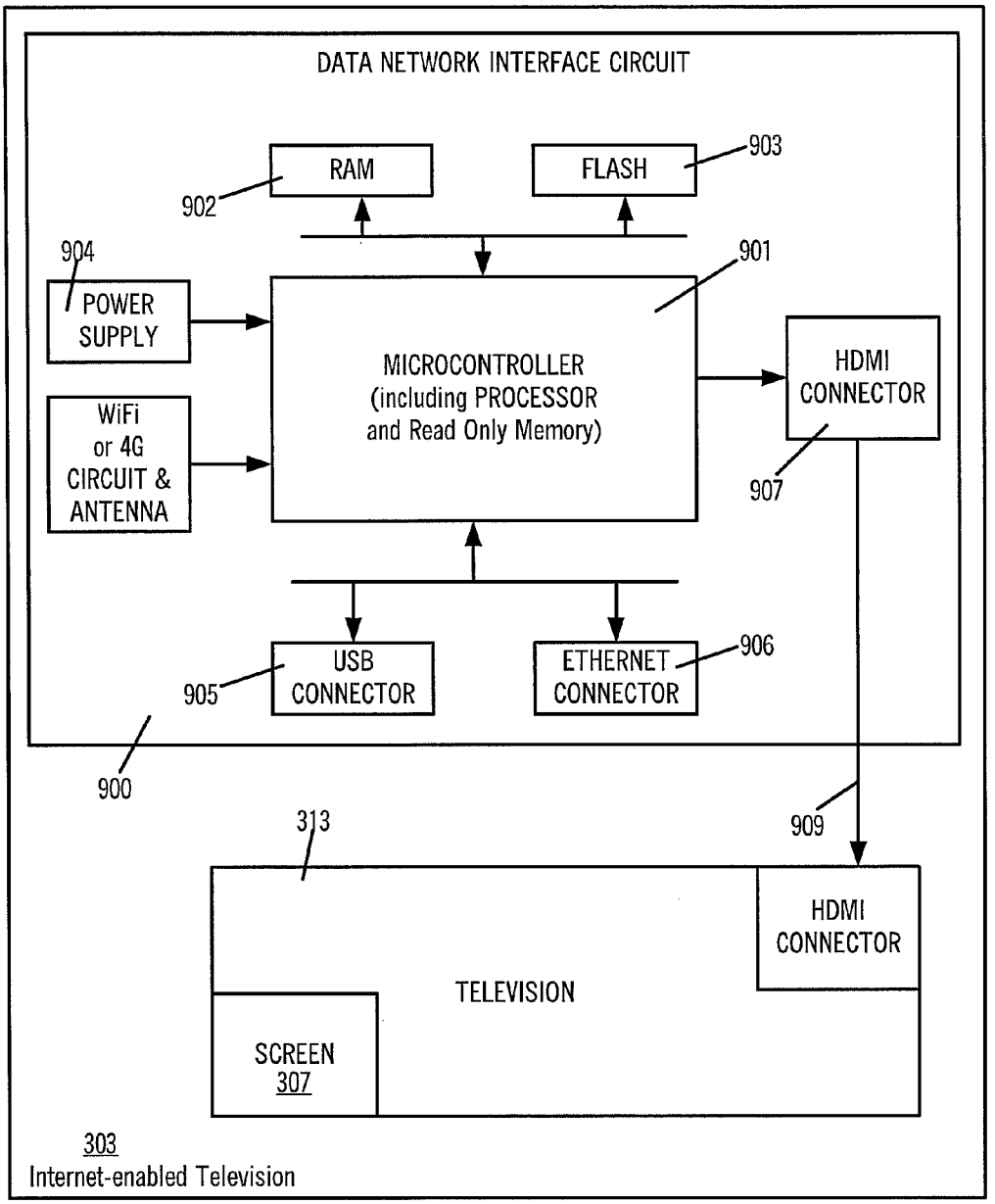


FIG. 9B

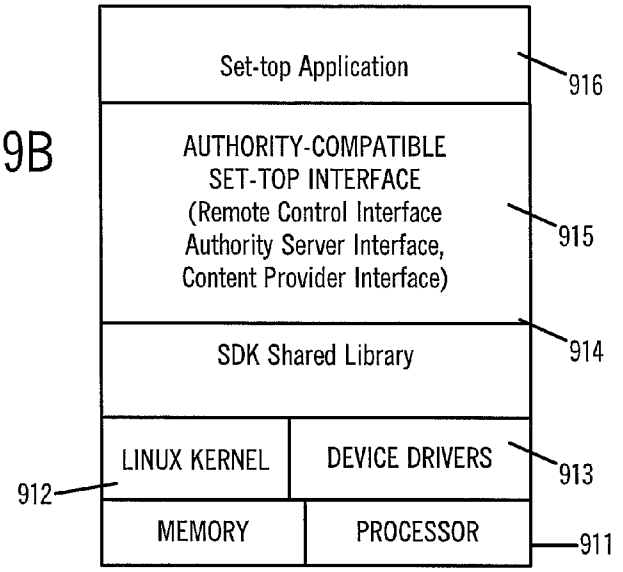

Set-top Application
916
AUTHORITY-COMPATIBLE
SET-TOP INTERFACE
(Remote Control Interface
Authority Server Interface,
Content Provider Interface)
915
SDK Shared Library
914
LINUX KERNEL
DEVICE DRIVERS
913
912
MEMORY
PROCESSOR
911

FIG. 9C

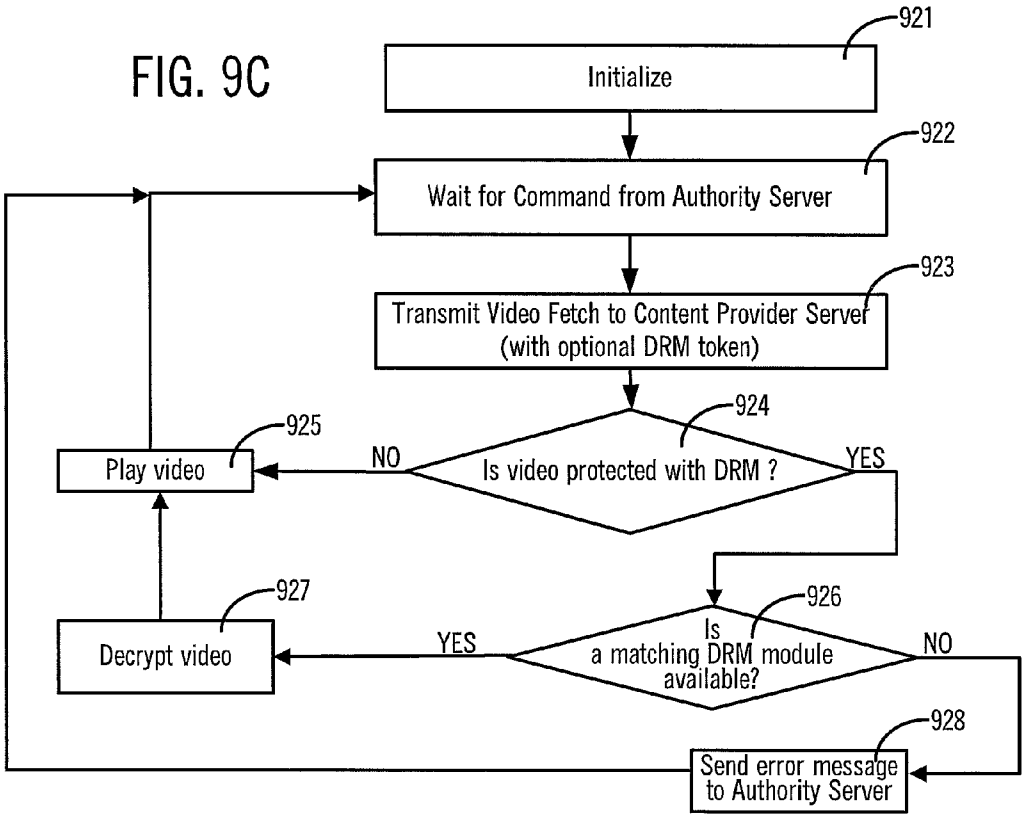

921
Initialize
922
Wait for Command from Authority Server
923
Transmit Video Fetch to Content Provider Server
(with optional DRM token)
924
Is video protected with DRM ?
NO
YES
925
Play video
926
Is
a matching DRM module
available?
YES
NO
927
Decrypt video
928
Send error message
to Authority Server

FIG. 10A (PRIOR ART)

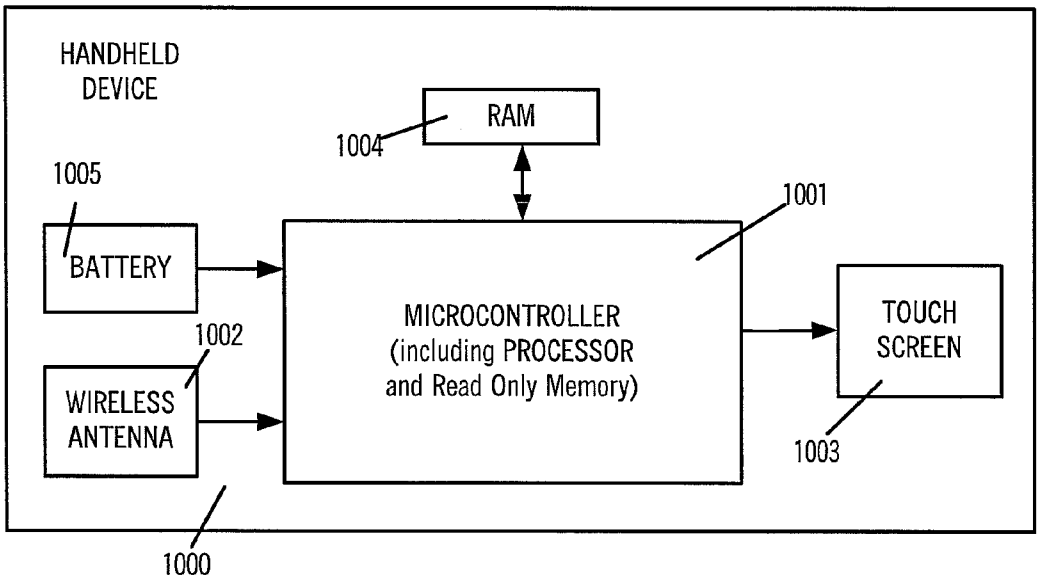


FIG. 10B

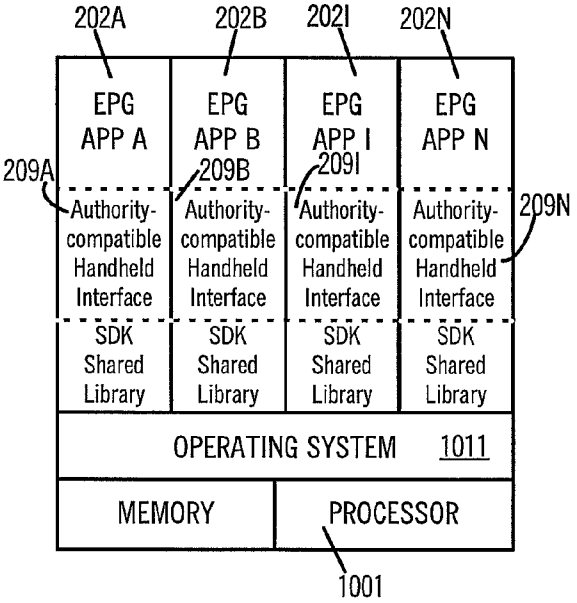


FIG. 10C

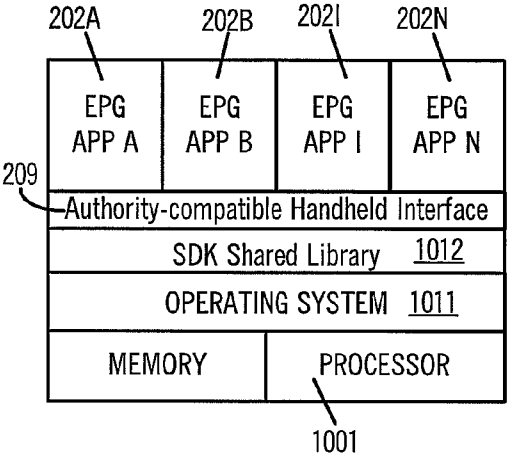


FIG. 10D

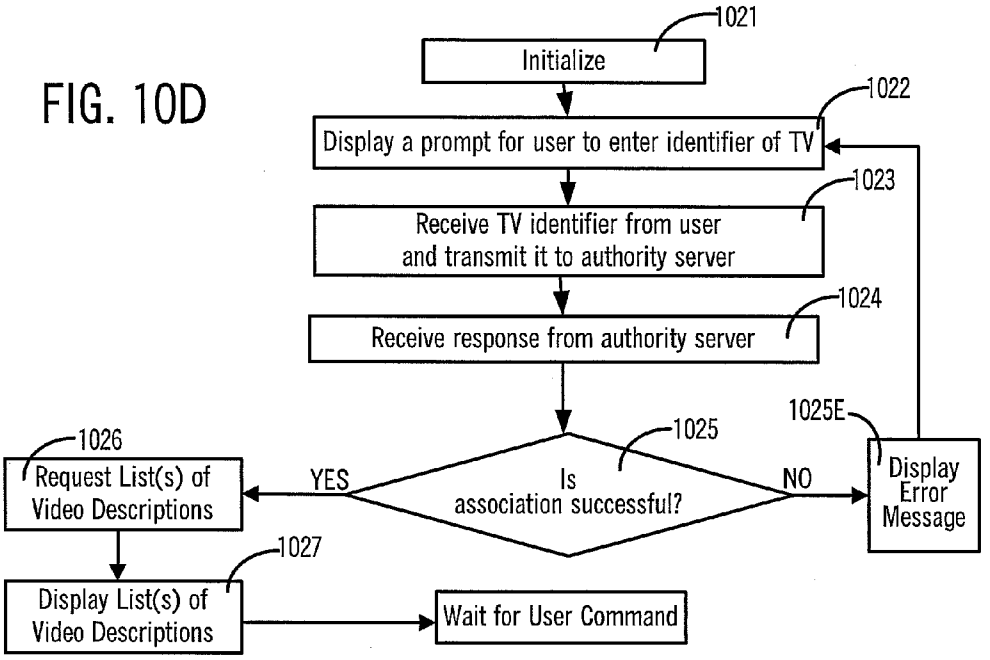


FIG. 10E

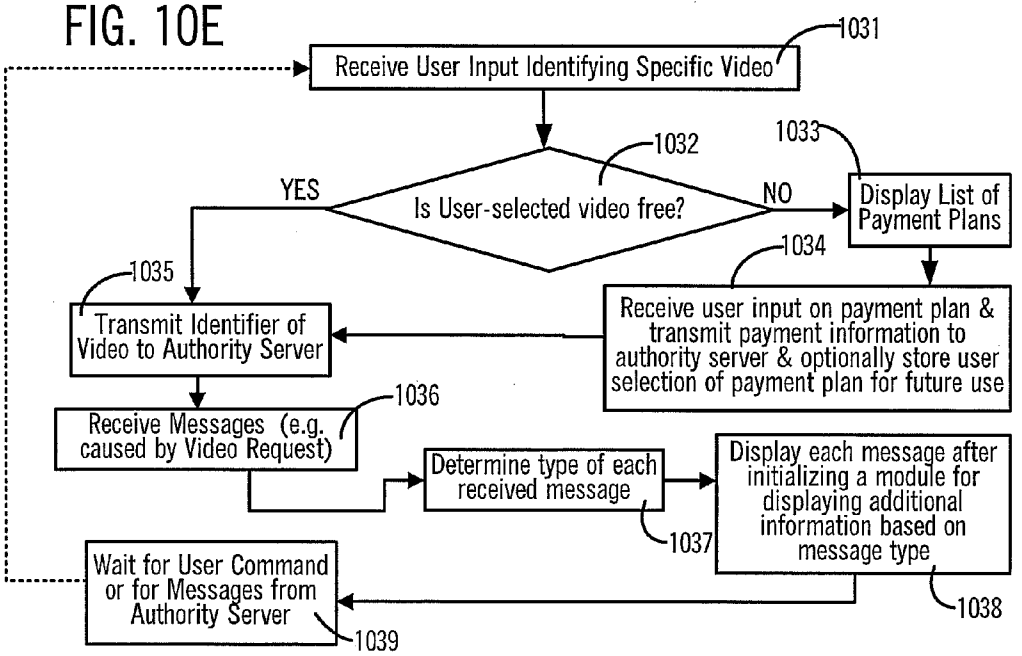


FIG. 11A (prior art)

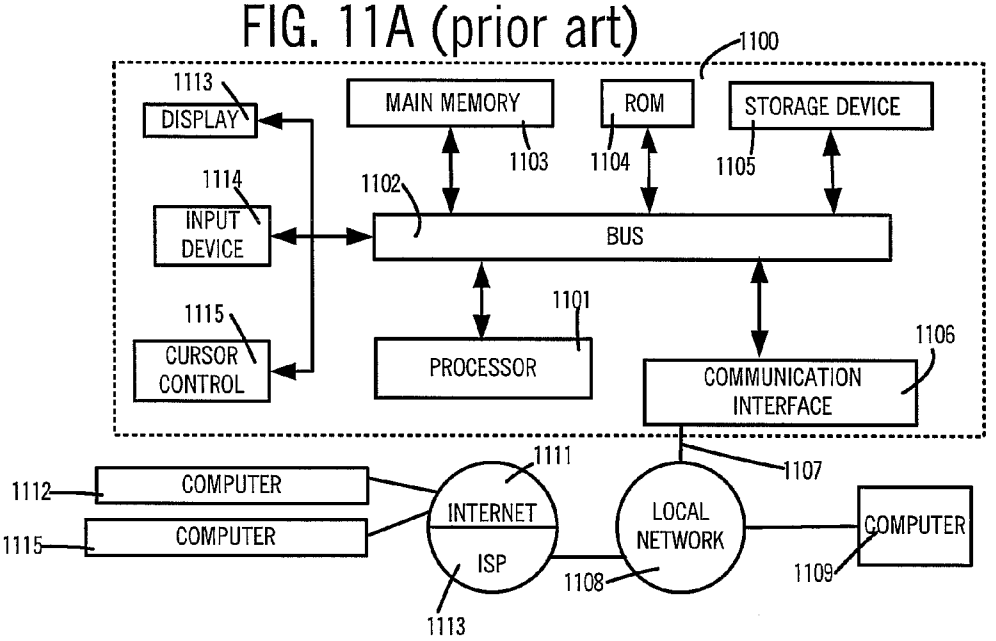


FIG. 11B

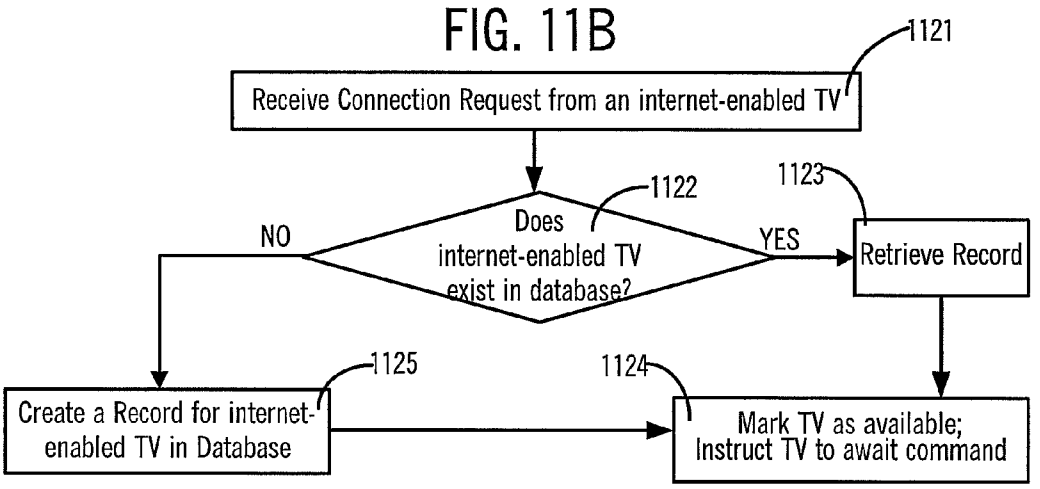
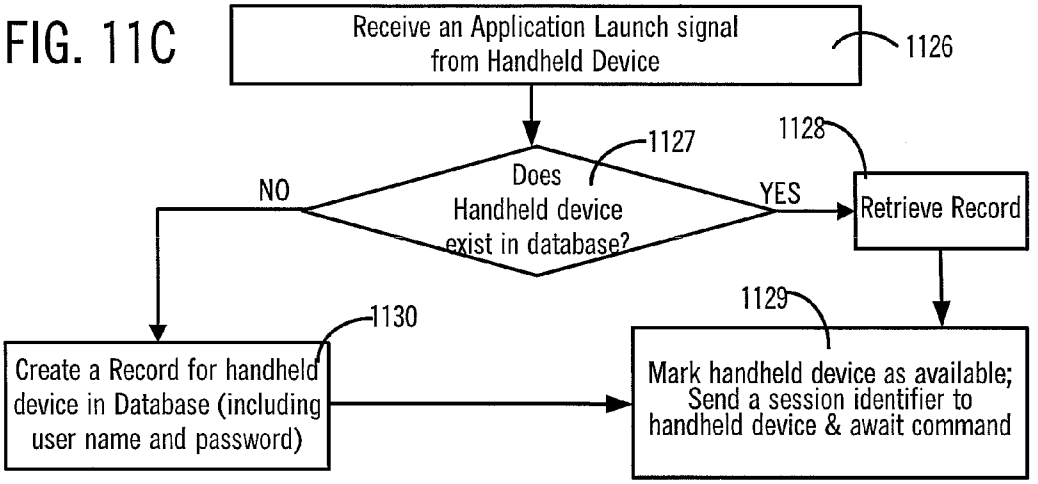


FIG. 11C



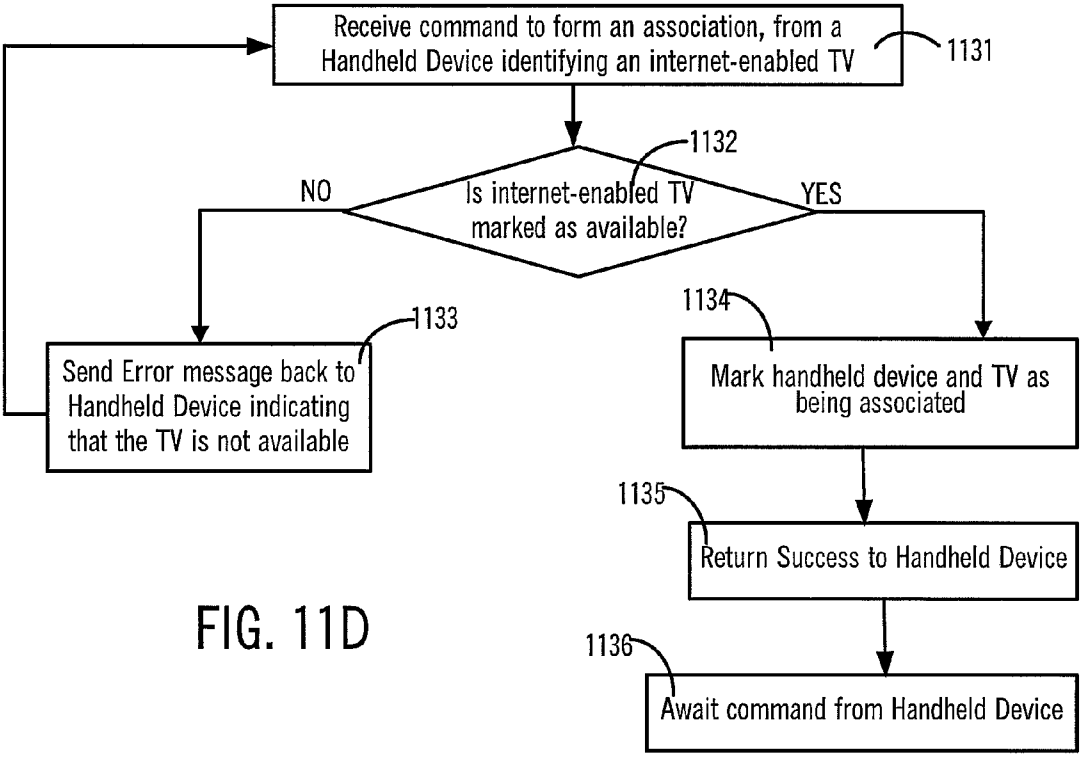


FIG. 11D

FIG. 11E

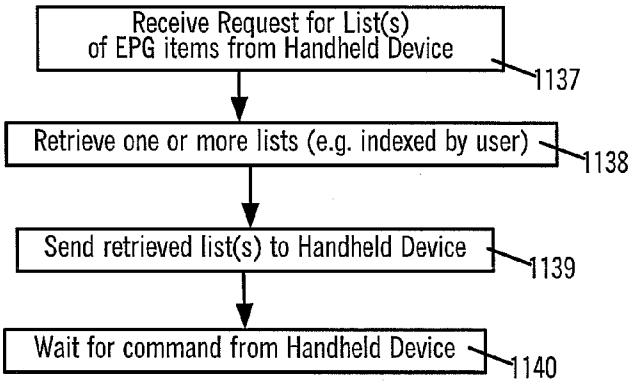


FIG. 11F

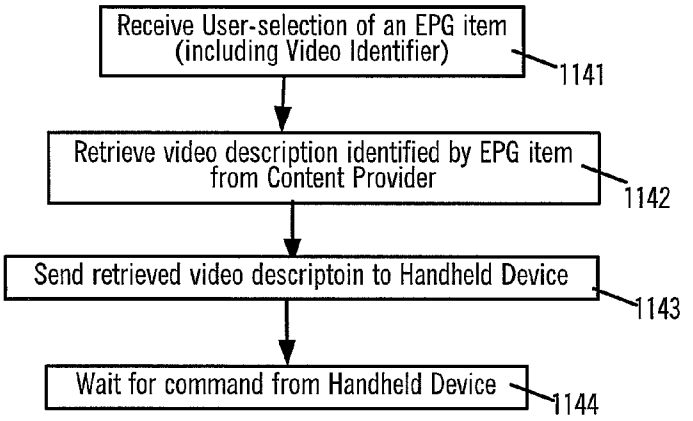


FIG. 11G

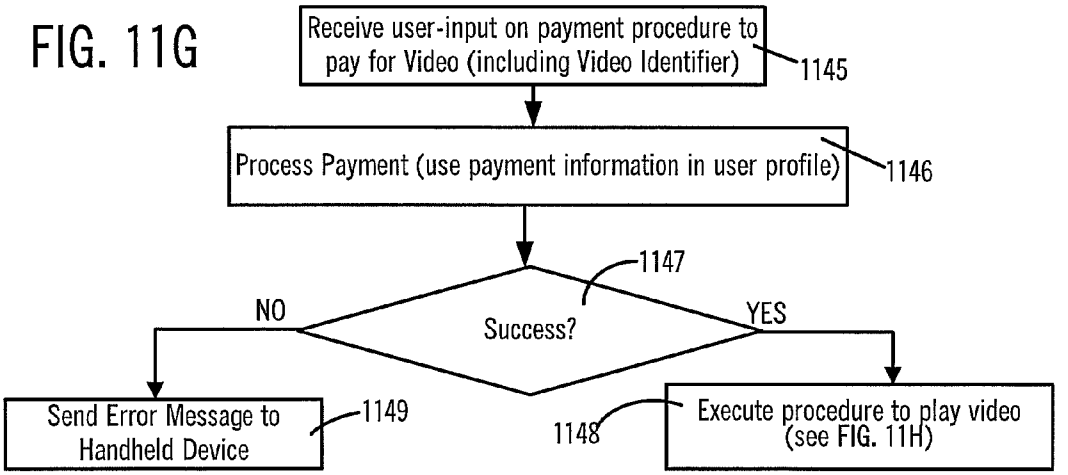


FIG. 11H

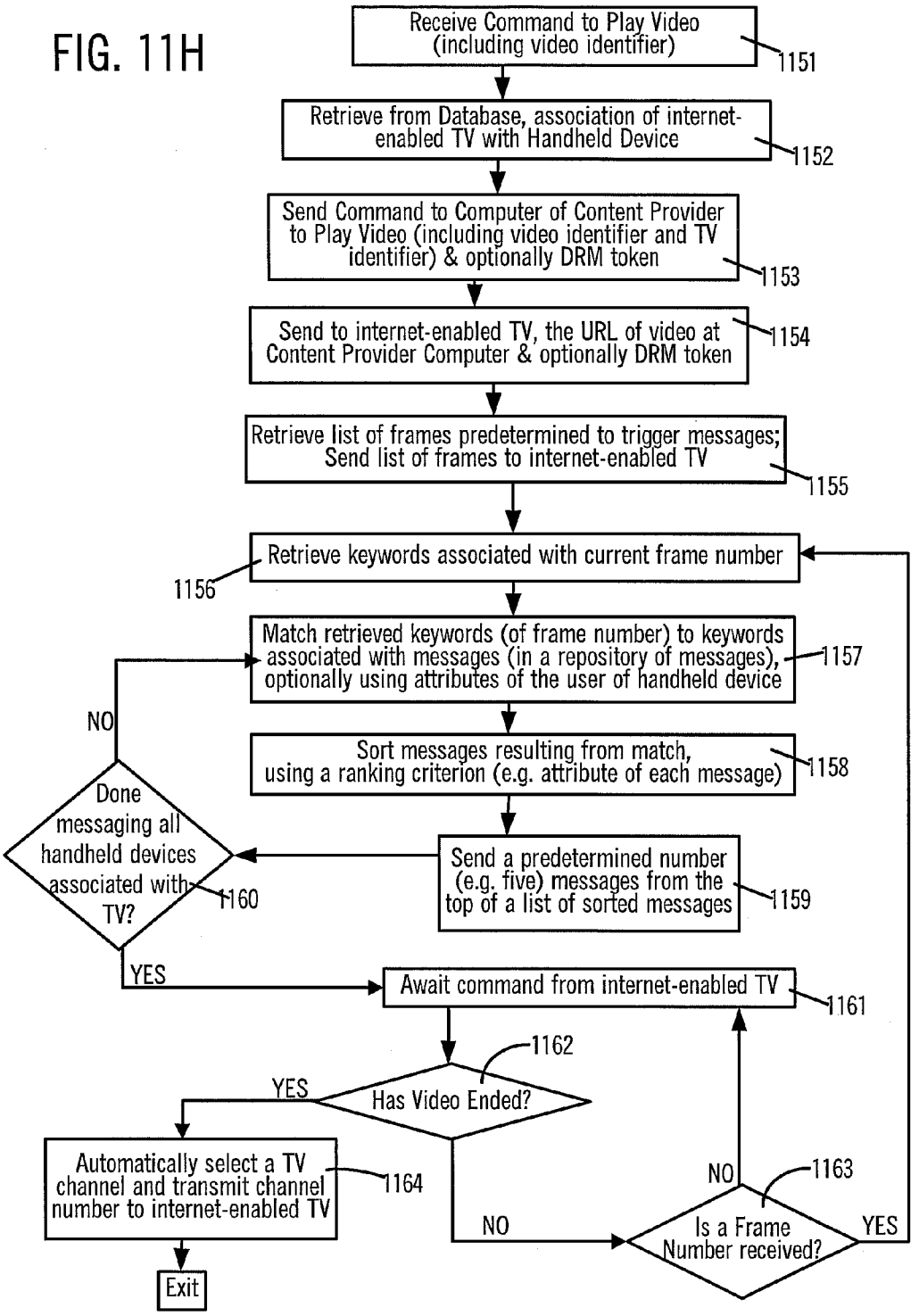

Receive Command to Play Video (including video identifier)
1151
Retrieve from Database, association of internet-enabled TV with Handheld Device
1152
Send Command to Computer of Content Provider to Play Video (including video identifier and TV identifier) & optionally DRM token
1153
Send to internet-enabled TV, the URL of video at Content Provider Computer & optionally DRM token
1154
Retrieve list of frames predetermined to trigger messages; Send list of frames to internet-enabled TV
1155
Retrieve keywords associated with current frame number
1156
Match retrieved keywords (of frame number) to keywords associated with messages (in a repository of messages), optionally using attributes of the user of handheld device
1157
Sort messages resulting from match, using a ranking criterion (e.g. attribute of each message)
1158
Send a predetermined number (e.g. five) messages from the top of a list of sorted messages
1159
Done messaging all handheld devices associated with TV?
1160
NO
YES
Await command from internet-enabled TV
1161
Has Video Ended?
1162
YES
NO
Automatically select a TV channel and transmit channel number to internet-enabled TV
1164
Exit
Is a Frame Number received?
1163
NO
YES

FIG. 11I

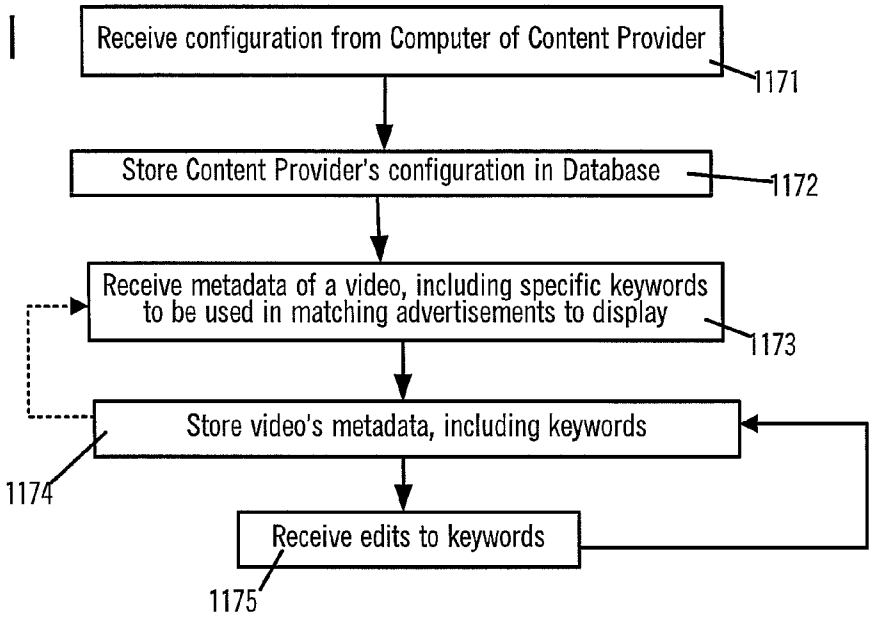


FIG. 11J

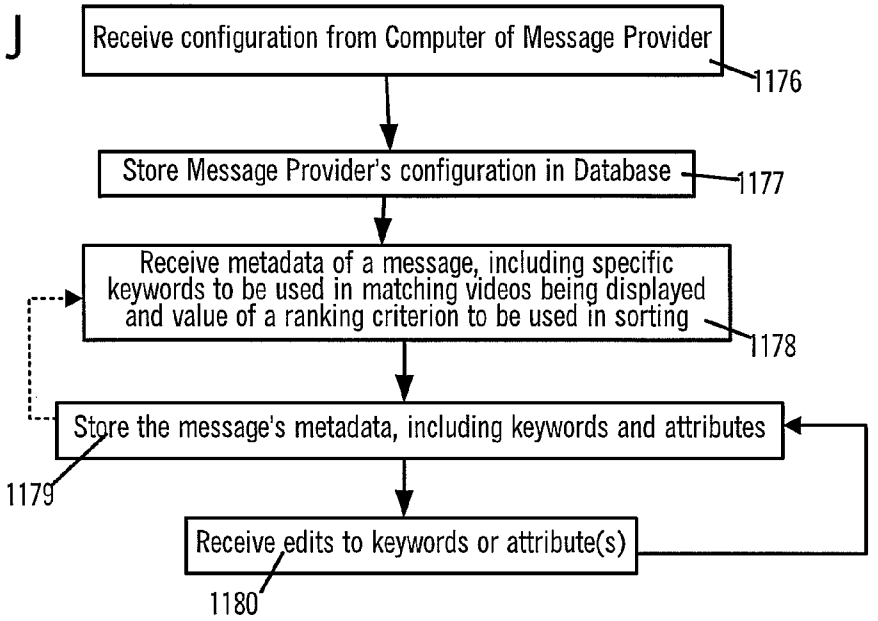


FIG. 11K

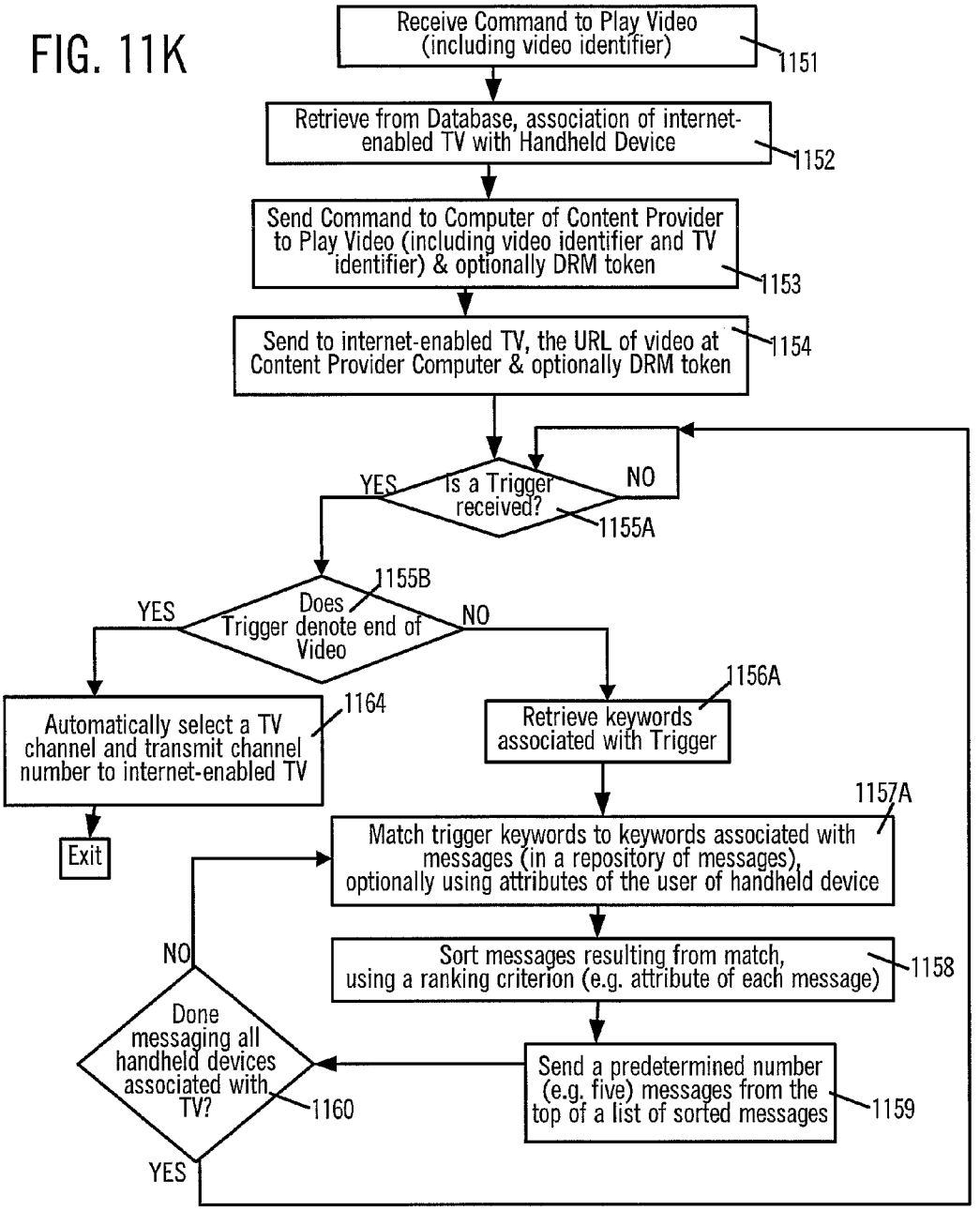

Receive Command to Play Video (including video identifier)
1151
Retrieve from Database, association of internet-enabled TV with Handheld Device
1152
Send Command to Computer of Content Provider to Play Video (including video identifier and TV identifier) & optionally DRM token
1153
Send to internet-enabled TV, the URL of video at Content Provider Computer & optionally DRM token
1154
Is a Trigger received?
1155A
YES
NO
Does Trigger denote end of Video
1155B
YES
NO
Automatically select a TV channel and transmit channel number to internet-enabled TV
1164
Exit
Retrieve keywords associated with Trigger
1156A
Match trigger keywords to keywords associated with messages (in a repository of messages), optionally using attributes of the user of handheld device
1157A
Sort messages resulting from match, using a ranking criterion (e.g. attribute of each message)
1158
Send a predetermined number (e.g. five) messages from the top of a list of sorted messages
1159
Done messaging all handheld devices associated with TV?
1160
NO
YES

FIG. 12

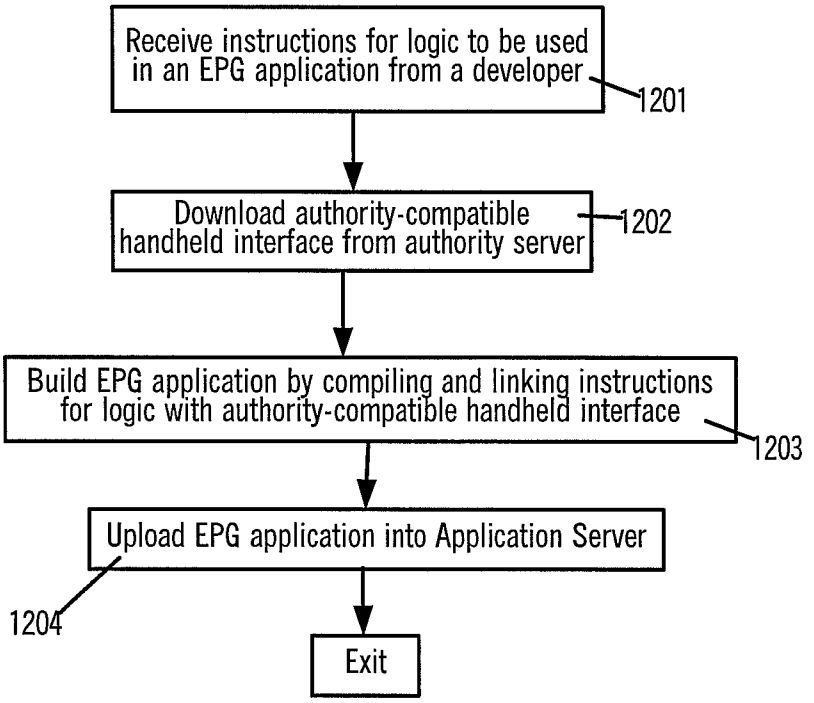

Receive instructions for logic to be used in an EPG application from a developer
1201
Download authority-compatible handheld interface from authority server
1202
Build EPG application by compiling and linking instructions for logic with authority-compatible handheld interface
1203
Upload EPG application into Application Server
1204
Exit

FIG. 13A

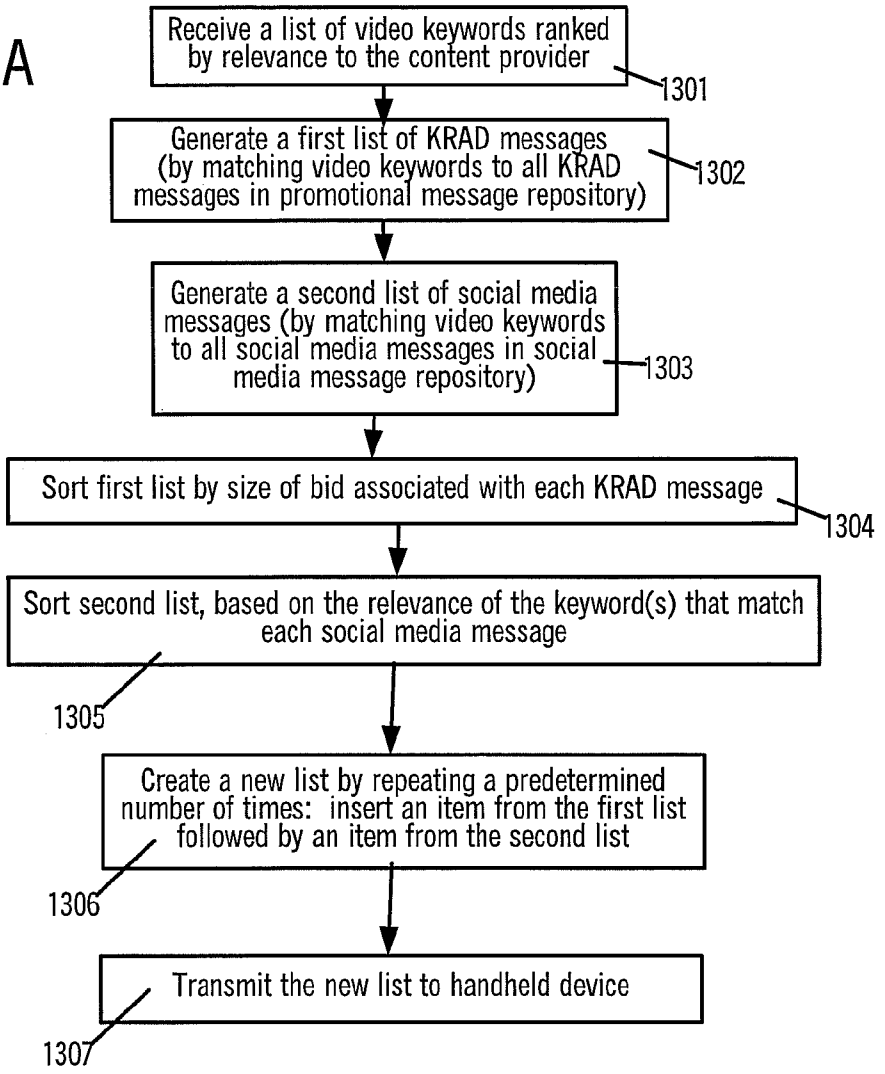
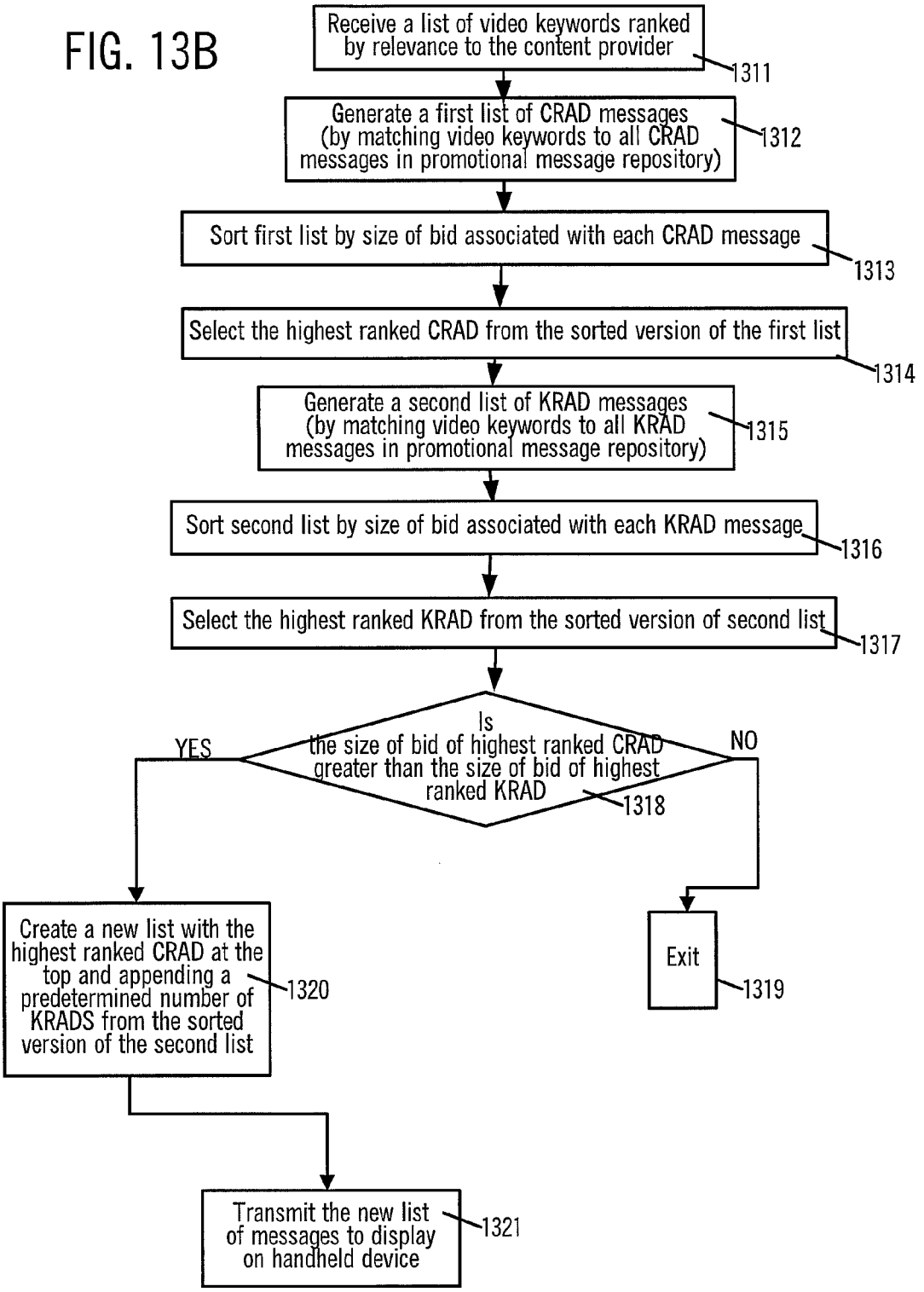

Receive a list of video keywords ranked by relevance to the content provider
1301
Generate a first list of KRAD messages (by matching video keywords to all KRAD messages in promotional message repository)
1302
Generate a second list of social media messages (by matching video keywords to all social media messages in social media message repository)
1303
Sort first list by size of bid associated with each KRAD message
1304
Sort second list, based on the relevance of the keyword(s) that match each social media message
1305
Create a new list by repeating a predetermined number of times: insert an item from the first list followed by an item from the second list
1306
Transmit the new list to handheld device
1307

FIG. 13B


Receive a list of video keywords ranked by relevance to the content provider
1311
Generate a first list of CRAD messages (by matching video keywords to all CRAD messages in promotional message repository)
1312
Sort first list by size of bid associated with each CRAD message
1313
Select the highest ranked CRAD from the sorted version of the first list
1314
Generate a second list of KRAD messages (by matching video keywords to all KRAD messages in promotional message repository)
1315
Sort second list by size of bid associated with each KRAD message
1316
Select the highest ranked KRAD from the sorted version of second list
1317
Is the size of bid of highest ranked CRAD greater than the size of bid of highest ranked KRAD
1318
YES
NO
Create a new list with the highest ranked CRAD at the top and appending a predetermined number of KRADS from the sorted version of the second list
1320
Exit
1319
Transmit the new list of messages to display on handheld device
1321

RESPONDING TO A VIDEO REQUEST BY DISPLAYING INFORMATION ON A TV REMOTE AND VIDEO ON THE TV

BACKGROUND

A smartphone **100** (FIG. **1**A) of the prior art enables a user to make a telephone call as well as provides support for multiple applications ("apps"), such as a web browser or email client. An example of a smartphone is the product called "iPhone" available from APPLE INC, e.g. as described in US Patent Publication 20080122796 published on May 29, 2008 by Jobs et al, and in U.S. Pat. No. 7,479,949 granted to Jobs et al on Jan. 20, 2009 both of which are incorporated by reference herein in their entirety as background information on conventional smartphones.

One of the applications ("apps") in such a smartphone **100** may be, for example, a store application program ("store app") **101** (FIG. **1**A) that enables users to download additional applications. Specifically, on touching store app **101** (FIG. **1**A), smartphone **100** displays the user interface illustrated in FIG. **1**B, wherein the user may enter a search term in box **102**. Below search box **102** is displayed a list **103** of identifications **103**A-**103**D of application programs, such as a music app, a camera app, a travel app and an app to search for toys, any or all of which may be downloaded into smartphone **100**, from a computer at a predetermined address on the Internet.

One such app is created by YouTube, to enable a user to view on the smartphone iPhone, any video that is posted on the YouTube website. Specifically, touching a YouTube icon shown by the user interface of the iPhone opens the YouTube app, which displays on a touch screen of the iPhone, a main page of the YouTube website. The user may then enter appropriate keywords in a search field on the iPhone's touch screen, to find and select a video which is then displayed on the iPhone's touch screen. For more information, see an article entitled "A Tutorial on Watching YouTube Videos From an iPhone" by T I Kleban published on Ezine on Oct. 19, 2007. Another app called "vTap" allows a user to search for videos on the web, for example at the following websites: YouTube, MySpace, Dailymotion, news sites like the Associated Press and Reuters, even ESPN. For more information, see "Possibly the best iPhone Web app yet: vtap trumps built-in iPhone YouTube app" by Ben Wilson published on CNET, on Nov. 2, 2007.

The two apps described in the previous paragraph require the user to view video on a screen built into a smartphone. Another app called "i.TV" enables a user who subscribes to Netflix to manage their queue of films available via Netflix, and also enables the user to control a digital video recorder (DVR) of the type available from TiVo, Inc. For more information, see the following articles each of which is incorporated by reference herein in its entirety as background: (A)"Appiphilia: i.TV app tunes in new features for iPhone" published by Michelle Maltais of the Los Angeles Times on Dec. 23, 2008; (B) "i.TV's iPhone app gets deep Netflix integration" published Nov. 10, 2008 by Josh Lowensohn of CNET and (C) "i.TV for iPhone: Cluttered but promising entertainment guide" published Aug. 17, 2009, by Erica Sadun of Weblogs, Inc.

SUMMARY

In accordance with the invention, a handheld screen is used as a supplement to a television screen. Specifically, information displayed on a handheld screen in accordance with the invention supplements a video displayed on the television (TV) screen. In many embodiments of the invention, display of supplementary information on the handheld screen is coordinated with the display of video on the television screen. In some embodiments, the supplementary information on the handheld screen is selected by a computer system to match the specific video being displayed on the TV screen. Additionally, in several such embodiments of the invention, the display of such supplementary information occurs simultaneously or contemporaneously relative to the video display e.g. the two displays are made to overlap in time by the computer system transmitting the selected information (or an identifier thereof) to a handheld device (containing the handheld screen) at the same time as (or within a predetermined duration of) transmission of the video to a television (containing the television screen). Such display of supplementary information on a handheld screen in a timely manner relative to video display on the TV screen (i.e. while the video is still being displayed) in accordance with the invention provides a richer viewing experience to a user than any prior art combination known to the inventors of the current patent application.

In some embodiments, transmission of the video and transmission of the supplementary information are both transmitted in response to a single event, for example receipt by the computer system, of a request to display the video, on demand. In numerous embodiments, the handheld device transmits to the computer system, a single video request containing an identification of a user-selected video (e.g. a URL of the file containing the video. The computer system responds by transmitting to the television a first signal carrying a series of frames in the user-selected video, and further transmitting to the handheld device, a second signal carrying supplementary information that is automatically selected for display on the handheld device, both signals being based on the single video request. The television responds by automatically displaying on the television screen, the series of frames being received in the first signal. The handheld device responds by automatically displaying on the handheld screen, the supplementary information received in the second signal. As described above, the two signals are both transmitted by the computer system in response to the same event (for example, in the numerous embodiments described above, by a request for a user-selected video). In such embodiments, coordinated displays, of video on the television and supplementary information on the handheld device, occur in a timely manner relative to one another.

BRIEF DESCRIPTION OF THE FIGURES

FIGS. **1**A and **1**B show a smartphone **100** of the prior art.

FIG. **2**A illustrates a handheld device **200** (e.g. a smartphone) programmed to display multiple apps available for download from an app store, each app containing therein an electronic program guide (EPG) of videos available for on-demand display on an internet-enabled television in accordance with the invention.

FIG. **2**B illustrates, in a high level block diagram, handheld device **200** of FIG. **2**A, wherein multiple EPG apps have been downloaded and installed as represented by icons **203**A-**203**N of corresponding EPG apps **202**A-**202**N, to provide access to corresponding groups **207**A-**207**N of descriptions of videos in computer system **250** including corresponding computers **281**A-**281**N of respective content providers A-N and a computer **282** that authorizes transfer of video ("authority server").

FIG. 2C illustrates a user interface of an EPG app **202**N of FIG. 2B, as displayed on handheld device **200** of FIG. 2A, including a list of EPG items **291**A-**291**Z and a search box **205** displayed on a screen **204** and a slide-out keyboard **299** to input text to handheld device **200**.

FIG. 2D illustrates a user interface of an EPG app **202**J similar to FIG. 2C, in another embodiment in accordance with the invention.

FIG. 2E illustrates a user interface of an EPG app **202**J similar to FIG. 2C, in still another embodiment in accordance with the invention.

FIG. 2F illustrates display of a video description **292**A in several embodiments of the invention, for a specific EPG item **291**A selected by the user in the list of FIG. 2D.

FIG. 2G illustrates display of information in the form of messages on a handheld screen **204**, concurrent with a display of user-selected video **208**A (identified by item **291**A and described in video description **292**A in FIG. 2B) on an internet-enabled television, in several embodiments of the invention.

FIGS. 2H-2L illustrate display on handheld screen **204**, of additional information being exchanged between a user of handheld screen **204** and another user in accordance with one aspect of the invention.

FIGS. 2M and 2N illustrate display on handheld screen **204**, of additional information being exchanged between a user of handheld screen **204** and an advertiser in accordance with another aspect of the invention.

FIGS. 3A-3C illustrate, in high level block diagrams, flow of signals among handheld device **200**, computer system **200** including at least one computer programmed in accordance with the invention, and a television located physically in the same building as and adjacent to handheld device **200**.

FIG. 3D illustrates timing overlaps between videos displayed on the internet-enabled television **303** of FIG. 3A and messages of information displayed on handheld device **200** in several embodiments of the invention.

FIG. 3E illustrates scrolling of messages **305**A-**305**E between times T**1** and T**3** of FIG. 3C, in handheld device **200**.

FIGS. 4A-4H illustrate, in an exemplary sequence of time illustrated in FIG. 3E, the operation of dual displays of coordinated media on handheld device **200** and internet-enabled television **303** in a user's home in some embodiments of the invention.

FIG. 5A illustrates, in a timing diagram, automatic scrolling of messages **502**A-**502**D on a handheld device **200** in response to predetermined trigger events at times T**2** and T**3** while display of an EPG item **304** by handheld device **200** remains unchanged (auto-locked) during the display of the identified video **302** by a television **303**.

FIGS. 5B and 5C illustrate the operation of dual displays of coordinated media in an exemplary sequence of time illustrated in FIG. 5A.

FIG. 5D illustrates, in a timing diagram, automatic scrolling of messages on a handheld device **200** in response to display of a predetermined frame at time T**2** while display of an EPG item **304** by handheld device **200** remains unchanged (auto-locked) during the display of the identified video **302** by television **303**.

FIGS. 5E and 5F illustrate the operation of dual displays of coordinated media in an exemplary sequence of time illustrated in FIG. 5A.

FIG. 6A illustrates, in a high level block diagram, transmission of signals **311** and **312** by computer system **250** to handheld device **200** and internet-enabled television **303** respectively, in order to generate dual displays of coordinated media that overlap in time in user's family room **310**, in accordance with the invention.

FIG. 6B illustrates, in an intermediate level flow chart, acts performed by computer system **250**, handheld device **200** and television **303** of FIG. 6A, in illustrative embodiments of the invention.

FIG. 7 illustrates, in a high level block diagram, flow of signals among a handheld device a wireless access point and a television, all located physically in the same building in several embodiments of the invention.

FIG. 8A illustrates acts performed by three computers included in a computer system **250** in an implementation illustrated in FIG. 8B, namely an authority server, a content provider server, and a message server (or message client).

FIG. 8B illustrates, in a high level block diagram, flow of signals in an implementation of one embodiment of the invention.

FIG. 9A illustrates, in a high level block diagram, an internet-enabled television of the prior art, for use in some embodiments of the invention.

FIG. 9B illustrates a software stack executed by a processor in an internet-enabled television, in the implementation of FIG. 8B.

FIG. 9C illustrates acts performed by the processor of FIG. 9B in the implementation of FIG. 8B.

FIG. 10A illustrates, in a high level block diagram, a handheld device of the prior art, for use in some embodiments of the invention.

FIGS. 10B and 10C illustrate software stacks executed by alternative embodiments of a processor in a handheld device, in the implementation of FIG. 8B.

FIGS. 10D and 10E illustrates, in flow charts, acts performed by the processor of FIG. 10B (and also of FIG. 10C) in the implementation of FIG. 8B.

FIG. 11A illustrates, in a high level block diagram, a computer of the prior art, for use in some embodiments of the invention, as an authority server, a content provider server, and a message server (or message client).

FIGS. 11B-11J illustrate, in flow charts, acts performed by the authority server of FIG. 11A in an illustrative implementation in accordance with the invention.

FIG. 11K illustrates, in a flow chart, acts performed by an authority server similar to the acts of FIG. 11H, in an alternative embodiment of the invention.

FIG. 12 illustrates, in a flow chart, acts performed by the content provider server of FIG. 8B, to create and upload an EPG app to the app server of FIG. 8B in an illustrative implementation of one embodiment of the invention.

FIGS. 13A and 13B illustrate, in flow charts, acts performed by the authority server in an illustrative implementation in accordance with the invention to prepare a list of messages transmitted to a handheld device for display thereon.

DETAILED DESCRIPTION

In several embodiments of the invention, a handheld device **200** is a smartphone, which is a cellular phone having a screen on which information unrelated to phone calls can be displayed through application software ("apps"), such as: calendar app, email app, web-browser app, and store app etc. Examples of smartphones (also called PDA phones) that can be used as handheld device **200** include the following: iPhone 3G available from Apple Inc, Blackberry Storm available from Research In Motion Limited and Nokia E71 available from Nokia Corporation. In several embodiments of the invention, a user of handheld device **200** searches for apps

that can display electronic program guides (EPGs) of videos available for on-demand display on a television, by entering a character string, e.g. "EPG" in a search box **201** (FIG. **2**A) displayed by a store app in a handheld device **200**.

Although a handheld device **200** which includes a cellular phone is used in some embodiments of the invention, other embodiments of the invention use a handheld device **200** that does not have any telephone functionality. One example of such a handheld device **200** is a personal digital assistant (PDA) that has a screen **204** to display information and that has a wireless interface. One example of such a PDA that can be used as handheld device **200** is the music player iPod Touch® available from Apple Inc. Another example of handheld device **200** is a media viewing device that includes a screen for information display, e.g. an e-book device on which a book can be displayed. Examples of e-book devices that can be used as handheld device **200** in accordance with the invention include Kindle 2 available from Amazon.com, Inc. and PRS-700 available from Sony Corporation. In several embodiments, screen **204** (of a handheld device **200**) simply displays information thereon and is not touch sensitive, although in other embodiments screen **204** is sensitive to a user's touch thereon. Accordingly, one example of a handheld device **200** is a tablet PC such as P1610 tablet PC available from Fujitsu, ThinkPad X200 Tablet 7449 available from Lenovo, and Pavilion TX1000Z 12.1" TOUCH-SCREEN Tablet available from HP.

In response to receipt of user input in search box **201** (FIG. **2**A), handheld device **200** conducts a search of all apps available for download at an app server computer accessible by handheld device **200** at a predetermined address on the Internet, and displays representations of multiple apps **202**A, **202**B, **202**I, **202**N (wherein A≤I≤N, N being the total number of apps) that match the user input. Each app **202**I contains an electronic program guide (EPG) identifying videos available for on-demand display on an internet-enabled television. The predetermined address is typically stored in a memory of handheld device **200**, e.g. provisioned at the factory by a manufacturer of handheld device **200**. The predetermined address is used by a store application of the type described in the Background section (see above).

In an illustrative example, the user may download into handheld device **200**, any one (or more or even all) of EPG apps **202**A, **202**B, **202**I, **202**N (FIG. **2**A). After download and installation in handheld device **200**, corresponding text and/or graphic icons **203**A, **203**B, **203**I, **203**N are displayed on screen **204** of handheld device **200** (see FIG. **2**B). On screen **204**, each text and/or graphic icon **2031** (also called "representation" of) denotes a copy of a corresponding app **202**I that is now installed and available to be opened in handheld device **200**. Screen **204** can be any external surface of a handheld device **200** on which an electronically created picture or image is normally formed, such as a glass plate of a liquid crystal display (LCD). Specifically, screen **204** can be, for example, 3.5-inch in size (measured diagonally) with 320×480 pixel resolution and a multi-touch panel of the type included in a typical smartphone (such as the iPhone available from Apple, Inc).

After download of the type described in the immediately preceding paragraph, a user may choose from among multiple EPG apps **202**A . . . **202**N, e.g. in embodiments wherein screen **204** is touch sensitive, the user uses a finger to touch an icon **203**N displayed by handheld device **200** (see FIG. **2**B). In response to the user's touch on icon **203**N, handheld device **200** opens the corresponding EPG app **202**N on handheld screen **204** (i.e. after the download of app **202**N into device **200**). As shown in FIG. **2**C, handheld device **200** may display on screen **204**, a user interface of EPG app **202**N including multiple items **291**A-**291**Z of EPG information ("EPG items"). Each EPG item **291**J (FIG. **2**C) includes metadata on attributes of a video **208**J (FIG. **2**B) available for on-demand display. Examples of metadata in an EPG item **291**J (FIG. **2**D) that are displayed include title **271**J, duration of play **272**J, number of times viewed by other users **273**J, five-star rating **274**J and whether or not any payment is required for viewing the video **208**J. Depending on the embodiment, metadata of an EPG item may also include EPG information that is not displayed, such as a unique video identifier.

EPG items **291**A-**291**Z (FIG. **2**C) initially displayed by default on handheld screen **204** on opening of app **202**N are typically present in a list ("featured list") for the current user. Such a featured list may be predetermined in any manner depending on the embodiment, e.g. specifically determined by a content provider A operating a computer to digitally transmit videos **208**A-**208**Z (identified by EPG items **291**A-**291**Z). EPG items **291**A-**291**Z that are initially displayed in a featured list are eventually replaced by a display of other EPG items, e.g. EPG items that match a user's input in a search box **205** (see FIG. **2**C) accessible by touching button **274** (FIG. **2**D) or EPG items in a favorites list accessible by touching button **275**.

Search box **205** (FIG. **2**C) is included in app **202**N to enable a user to type in a search term therein, using a slide-out keyboard **299** that is included in a handheld device **200** of some embodiments. Instead of a slide-out keyboard, other embodiments of a handheld device **200** may receive a search term from a user via an on-screen keyboard as illustrated in FIG. **2**E. Accordingly, the user may search among a group **207**N (FIG. **2**B) of EPG items **291**A-**291**Z and optionally related video descriptions **292**A-**292**Z supplied by a content provider N (such as Paramount Pictures Corporation) that creates a corresponding app **202**N (which is identified on screen **204** by representation **203**N). A video description **292**J typically includes additional detailed information on subject matter included within the video, such as an outline of a plot, names of actors and/or director, a movie review, ratings etc.

In the example illustrated in FIG. **2**C, video titles displayed on screen **204** by an app **202**N are only of those EPG items **291**A-**291**Z (FIG. **2**B) for which a corresponding content provider N (namely Paramount Pictures Corporation) can provide the described videos **208**A-**208**Z to the user for viewing on a television. Results of searching an EPG group **207**D based on the user's input in box **205** are displayed immediately below search box **205** (replacing previously displayed EPG items **291**A-**291**Z in FIG. **2**C). Next, the user may select any EPG item **291**J displayed on screen **204** of handheld device **200**, to view its corresponding video **208**J on an internet-enabled television (that has been associated with the user's smartphone).

Therefore, in some embodiments of the invention, each app **202**I is strictly limited to searching among and/or displaying only within its corresponding group **207**I of EPG items and related video descriptions, as shown in FIG. **2**B. As one example, a user may open app **202**A (see FIG. **2**B) to search among its group **207**A of video descriptions (not labeled in FIG. **2**B) supplied by content provider A, namely Netflix, Inc. In this example, if the user decides not to select any video described in the search results from group **207**A, the user may open another app **202**C to search among another group **207**C of video descriptions (also not labeled in FIG. **2**B) that are supplied by another content provider I, namely ZillionTV Corporation. As yet another example of such embodiments, if the user wishes to watch the movie "Mission Impossible IV", the user must open an app **202**N to search for the specific EPG

item identifying this movie in the group **205**N in a situation where the only content provider of this movie is content provider N, namely Paramount Pictures.

Depending on the embodiment of the invention, a specific video can be made available to a user for selection by more than one content provider (i.e. by multiple content providers). For example, a movie with title "Star Trek" in EPG item **291**Z (FIG. **2**C) is illustrated in FIG. **2**B as identifying the video **208**Z, and in this example video **208**Z is made by content provider N, namely Paramount Pictures Company. Additionally, in this example content provider N, has provided a copy **208**ZC of this exact same video **208**Z to another content provider I (e.g. pursuant to a license agreement therebetween). Hence, content provider I (e.g. ZillionTV) also makes available its own copy **208**ZC of video **208**Z to the user through its own app **202**I e.g. by including in its group **2071** an EPG item **291**X identifying the same title, of video **208**Z. Note that description **292**X of EPG item **291**X that is provided by content provider I may be either different from, or a copy of, the description **292**Z of video **208**Z provided by content provider N, depending on the implementation of the invention. Hence, in this example, a user can obtain a video **208**Z (or a copy thereof) for viewing on demand (VOD) from either one of two different content providers I and N, via their respective apps **202**I, **202**N (accessible in handheld device **200** by touching corresponding representations **203**I, **203**N).

Accordingly, as will be readily apparent from this detailed description, depending on the embodiment, the EPG apps **202**A-**202**N displayed by a handheld device **200** (FIG. **2**A) can be from different types of content providers. For example, one type of content provider illustrated in FIG. **2**A is a movie studio that produces normal movies, such as Paramount Pictures (see EPG app **202**N). FIG. **2**A illustrates another type of content provider that supplies movies on demand using the Internet, such as Zillion (see EPG app **202**I). In this example, another EPG app **202**A in FIG. **2**A identifies Netflix as yet another type of content provider which rents movies on storage devices such as DVDs, and also supports download of movies via the Internet on digital video records like TiVo. Finally, yet another EPG app **202**B shown in FIG. **2**A identifies YouTube as yet another type of content provider which makes user-submitted videos available for download via the Internet.

Referring to FIG. **2**C, a user may touch an EPG item **291**A in an EPG app **206**A on a screen **204** of handheld device **200** to select (either directly or indirectly, depending on the embodiment) video **208**A (FIG. **2**B) for delivery to the user's television. Specifically some embodiments permit direct selection by a single touch of EPG item **291**J, e.g. if a payment attribute for viewing the corresponding video **208**J (FIG. **2**B) indicates that the video is available free of cost to the user.

However, in several embodiments, selection of EPG item **291**A displays redraws the display to show EPG item **291**A (which is no longer selectable) at the top of screen **204** and immediately underneath the corresponding video description **292**A, as illustrated in FIG. **2**F. In addition to the video description **292**A, in the display illustrated in FIG. **2**F the user is presented with two buttons **276** and **277** that respectively denote two options, namely (1) pay $1.99 to watch the video **208**A free of any TV commercials and (2) a default option of watching the video **208**A free of cost, but with TV commercials included in the display of video **208**A. Note that button **277** is displayed greyed out on screen **204** as shown in FIG. **2**F because in this example, this particular user had previously selected the second payment option and therefore the second payment option was automatically recorded as a default for this user, by handheld device **200**. Accordingly, at this stage the user may simply press button **278**, to select a video **208**A to be displayed, with TV commercials included therein.

In response to the user selection, video **208**A begins to play on an internet-enabled television associated with handheld device **200**. While video **208**A is playing on a television screen, handheld device **200** displays the corresponding EPG item **291**A at the top of handheld screen **204** and a control panel **252** at the bottom of handheld screen **204**, as shown in FIG. **2**G. Specifically, control panel **252** includes of some embodiments includes a rewind button **252**A, a pause button **252**B and a fast forward button **252**C, to enable navigation of the play of video **208**A on the television screen. Additionally, control panel **252** further includes two text strings to provide play status information to the user as follows: a text string **252**G to display the duration for which video **208**A has already played, and another text string **252**F to display the total duration of video **208**A.

Additional video status and control is provided in control panel **252**, via a bar **252**H on which a ball **252**I automatically slides towards the right, as video **208**A is played. The user can slide ball **252**H anywhere on bar **252**H to correspondingly change the frame of video **208**A displayed on the television screen. Control panel also includes a mute button **252**D that can be touched on handheld screen **204** to turn on/off the sound from the speakers of the television. Control panel also includes a favorites button **252**E that can be touched to bring up on handheld screen **204**, a display of a list of EPG items previously bookmarked by the user.

In certain alternative embodiments, in response to a user's touching of EPG item **291**A in EPG app **206**A on screen **204** as illustrated in FIG. **2**C, a default payment option for the user is automatically used by handheld device **200** to select video **208**A for display, i.e. without display of video description **292**A in FIG. **2**F, and handheld device **200** wirelessly transmits the selection of EPG item **291**A in a video request (in this example, as if the user had pressed button **278**). Therefore, in these embodiments, the video identified by EPG item **291**A starts playing on television **303**, immediately in response to the user's touching of EPG item **291**A displayed in a list of EPG items on screen **204**, i.e. instant play without displaying the video description.

During the time that video **208**A is playing on a television screen (including any TV commercials therein), handheld device **200** additionally displays a window **251** located on screen **204** between EPG item **291**A and control panel **252**. Window **251** displays a list of messages **251**A-**251**M to the user, containing information that "supplements" video **208**A whereas the above-described EPG item **291**A displays information (such as title) that "complements" video **208**A. The meanings of the two words "complement" and "supplement" are described in the next paragraph immediately following this paragraph. In some embodiments, the information in messages **251**A-**251**M is selected automatically for being likely to be of interest to the user. Accordingly, at this stage, the user has two attractive choices: the user may either watch video **208**A on the television screen or review and select any of messages **251**A-**251**M on handheld screen **204** to seek additional information. Depending on the embodiment, messages **251**A-**251**M can be any type of messages, such as social media messages from other users and/or promotional messages from advertisers.

Social media messages and promotional messages as displayed on handheld screen **204** are different types of messages that may contain different information relative to one another, depending on the embodiment. In some embodiments, a social media message includes two or more of the following pieces of information: (a) user name and an

optional graphic, (b) text string input by the user identified by the user name, (c) time at which the user typed the text string. Additionally, a promotional message of some embodiments includes two or more of the following pieces of information: (a) product name, (b) name of a vendor of the product identified by the product name and (c) price of the product. Note that other embodiments may exclude two or more of the just-described pieces of information, and/or alternatively include other pieces of information such as (d) name of a message thread in case of a social media message and (d) a graphic in case of a promotional message.

The words "complement" and "supplement" as used herein, both mean to make a display on a handheld screen in addition to the display of video **208**A on a TV screen. However, there is an important distinction between these two words, as follows. To "complement" a TV display is to provide on the handheld screen, any information lacking from the TV display and needed for video navigation. For example, to perform video navigation, the user may need to be reminded of the specific movie playing on the TV screen, by a display of complementary information on the handheld screen. Hence, EPG item **291**A (FIG. **2**G) displayed on handheld screen **204** is "complementary" to the TV display. Moreover, control panel **252** (FIG. **2**G) also displays complementary information on the handheld screen, such as the duration **252**G of video already viewed. In contrast, to "supplement" the TV display is to provide any information on the handheld screen that is unnecessary for video navigation. For example, display of information in messages **251**A-**251**M to converse with another user, or display of information promoting the purchase of a product or service is "supplementary" to the TV display, because such information is unrelated to video navigation.

In a specific embodiment illustrated in FIG. **2**G, supplementary information presented in window **251** is physically arranged in the center of handheld screen **204**, sandwiched symmetrically by complementary information in EPG item **291**A at the top of screen **204**, and complementary information in control panel **252** at the bottom of screen **204**. However, as will be readily apparent from this detailed description, other arrangements of these two types of information are used in such displays on screen **204** in other embodiments of handheld device **200**. For example, all complementary information is presented together in one area and all supplementary information is presented in another area (e.g. in a bottom half and a top half respectively of screen **203**), in an alternative embodiment (not shown) of handheld device **200**.

In an example illustrated in FIG. **2**G, messages **251**A and **251**J are social media messages, and messages **251**I and **251**M are promotional messages from advertisers of products or services to be sold to the user. By selecting either of messages **251**A and **251**J the user (also called "owner") can obtain additional information and converse with (i.e. chat with) another user (also called "author") of such messages. By selecting messages **251**I and **251**M the owner of handheld device **200** can obtain additional information needed to enter into a purchase transaction, i.e. buy a corresponding product or service described in the messages displayed on handheld screen **204**. Handheld device **200** enables its owner to distinguish between these two types of messages in the illustrative example by display of extra text (or graphic) **255**A in a bottom right corner of a message **251**A e.g. by displaying the word "Chat".

Although both words "Chat" and "Buy" are shown in FIG. **2**G as identifying respective types of messages **251**A-**251**M, other embodiments display only one word (e.g. Chat). No extra text (or graphic) is displayed in embodiments wherein the distinction between different types of messages is readily apparent to the owner of handheld device **200**, from the presence of certain features depending on the type of message, such as a graphic image of a message's author and the author's nickname both located at the left side of screen **204** in case of a social media message. Messages of different types may alternatively be made visually distinct from each other by use of color and/or certain fonts and/or attributes of text, such as italics, depending on the embodiment. Also note that although only two types of messages are illustrated in FIG. **2**G, other embodiments support additional types of messages, such as a third type of message from the government, about a local emergency (such as a fire) requiring evacuation of the user's neighborhood.

In response to manual selection of a social media message (see FIG. **2**G), handheld device **200** responds by displaying the entirety of message **251**A and additional information **253** in the form of the author's bio, as illustrated in FIG. **2**H. In the example illustrated in FIG. **2**G, the owner of handheld device **200** selected the movie "Mission: Impossible" for play on their internet-enabled television, and so this user's handheld screen **204** displays the following two social media messages, namely message **251**A is a text message by a first author having the nickname "usumcasane" saying "There is a version of MISSION IMPOSSIBLE where Jean Reno is the hero and kills Tom Cruise" and message **251**J is another text message by a second author having the nickname "Deadron" saying "I like Mission Impossible but the earliest rarely seen Avengers episodes are better." Note that these two text messages, which are displayed by handheld device **200** include information that is context-specific, e.g. information selected to be complementary to video **208**A that in turn was selected by the user of handheld device **200**.

Handheld device **200** presents such context-specific information on handheld screen **204**, while user-selected video **208**A is playing on that user's television screen. Also as shown in FIG. **2**H, the user may touch button **254** displayed on handheld screen **204** to prepare and send a new text message to the author of a displayed message **251**A. For example, in response to button **254** being touched, handheld device **200** responds by displaying on touch-sensitive screen **204** (see FIG. **2**I) at least the following: (a) the complete text and graphics of the selected message in a balloon **255**A (b) a field **255**B to hold new text to be typed by the current user, and (c) a keyboard **255**C. Additional information, such as a time stamp **255**D of the message **251**A may also be displayed on screen **204** (see FIG. **2**I) adjacent to message **251**A.

As will be readily apparent from this detailed description, a user can review additional information about any social media message on screen **204** and then enter a new social media message on screen **204**, without affecting a display of video **208**A on a television screen, in accordance with the invention. After such a new social media message is sent out wirelessly, handheld device **200** shows two text balloons **255**A and **255**E, as illustrated in FIG. **2**J. When a recipient named in the new social media message responds, a third text balloon **255**F is additionally displayed by handheld device **200**, as illustrated in FIG. **2**K. Additionally, as soon as the recipient responds, handheld device **200** adds the nickname of the recipient to a list of friends of the current user, and in future all text messages from the recipient become accessible by touching this nickname in the friends list (as illustrated in FIG. **2**L). Specifically, the just-described conversation is recorded by handheld device **200**, and displayed whenever requested, e.g. as message **256** in another window that lists the most-recently recorded social media messages that have been specifically addressed to the current user (i.e. owner of

handheld device **200**) as shown in FIG. **2**L. The current user's review of the historical log of messages is performed by interaction with handheld screen **204**, and does not affect the display of video **208** on the television screen which continues to play normally.

Referring back to FIG. **2**G, in response to the user selecting a promotional message **251**I, handheld device **200** responds by displaying on screen **204** additional information **257** (FIG. **2**M) in the form of terms needed for a sale of a product (or service). Examples of the terms of sale include (A) description **258** of the product being sold, including, for example, color, size, product number and manufacturer, (B) price **259**A, and (C) manner of shipping **259**B. Handheld device **200** also displays on screen **204** a button **260** labeled "BUY NOW", and pressing this button forms a legally-binding contract for the purchase of the product as described in the terms of sale in additional information **257**. In response to the user pressing button **260**, handheld device **200** displays a pop-up message thanking the user for the purchase as illustrated in FIG. **2**N. The user's review of additional information **257** and the user's input to purchase the product are all performed by interaction directly with handheld screen **204**, and such activities by the user do not affect the display of video **208** on the television screen which, as noted above, continues to play normally.

In certain alternative embodiments, in response to a user's touching of a promotional message **251**I in window **251** as illustrated in FIG. **2**G, a product or service advertised therein is instantly purchased by handheld device **200** transmitting an order to computer system **250**, i.e. without display of product description **258** in FIG. **2**M (in this example, as if the user had pressed button **260**). Certain products and services which do not have any user-selectable options (such as books available on websites like Amazon.com) are suitable for such an instant purchase. In some embodiments, such an instant purchase promotional message **251**I includes the name of the vendor.

The above-described display of video **208** on a TV screen **307** (FIG. **3**A) is caused by a request **301** for on-demand viewing of a user-selected video **208**A (also referred to as video **302**) from a predetermined software **209** (also referred to as authority-compatible handheld interface software) that is executed by handheld device **200**. Software **209** in certain embodiments is shared by multiple EPG apps **202**A-**202**N in handheld device **200** as illustrated in FIG. **10**C. However, in other embodiments, each copy of EPG app **202**A-**202**N executing in handheld device **200** has its own corresponding copy that is compiled and linked therein, as software **209**A-**209**N illustrated in FIG. **10**B.

Depending on the embodiment, computer system **250** (FIG. **2**B) includes either a single computer **282** and/or multiple computers **281**A-**281**N interconnected to one another. Each of computers **282** and **281**A-**281**N included in computer system **250** can be any computer that has access to a storage device to store video(s), and that is connected to a data network (such as the Internet) for transmission of the stored video(s). An example of a computer included in computer system **250** is the product PowerEdge-R610 with 4 GB RAM, Intel Xeon E5520 processor operating at 2.26 GHz, and 160 GB hard disk, which is available from Dell, Inc.

In several illustrative embodiments, computer system **250** responds to request **301** by sending a signal **312** carrying the user-selected video **302** to an internet-enabled television **303** (FIG. **3**A) that is typically located in the vicinity of handheld device **200** (e.g. co-located in a building **310**, and in many embodiments co-located in a common room within building **310**, such as a family room of a typical home). Internet-enabled television **303** in accordance with the invention is any normal television that includes circuitry to interface with the Internet, either internally within a housing, of which TV screen **307** is a portion, or externally in a box that is normally placed on top of the television housing. Also in accordance with the invention, television **303** executes predetermined software, referred to herein as authority-compatible set-top interface software, to display video **302** that is retrieved from the Internet in response to request **301**. As noted above, video **302** is whichever one of videos **208**A-**208**Z that has been manually selected (e.g. by the user touching handheld screen **204**) for on-demand viewing on television **303** through a service of content provider N.

In the illustrative embodiments of the invention described in the immediately preceding paragraph, computer system **250** additionally responds to the same video request **301**, by sending another signal **311** (FIG. **3**A) carrying one or more message(s) **305** to be displayed to the user by handheld device **200** which sent video request **301**. In several such embodiments, the content of at least one of message(s) **305** consists essentially of text and/or graphics automatically selected by computer system **250** to be complementary to the user-selected video **302**, for example based on an attribute, such as (A) words spoken by actors in video **302**, (B) items or individuals shown in various frames of video **302**, (C) description **2921** of video **302**, (D) a five-star rating of video **302**, and (E) the number of times video **302** has been viewed, etc. In some embodiments, one such attribute of video **302** is a list of key words (in the form of a text string of one or more words in the English language for example) that have been associated therewith for matching by computer system **250** to keywords associated with the text and/or graphics to be included in one or more of message(s) **305**.

As noted above, an example of message **3051** is a string of text in a tweet signal **267** (FIG. **3**B), which text has been input by another user through a tweet-client app in another handheld device **266** (FIG. **3**B). An example of a tweet-client app is the software program Tweetie 2.1 (for iPhone and iPod Touch) available from the company atebits LLC. Note that tweet is just one example of a signal carrying a text string from a user, and another such example is a Short Message Service (SMS) message that is input by a user entering the text string and a published phone number (or a pre-defined name) of computer system **250** into a cellular phone. Computer system **250** of some embodiments selects one or more such text strings to be sent in signal **311**, from among numerous text strings being received therein from various users, based directly or indirectly on a specific video **302** identified in request **301**.

In some embodiments are text messages (such as tweets), transmitted on the Internet by a social networking and microblogging service, such as TWITTER, Inc. In an illustrative implementation, on receipt of video request **301** that explicitly identifies the user-selected primary video "Plane Crazy", computer system **250** subscribes to a feed of tweets that contain the words "Mickey" and "Minney" (e.g. these two words are stored in the form of strings of text in a storage device of computer system **250**, identified as keywords that are associated with the video "Plane Crazy"). Accordingly, computer system **250** transmits any text messages received via the subscription, to handheld device **200** associated with television **303**, while the user-requested video "Plane Crazy" is displayed thereon.

In an example of the type described in the immediately preceding paragraph, request **301** (not shown in FIG. **3**B; see FIG. **3**A) identifies a movie entitled "Plane Crazy" starring MICKEY MOUSE, and in response thereof computer system **250** automatically transmits in signal **311** to handheld device

200, a string of text embedded in tweet signal 267 that has been input by a user named Tricia, namely the text string "Mickey has nice gloves." In addition, as noted above, in response to the same video request 301, computer system 250 also transmits user-selected video 302, namely the movie "Plane Crazy" to internet-enabled television 303, for on-demand viewing.

In an example of the type illustrated in FIG. 3B and described above, signal 311 to handheld device 200 is sent after transmission of signal 312 to television 303 begins. Specifically, in this example, a display on handheld screen 204 is updated to display an EPG item in area 289 (FIG. 3A) corresponding to video 302 as soon as television 303 begins displaying video 302, but messages of supplementary information displayed in areas 290A-290Y (FIG. 3A) are not changed at this time (i.e. when video display begins). Instead, in this specific example, as soon as a tweet is received by computer system 250, computer system 250 checks if the tweet contains text matching one or more predetermined keywords associated with the movie "Plane Crazy" which is currently being transmitted. If so, computer system 250 transmits to handheld device 200, the above-described signal 311 carrying the text from the received tweet, i.e. in real time. In this particular example, if the same text string is received in a tweet before the beginning of or after the ending of display of movie "Plane Crazy" by television 303, no transmission of signal 311 occurs from computer system 250 to handheld device 200.

In certain embodiments of the type described in the immediately preceding paragraph, the text in such a real-time tweet describes an advertiser's limited-time targeted promotion (such as an offer to sell a large pizza for $5.99 within the next 10 minutes to all viewers of videos identified with predetermined keywords). In an example of other embodiments, the text in such a real-time tweet describes a dolphin being spotted in the Sacramento Delta (in California) to all viewers watching videos identified with the keyword "sea animals". In another example of such embodiments, the text in such a real-time tweet describes a company's current stock price, to all viewers watching videos identified with the keyword of that company's name.

In certain embodiments of the invention, a message 305 (in the signal 311 from computer system 250 to handheld device 200) consists essentially of information (also referred to herein, as "non-EPG" information) that is not present in an EPG item or video description. Non-EPG information is not descriptive of video 302. As noted above, such non-EPG information supplements the display of video 302 whereas EPG information itself complements the display of video 302. In several such embodiments, supplementary information is displayed in multiple messages that are automatically scrolled on handheld screen 204 whereas complementary information is displayed without automatic scrolling while the same video is being displayed on the television screen. To re-iterate, an automatically-scrolled message 3051 does not contain any EPG information on the specific video 302 selected by the user. Instead, as noted above EPG information is presented to the user in area 289 (FIG. 3A), by displaying therein an EPG item 304 (similar or identical to EPG item 291A described above in reference to FIG. 2G) that remains locked (i.e. kept unmoved) during automatic scrolling of non-EPG information in window 251.

Therefore, in an example of such embodiments, as illustrated in FIG. 3B, the text "Tricia: Mickey has nice gloves" (which is an example of non-EPG information) is included in an automatically-scrolled message displayed in window 251 and the text "Plane Crazy, Starring Mickey Mouse" (which is an example of an EPG item) is included in an EPG item displayed automatically-locked in area 289, both being displayed simultaneously or contemporaneously on screen 204 of handheld device 200. Note that the word "simultaneous" denotes at the same time as, whereas the word "contemporaneous" denotes a period of time smaller than human perception. Although only a message of text is illustrated in FIG. 3B, the message is merely illustrative, and other embodiments of computer system 250 transmit to handheld device 200, message(s) that contain graphic(s) or a combination of text and graphics, or instructions in Hyper Text Markup Language ("HTML") such as a web page. Note that a graphic in a message when displayed on screen 204 may move, e.g. a flag that waves, in embodiments wherein the graphic conforms to an animated image format, such as animated GIF (e.g. GIF89a specification commonly used on the World Wide Web).

Accordingly, two displays, one on a screen 204 in the user's hand located at a small distance (e.g. 1 foot or 2 feet from the user's eyes, within the user's personal space) and another on a screen 307 (FIG. 3A) at a larger distance from the user (e.g. 8 to 10 feet from the user's eyes, at a normal TV-viewing distance), together operating as described above in reference to FIGS. 3A and 3B provide a rich viewing experience to the user. Specifically, a display on a near-by screen 204 of a message that is caused directly or indirectly by a request for the selected video being displayed on a distant screen 307 enables a user to interact with the displayed message without interrupting a currently-occurring display of the selected video, as illustrated by the following three examples.

In a first example of such interaction, a user may review messages displayed on screen 204 in the user's hand to check on any other videos that may be of interest by using only the handheld device 200, while friends or relatives in the same room as the user (e.g. room 310 in FIG. 3B) continue to watch on screen 307 a display of user-selected video occurring without any distraction or interruption of the type normally present in picture-in-picture displays. In a second example of such interaction, a user may review locally displayed information to research details about the selected video, such as (1) the career history of, or (2) an article of clothing worn by, one of the actors while the television displays the user-selected video. In a third example of such interaction, the user may review advertisements that are discreetly shown on the handheld screen and the user may place an order for an advertised product or service (e.g. order a pizza) and even receive it while others watch without interruption a display of the user-selected video on the television. To re-iterate, in all these three examples, a user's interaction with information displayed within the user's personal space on handheld screen 204 does not interrupt the video displayed outside the user's personal space on TV screen 307.

In several embodiments of the invention, a user can view and input text on a handheld screen 204 within the user's personal space, and thus effectively perform searches, select video and review textual information in relative privacy (i.e. outside of the view of the eyes of any other people present in family room 310) while a user-selected video 302 is being played (i.e. displayed) on TV screen 307 that is located at the TV-viewing distance. In contrast, some prior art TV technologies display a keyboard and EPG on a distant TV screen, which requires the user to choose videos and choose keyboard keys by pressing arrow buttons on a handheld TV remote control.

In certain embodiments, one or more message(s) 305 being transmitted to handheld device 200 is/are received ahead of time in computer system 250, and stored therein for future

transmission in signal **311**, to handheld devices **200** of users requesting matching videos on respectively associated televisions **303**. In such embodiments, signal **311** is transmitted by computer system **250** in response to receipt therein of video request **301** from handheld device **200** which also causes the transmission of user-selected video **302** in signal **312**, as illustrated by the two arrows **311** and **312** in FIG. **3**C. Therefore, in embodiments of the type described above, at least two physically separated displays occur in a single room **310** (FIG. **3**B), in response to a request **301** for a single video **302**.

In some embodiments, multiple users associate their respective handheld devices **241** and **200** with the same internet-enabled television **303**, and therefore both devices **241** and **200** display the same EPG item **291**I at the top of their respective screens, as illustrated in FIG. **3**C. However, a set of messages **305** (FIG. **3**C) displayed by handheld device **200** have information that is different from the information in another set of messages **243** displayed by handheld device **241**, although both sets are supplementary to the video displayed by television **303** on its screen **307**. Specifically, the information in the two sets of messages **305** and **243** is selected by computer system **250** (FIG. **3**C) based on one or more attributes of the user, such as age or gender. In the example shown in FIG. **3**C, the user of handheld device **200** is a child and accordingly the information in messages **303** (such as advertisements for a laptop, stickers, and gloves) is selected based on the child's age, whereas the user of handheld device **241** is a parent and accordingly the information in messages **243** (such as advertisements for a comforter, detergent, and batteries) is selected based on the parent's age.

Certain embodiments enable a user (such as the parent) to completely disable the display of certain types of messages on their handheld device(s). For example, social media messages are completely turned off by the parent in the embodiment of FIG. **3**C, to prevent exposure of their child to inappropriate messages. Although in the embodiment of FIG. **3**C, social media messages are illustrated as having been turned off in both handheld devices **200** and **241**, other embodiments enable an owner of television **303** to selectively turn on/off social media messages individually for each handheld device **200**, **241** associated with television **303**. In one such example, the display options on social media messages are set so that handheld device **241** of a parent receives and displays social media messages, and handheld device **200** of the child does not.

Many embodiments do not allow selectively turning off the display of promotional messages from advertisers, on handheld devices **200**, **241**. In such embodiments, if a user does not want to view any promotional messages, the user can turn the power off in handheld devices **200**, **241**, in the normal manner. Note, however, that all promotional messages that were transmitted to a handheld device **200** when it is powered off are maintained in a corresponding log stored in a storage device by computer system **250**. Accordingly, all promotional messages selected for the user by computer system **250** are available for display whenever in future handheld device **200** is turned on, thereby providing the user an opportunity to view any promotional messages that may be of interest and that were missed when powered off.

In several embodiments, message display (on a handheld device **200**) and video display (on television **303**) occur in a timely manner relative to one another, as shown in FIG. **3**D. Specifically, in FIG. **3**D, at time T**0**, a video request **301** is sent by handheld device **200** to computer system **250**. Thereafter between times T**1** and T**2**, television **303** displays video **302** (also called primary video **1**) identified in request **301**, as shown by relationship **361** (shown as a dashed line in FIG. **3**C). Additionally, between times T**1** and T**2**, an EPG app **202**I executing in handheld device **200** displays EPG item **304** and one or more of message(s) **305**A-**305**D (on receipt thereof), based on the video **302** identified in request **301**, as shown by relationship **362** (shown as another dashed line in FIG. **3**C). As illustrated by the temporal relationship **351** shown in FIG. **3**C, a duration during which the user-selected primary video **302** is displayed on TV screen **307** overlaps with the duration during which EPG item **304** and messages **305**A-**305**D are displayed on handheld screen **204**.

As noted above, multiple messages **305**A-**305**D which are displayed on handheld screen **204** at time T**1** are carried by a signal **311** transmitted by computer system **250**, in response to request **301** for video **302**. At time T**1**, signal **311** may additionally carry EPG item **304** (or an identifier thereof) to handheld device **200**, e.g. if handheld device **200** did not originate video request **301**. Moreover, as shown in FIG. **3**C, signal **311** subsequently carries additional messages **305**E and **305**F at times T**2** and T**3**, with transmission thereof being caused in computer system **250** by respective videos **341** and **342** (also called secondary videos **1** and **2**), as illustrated by arrows **363** and **364** in FIG. **3**C. An illustrative example is shown in FIGS. **4**A-**4**H for the time sequence shown in FIG. **3**C, starting with time T**1** illustrated in FIG. **4**A.

In some embodiments of the type illustrated in FIG. **3**C, at a time T**2**, computer system **250** suspends transmission of the user-selected primary video **302** and starts transmission of another video **341** (called "secondary video **1**") to television **303** (for example, see FIG. **4**C). Secondary video **341** is not selected by the user and instead secondary video **341** is automatically selected by computer system **250** in different ways, depending on the embodiment. In one illustrative embodiment, the switch by computer system **250** from transmitting user-selected primary video **302** to transmitting automatically-selected secondary video **341** is performed between two frames of video being transmitted to television **303**, and there is no user-perceptible delay (e.g. delay less than 1 millisecond) in the switch.

In one illustrative embodiment, a predetermined frame is repeatedly transmitted at a periodic rate (e.g. 30 frames per second) in a real-time stream carried by signal **312** to television **303** until frames of video **341** become available for transmission, although in another illustrative embodiment no frame is transmitted between frames of videos **302** and **341** and instead television **303** continues to display the last-received frame until a new frame is received. Automatically-selected secondary video **341** is transmitted to television **303** in a manner similar or identical to the transmission of user-selected primary video **302**. Hence, television **303** displays automatically-selected secondary video **341** in a manner similar or identical to the display of user-selected primary video **302**, starting at time T**2** (for example, see FIG. **4**C).

As noted above, an EPG item **304** in signal **311** is normally displayed in a top area **289** (FIG. **3**E) of screen **204** that is automatically maintained non-scrolling in some embodiments of an EPG app **202**I in handheld device **200** as follows. Specifically, EPG app **202**I continuously displays EPG item **304** (e.g. EPG information) in top area **280** on screen **204** during the time that any portion of a given user-selected primary video **302** (identified in EPG item **304**) is being displayed (and in some embodiments, is still to be displayed) by television **303**. Display of EPG item **304** in an area **280** that is not automatically scrolled enables a user to visually correlate the two displays on screens **204** and **307**, regardless of the automatic scrolling of messages **305** in a middle area **290** of screen **204**.

As noted above, messages **305**A-**305**D (FIG. **3**C) that are displayed in message areas **290**A-**290**Y (FIG. **3**A) of window **251** are scrollable automatically over time. Specifically, as shown in FIG. **3**C, at time T**2** while transmitting automatically-selected secondary video **341**, computer system **250** of certain embodiments is programmed to transmit a new message **305**E (as illustrated by relationship **363** in FIG. **3**C) to handheld device **200** that is associated with television **303** (to which video **341** is being transmitted). Hence, handheld device **200** of some embodiments displays new message **305**E by automatically scrolling a preexisting display of messages **305**A-**305**D downwards in regions **290**Y, **290**J, **290**I and **290**A respectively as shown in FIG. **3**E. Note that in this example, second screen area **290** is subdivided equally into Y regions (e.g. five regions), namely regions **290**A-**290**Y (wherein A≤I≤J≤Y) and in each region **2901** the EPG app **202**I displays a single automatically-scrolled message.

At time T**2**, in the just-described embodiment, an EPG app **202**I automatically removes a previously-displayed message **305**B (FIG. **3**E) from screen **204**, and shifts in the downward direction each of the remaining previously-displayed message **305**C from a current region **290**I to its neighboring region **290**J (located immediately below the current region **290**I) thereby to make region **290**A available on screen **204** for displaying the new message **305**E. FIG. **4**B shows the scrolling of messages from time T**1** to time T**2** in the illustrative example shown in FIGS. **4**A and **4**C. In this embodiment, region **290**A (FIG. **3**E) is located immediately below first screen area **289** (currently displaying automatically-locked EPG item **304** which as noted above is displayed continuously, regardless of any automatic changes in the display of messages **305** in window **251**).

In some embodiments, a new message **305**E that is transmitted at time T**2** to television **303** is identified by computer system **250** based on one or more tags associated with secondary video **341** (as illustrated by arrow **363** in FIG. **3**C). Moreover, another temporal relationship **352** is formed between times T**2** and T**3** as shown in FIG. **3**C, due to overlap between a duration for which secondary video **341** is displayed on TV screen **307** and a corresponding duration during which the new message **305**E is displayed on handheld screen **204**. FIG. **4**D shows the messages at time T**3** in the illustrative example shown in FIGS. **4**A-**4**C. In one such embodiment, the just-described two durations are sufficiently similar or identical to one another, with a difference therebetween being less than a user-perceptible delay (e.g. delay less than 1 millisecond).

Although a message **305**A disappears from screen **204** at time T**2** as shown in FIG. **3**D, in some embodiments such a previously-displayed message **305**A merely scrolls off the display on screen **204** and is temporarily retained by EPG app **202**I, in a memory **385** included in handheld device **200**. Memory **385** is shown conceptually located below the handheld device at time T**2** by a dashed line in FIG. **3**D. Therefore message **305**A is available in handheld device **200**, for immediate retrieval and re-display on screen **204** by EPG app **202**I in response to user input on screen **204**.

In some embodiments, a user touches a touch-sensitive screen **204** in the normal manner of operation of a list of items displayed by handheld device **200**, so as to manually scroll through messages **305**. Specifically, in response to the user's touch, EPG app **202**I responds by changing the display on screen **204** to scroll back through earlier messages that have been previously-displayed by EPG app **202**I. Although information displayed in area **289** is not automatically-scrolled, EPG item **304** displayed therein does get scrolled along with messages **305** displayed in areas **290**A-**290**Y in response to user input.

Specifically, during manual scrolling all information currently displayed on screen **204** is scrolled, regardless of whether the display areas are automatically-locked or automatically-scrolled. For example, between times T**2** and T**3** (FIG. **3**E), manual scrolling by the user sliding a finger in an upward direction on touchscreen **204** brings into display a previously-displayed message **305**A (from memory **385**) into area **290**Y, and a message **305**E that was earlier displayed in area **290**A prior to the user's touch is scrolled into automatically-locked area **289** after the user's touch. Therefore, manual scrolling on screen **204** is similar or identical to manual scrolling of any list of items typically displayed in applications that execute in a smartphone, such as an iPhone.

The above-described memory **385** is local to and contained within handheld device **200**, and local memory **385** is supplemented by an additional memory (not shown in FIG. **3**D) in computer system **250** that holds an identifier of each message that has been previously transmitted to handheld device **200** of each user. Hence, as a user manually scrolls backwards through their list of messages, a corresponding number of additional previously-displayed messages are transmitted from computer system **250** to local memory **385**, thereby to eliminate a memory constraint (based on the size of memory **385**) on the number of previously displayed messages that can be shown to the user in the absence of such additional memory.

In some embodiments of the type illustrated in FIG. **3**C, at time T**3**, computer system **250** completes transmission of secondary video **341** and starts transmission of another secondary video **342** which is also not requested by the user. Hence, television **303** starts displaying another secondary video **342** at time T**3**. Additionally at time T**3**, computer system **250** also transmits another new message **305**F to the associated handheld device **200** as illustrated by arrow **364**. Hence, at time T**3**, handheld device **200** automatically scrolls messages **305**E-**305**C which are currently displayed, and message **305**B disappears from view. As noted above, message **305**B is kept in memory **385**, now with message **305**A so both these messages are available for display by EPG app **202**I in response to user input to scroll back the displayed list of messages. Hence, at time T**3**, a new message **305**F is automatically displayed on handheld screen **204** in region **290**A.

Therefore, yet another temporal relationship **353** is now formed between times T**3** and T**4**, due to overlap between a duration for which another secondary video **342** is displayed on TV screen **307** and a duration during which the most-recently received message **305**F is displayed on handheld screen **204**. Subsequently, at time T**4**, computer system **250** returns to transmitting primary video **302**. In some embodiments, at time T**4** there is no change in the current display of screen **204**, i.e. messages **305**C-**305**F and EPG item **304** continue to be displayed on screen **204**. FIG. **4**E shows the messages **305**C-**305**F displayed at time T**4** by the handheld device **200** in the illustrative example shown in FIGS. **4**A-**4**D. The next change on handheld screen **204** happens at time T**5**, when computer system **250** suspends transmission of primary video **302** and starts transmission of a third secondary video **343** to television **303** and also transmits a new message **305**G to handheld device **200** as illustrated by arrow **365**.

Therefore at time T**5**, message **305**C disappears from view on screen **204** and messages **305**D-**305**F are automatically scrolled downward on screen **204** and the new message **305**G is displayed immediately below EPG item **304** (which con-

tinues to be displayed unchanged). Hence, another temporal relationship **355** is formed between times T**5** and T**6** as shown in FIG. **3**C, due to overlap between a duration for which secondary video **343** is displayed on TV screen **307** and a corresponding duration during which the new message **305**G is displayed on handheld screen **204**. FIG. **4**F shows the messages **305**D-**305**G displayed at time T**5** by handheld device **200** in the illustrative example shown in FIGS. **4**A-**4**E.

Subsequently, at time T**6**, display of primary video **302** resumes on TV screen **307**, but the display on handheld screen **204** remains unchanged, thereby resulting in another temporal relationship **356** between times T**6** and T**7**. FIG. **4**G shows the messages at time T**6** in the illustrative example shown in FIGS. **4**A-**4**F.

At time T**7**, the display of primary video **302** is completed (i.e. video **302** has reached the end), and in some embodiments computer system **250** automatically begins transmission of another primary video **370** to television **303**, as illustrated in FIG. **3**C. In such embodiments, computer system **250** automatically selects primary video **370**, e.g. based on attributes of the user. Additionally at time T**7**, in conjunction with transmission of video **370** to television **303**, computer system **250** also transmits to handheld device **200**, a new EPG item **371** that identifies video **370** and additional messages **372**A-**372**D. At time T**7**, television **303** begins the display of video **370** and at about the same time (e.g. within a few seconds), handheld device **200** replaces previously-displayed EPG item **304** with newly-received EPG item **371** and further replaces previously-displayed messages **305**D-**305**G with newly-received messages **372**A-**372**D. In this manner, a handheld screen **204** that is associated with television screen **307** is updated by computer system **250** with new supplementary and complementary information, whenever a corresponding primary video is changed. FIG. **4**H shows the messages **372**A-**372**D displayed by handheld device **200** at time T**7** in the illustrative example shown in FIGS. **4**A-**4**G.

Although in the embodiments illustrated in FIG. **3**D there are no changes on screen **204** when the video being displayed on screen **307** changes, e.g. from secondary video **342** to primary video **302** at time T**4** and from secondary video **343** to primary video **302** at time T**6**, in other embodiments a new set of messages are displayed on screen **204** at such times, in a manner similar to time T**7**. Moreover, although in some embodiments, messages **305**A-**305**D are all of the same type (e.g. all promotional messages), in other embodiments messages of two types alternate among each other, e.g. a promotional message, a social media message, another promotional message, another social media message.

Handheld device **200** of several embodiments in accordance with the invention displays a message of the type described above in response to a trigger event, such as a predetermined frame number in the video **302** displayed on screen **307**, a predetermined time of the day (e.g. noon every day), or a predetermined signal from the Internet. In one such embodiment illustrated in FIG. **5**A, when the display of video **302** begins at time T**1** on screen **307**, messages **502**A-**502**D are displayed on screen **204** (see FIG. **5**B). Thereafter, a predetermined trigger event occurs at time T**2**, and the display on handheld device **200** is updated by scrolling messages **502**B-**502**D downward and a new message **502**E is displayed (and message **502**A disappears). In some embodiments, handheld device **200** simply displays a list of messages **502**A-**502**D as received from computer system **250** at time T**1**, and thereafter handheld device **200** replaces the currently displayed list, with a new list of messages **502**B-**502**E as received from computer system **250** at time T**2**. In several such embodiments, handheld device **200** simply displays on its screen **204** all information as received from computer system **250**, and therefore computer system **250** transmits the EPG item **501** to handheld device **200** twice, i.e. with each message list transmitted at each of the two times T**1** and T**2**.

In the example illustrated in FIG. **5**C, new message **502**E is a social media message that has been selected, e.g. based on an attribute (such as a list of friends) of the user of handheld device **200** or based on video **302** currently being displayed on screen **307**. Although a social media message **502**E is illustrated in FIG. **5**C as being generated in response to a trigger event (such as repeated occurrence of a predetermined duration of time), other embodiments use other messages, e.g. a promotional message or use other trigger events (such as a predetermined frame number in the video being displayed), or any combination thereof. In some embodiments, computer system **250** uses filter criteria set by the user of handheld device **200** to exclude messages that match the filter criteria. An example of a filter criterion is the age of a message, e.g. the user may filter out all messages that are more than 1 day old. In the example illustrated in FIG. **5**B, computer system **250** searches a message repository periodically, e.g. every 5 minutes, for messages that match predetermined criteria (such as keywords to be used in matching), and the finding of a matching message by computer system **250** constitutes a predetermined trigger event that occurs at time T**2**. The matching message **502**E is then displayed by handheld device **200**, as shown in FIG. **5**C.

In another example illustrated in FIG. **5**D, a list of predetermined frame numbers constitute trigger events for the display of new messages by handheld device **200**. Specifically, a predetermined frame number **15000** occurs during the display of video **302**, at a time T**2** in FIG. **5**D, and accordingly computer system **250** searches its message repository for messages that match the predetermined criteria (such as a set of keywords associated with each predetermined frame number in the list). A predetermined number of matching messages are then displayed by handheld device **200**. For example, on handheld screen **204**, EPG item **501** and messages **502**E-**502**H are displayed at time T**2** (FIG. **5**F), replacing the entire display of EPG item **501** and messages **502**A-**502**D displayed earlier at time T**1** (FIG. **5**E).

In some embodiments, a message ("secondary message") that is transmitted at the same time as the start of transmission of a secondary video is prepared by computer system **250** to include certain features, such color and graphic that are excluded from another message ("primary message") that is transmitted at the same time as the start of transmission of a primary video. In one such embodiment, each secondary message and a corresponding secondary video originate from a single entity, such as an advertiser. In one specific example, primary messages from an advertiser are referred to herein as "KRADs" while secondary messages from an advertiser are also referred to herein as "CRADs" and "GRADs". Note that KRADs, CRADs, and GRADs are three types of promotional messages from advertisers, also called remote advertisements ("RADs").

In some embodiments, each of the messages is stored in a computer file in a file system on a disk, whereas in other embodiments each of the messages is stored in a record in a database on a disk, and in still other embodiments a portion of each message (e.g. text) is stored in the database and another portion of each message (e.g. graphic) is stored in a computer file. In such embodiments, the information transmitted by computer system **250** to handheld device **200** includes only text in a list of messages to be displayed in window **251** and a URL of any graphic image associated with the text. Accordingly, in such embodiments, handheld device **200** initially

displays the text first on handheld screen **204** and the graphic (e.g. see graphic **256**J in FIG. **2**G) is displayed after handheld device **200** downloads the graphic using the URL from the Internet. Such a two-step display of the text and graphic individually reduces the latency in the initial display of the text of the messages in window **251**.

In one such example, an advertiser (such as The Proctor & Gamble Company) prepares a TV commercial for detergent (such as TIDE) as a secondary video, and additionally also prepares a corresponding secondary message containing an advertisement of the same detergent (e.g. offering to sell 70 oz for $9.99—see FIG. **3**C). Accordingly, in this example, a secondary video in the form of a TV commercial for TIDE on TV screen **307** is supplemented by a secondary message in the form of an advertisement for TIDE on handheld screen **204**. The just-described secondary message is matched by computer **250** to the just-described secondary video, e.g. by use of a globally unique identifier as the key word associated with each of the secondary message and the secondary video.

An example of the above-described embodiments is shown in FIG. **6**A, wherein a user has previously touched on handheld device **200**, an EPG item **304** of a cartoon movie entitled "Plane Crazy" (e.g. displayed by EPG app **202**A supplied by content provider A) starring Mickey Mouse, produced by Walt Disney, in the manner described above. Following the user's touch, computer system **250** is shown in FIG. **3**B as responding by transmitting: (1) to television **303**, a primary video **302** which constitutes an initial sequence of frames of the "Plane Crazy" movie (e.g. 27000 frames to be displayed at 30 frames/second, over 15 minutes) and (3) to handheld device **200**, a signal which includes the text "Miney Mouse Gloves $2.00" as an automatically-scrolled message **305**A. In this example, the text "Miney Mouse Gloves $2.00" is a string of characters of text that is to be displayed by handheld device **200**, containing an advertisement for gloves on sale by an advertiser which can be a department store, e.g. TARGET, or WALMART, or a specialized store, e.g. TOYSRUS.

Hence, in one specific illustrative embodiment shown in FIG. **6**A, handheld device **200** displays the "Miney Mouse Gloves $2.00" message **305**A in area **290**Y during the time that television **303** is simultaneously displaying any frame in the movie "Plane Crazy." (in alternative embodiments, contemporaneously displaying instead of simultaneously displaying). As noted above, transmission of signal **312** carrying a sequence of frames of movie "Plane Crazy" is directly caused by video request **301**, and transmission of signal **311** carrying one or more messages **305**A-**305**D is also directly caused by video request **301** in some embodiments of computer system **250**. In other embodiments transmission of one or more of messages **305**A-**305**D in signal **311** is indirectly caused (in computer system **250**) by transmission of a predetermined frame within user-selected video **302** (in turn caused by receipt of video request **301**).

An overlap between a display of "Miney Mouse Gloves $2.00" message **305**A by handheld device **200** and a display of the movie "Plane Crazy" by television **303** depends on a specific implementation of the invention, as follows. Specifically, a precise moment when the display of EPG item **304** and messages **305** begins on handheld device **200** (at time T**1** in FIG. **3**C) and a corresponding moment when a display of video **302** begins on television **303** depends on multiple factors as follows: (A) when the two signals **311** and **312** are respectively transmitted by computer system **250**, (B) delays in propagation through respective networks to respective destinations, and (C) processing time required to parse the respective signals on receipt. For example, an illustrative implementation in accordance with the invention is designed to ensure that a display of automatically-scrolled message **305**A by handheld device **200** overlaps (in time) a corresponding display of video **302** by television **303**, for at least one minute.

Referring to FIG. **6**B, a method **400** in accordance with the invention is performed by a combination of computer system **250**, a handheld device **200**, and a television **303**. Specifically, acts **431**-**433** (see bottom right corner of FIG. **6**B) are performed in some embodiments of the invention by handheld device **200** located in a family room **310**, while executing an EPG app **202**I of the type described above, as follows. In act **431**, handheld device **200** receives user input via its touch screen **204**, identifying a user's selection of a specific video, e.g. primary video **302**. Handheld device **200** then responds to the user input by sending video request **301** wirelessly to computer system **250**. In one illustrative embodiment, video request **301** includes a UPC code that uniquely identifies video **302** which has been selected by the user. In an alternative embodiment, video request **301** includes an identification of the video, such as a uniform resource locator (URL) address that identifies a specific computer uniquely on the Internet, and further identifies a directory path therein at which is located a file containing video **302**.

Video request **301** is received by computer system **250** located outside family room **310** in an act **411** (see top of FIG. **6**B). In some embodiments, as shown by act **413** in FIG. **4**A computer system **250** responds to receipt of video request **301** by transmitting a signal **312** (see FIG. **3**B) carrying at least a portion of the user-selected video **302** identified in video request **301**. Depending on the embodiment, in act **413** the entirety of user-selected video **302** may be transmitted in signal **312**, e.g. if primary video **302** is only 5 minutes long in duration (δT) when displayed on television **303**. Additionally, as shown by act **414** in FIG. **6**B, also in response to receipt of the same video request **301**, computer system **250** transmits a signal **311** (see FIG. **3**B) to handheld device **200**. Signal **311** includes a message **305** of the type discussed above, to be displayed by handheld device **200** on its own screen **204**. Hence, in response to the same video request **301**, multiple signals are transmitted by computer system **250** programmed as described in the current paragraph, namely signal **311** and signal **312** to the respective devices namely television **303** and handheld device **200** that are associated with one another and in some embodiments physically co-located relative to one another, for example in room **450** (see FIG. **6**A) of a user's home.

In act **413** of some embodiments, computer system **250** transmits signal **312** in a real-time stream of data and frames therein are recovered by a processor in television **303** on receipt thereof and displayed on TV screen **307**. In such embodiments, only a portion (e.g. of 15 minute duration) of user-selected video **302** (also called "primary video") is streamed initially in order to switch to transmitting (in the real-time stream) a secondary video as per act **414** (described above) before transmitting (in the real-time stream) a next portion (e.g. also of 15 minute duration) of the primary video (thereby to continue transmission of the user-selected video). Accordingly, act **413** is initially performed directly in response to a video request, and subsequently repeated after act **418** (described below) as an indirect response to the same video request.

Hence in such embodiments, after performing act **414**, computer system **250** performs act **415** to check if it is now time for secondary video, and if so computer system **250** selects a secondary video in act **419** and then begins transmission of the selected secondary video to television **303** and then goes to act **418**. In act **418**, computer system **250** selects

a next portion of the primary video and then returns to act **413** described above. In act **415** if the answer is no, computer system **250** goes to act **416** and checks if the display of the primary video has ended and if so computer system **250** exits in act **417**. If the display of the primary video has not ended in act **416**, computer system **250** goes to act **418** (described above). Note that act **414** may be performed initially but skipped during iteration in the loop (from act **418**), depending on the embodiment.

In act **413** of alternative embodiments, computer system **250** transmits signal **312** to download the user-selected video **302** to television **303**. Hence, in the alternative embodiments, if transmission of the primary video (e.g. user-selected video **302**) is not completed at the end of act **413** (e.g. if only a first 15 minute portion of an hour long video has been downloaded), then as per act **416** computer system **250** waits for a duration δT which is needed by a television to display the transmitted portion of the primary video at normal speed, e.g. at a frame rate that is normally used for display of videos on TV **303**. As noted above, an example of δT is 15 minutes. Then, computer system **250** goes to act **417** (described above).

In act **414**, in response to receipt of a video request **301**, computer system **250** of certain alternative embodiments does not transmit a message **305** in signal **311** (FIG. **3**B), and instead computer system **250** transmits an identifier of the message (e.g. identifier of non-EPG information) in signal **311**. In the just-described alternative embodiments (of the current paragraph), computer system **250** has already transmitted to handheld device **200** a catalog containing non-EPG information likely to be displayed, and this catalog is used on receipt of the identifier to retrieve the message to be displayed. Hence, at this stage, when signal **311** is being transmitted, handheld device **200** includes a catalog of non-EPG information in a non-volatile memory of handheld device **200**, such as a flash memory or a hard disk.

In the embodiment illustrated in FIG. **6**B, on receipt of signal **312**, television **303** retrieves one or more frames of video **302** contained in signal **312**, as per act **421** and goes to act **422**. In act **422**, television **303** automatically displays the retrieved frames of video **302** on TV screen **307**, and then returns to act **421** (described above). Moreover, in the embodiment illustrated in FIG. **6**B, on receipt of signal **311**, handheld device **200** programmed with EPG app **2061** retrieves one or more message(s) **305** contained in or identified in signal **311**, as per act **433** and goes to act **434**. In act **434**, handheld device **200** automatically displays the retrieved message(s) **305** on its screen **204**, and then returns to act **433** (described above). Note that handheld device **200** in the embodiment illustrated in FIG. **6**B includes at least a processor coupled to memory and the memory stores an EPG app **202**I with the related EPG data including one or more descriptions **206**A-**206**Z of corresponding videos **208**A-**208**Z (see FIG. **2**B) as described above.

In some embodiments, there are no changes to a display on handheld screen **204** when a user rewinds (or fast forwards) a display of user-selected video **302**. Specifically, in these embodiments, even when a signal is sent from handheld device **200** to computer system **250** to rewind or fast-forward video **302**, no new messages for display by handheld device **200** are sent by computer system **250** so that any messages currently displayed on screen **204** continue to be displayed even if the currently-displayed messages would normally change on screen **204** when video **302** is displaying on TV **303** at normal speed,

In the embodiment illustrated in FIG. **6**B on receipt of signal **311**, a processor in handheld device **200** when programmed with an EPG app **202**I retrieves a message **305** that is contained in or identified in signal **311**, as per act **433** and goes to act **434**. In act **434**, the processor of handheld device **200** automatically displays the retrieved message **305** on handheld screen **204**, and then returns to act **433** (described above).

Transmission of video request **301** and display of video-request caused message(s) **305**A-**305**D and an EPG item **304** by handheld device **200** is implemented in many embodiments by certain software that is used by each EPG app **2021** to interact with computer system **250**. Specifically, in some embodiments, a common piece of software called "authority-compatible handheld interface" **209**I (FIG. **2**B) is included in (and integrated into) each EPG app **202**I that is otherwise implemented independently by the corresponding content provider I, among multiple providers A-N. To summarize, in many embodiments, there are a N number of EPG apps **202**A-**202**N in handheld device **200** used to browse N corresponding video libraries of N content providers, and the N interfaces **209**A-**209**N included in the N different EPG apps **202**A-**202**N are all identical to one another, supplied by a single computer also referred to herein as an "authority server". Interfaces **209**A-**209**N being identical to one another ensures that computer system **250** interacts with handheld device **200** in an identical manner, regardless of which EPG app **202**I is currently being used.

In many embodiments of the type described herein, television **303** is a normal television **313** (FIG. **7**) that modified by including therein a data network interface circuit **392** (i.e. TV **313** and circuit **392** are together enclosed in a housing to form internet-enabled television **303**). Data network interface circuit **392** can be external to the TV housing, e.g. included in a separate housing of either a set-top box or a player of an optical disk, depending on the embodiment. In several embodiments in accordance with the invention, TV screen **307** (FIG. **3**A, FIG. **7**) is an external surface (e.g. formed of glass) on which an electronically created picture or image is normally formed, such as a large end of a cathode-ray tube of a television, or a glass plate of a liquid crystal display (LCD) or a plasma display. In many embodiments, such a TV screen **307** is several times (e.g. 4 or 5 times) larger when measured along a diagonal than handheld screen **204**. In one illustrative example, TV **303** has a screen **307** that is 15.6 inches in size (measured diagonally) more than four times larger than the 3.5-inch screen **204** of a handheld device **200**. Two illustrative examples of normal television **313** are the products (1) KDL-52V5100, which is a BRAVIA V series HDTV with a 52-inch LCD flat panel and a digital video processor, available from Sony Corporation and (2) SV370XVT which is also a HDTV, available from Vizio, Inc.

Although in embodiments of the type illustrated in FIG. **3**A, a message **305** transmitted by computer system **250** is in response to receipt therein of a video request **301**, in alternative embodiments of the type illustrated in FIG. **7**, message **305** is transmitted by computer system **250** in response to an additional request **551** (see FIG. **7**) from handheld device **200** explicitly requesting one or more messages. Also depending on the embodiment, video **302** that is selected for display by television **303** (FIG. **3**A) is either explicitly identified by user input selecting one of descriptions **206**A-**206**Z displayed on the screen **204** of handheld device **200** as described above (e.g. in reference to acts **411** and **413** in FIG. **6**B), or alternatively video **302** is automatically selected by computer system **250** in some embodiments of act **412**.

In a number of alternative embodiments, a handheld device **200** does not use a wireless network **308**, as shown in FIG. **3**A and instead handheld device **200** uses a wireless access point

501 (FIG. 7) that in turn is coupled to a router 502. In several such alternative embodiments, router 502 is coupled to data network 309 (described above) and therefore, the video request 301 is transmitted through data network 309 instead of wireless network 308. Moreover, in certain alternative embodiments, a television 303 of the type illustrated in FIG. 3A is not co-located within the same room as handheld device 200. In one such alternative embodiment illustrated in FIG. 7, a handheld device 200 is located in a room 521 that is separated by a wall 523 from another room 522 in which is located a normal television 313 that is similar or identical to above-described television 303 described herein. In one example of just-described embodiment, rooms 521 and 522 are in the same building, e.g. a parent working in study room 522 and a child viewing television 313 in family room 521.

Note that in another alternative embodiment of the type described above, rooms 521 and 522 are located in two different buildings that are physically separated from each other, e.g. a parent operates handheld device 200 at a room 521 in the parent's office which is located several miles distant from room 522 in that parent's home wherein a child is watching television 303. In such an embodiment, wireless access point 501 is coupled to a router 524 that in turn is coupled to data network 309 as shown in FIG. 7. Moreover, in some embodiments, a handheld device 200 uses wireless access point 501 (FIG. 7) with one or more router(s) 502 and optionally 524 to transmit a signal 552 to data network interface circuit 392 locally, i.e. within the user's building thereby to minimize latency in the response of television 303. In some embodiments, signal 552 is used by handheld device 200 essentially to transmit video navigation and audio control commands to data network interface circuit 392 that is connected to television 303. In other embodiments, signal 552 is used exclusively to transfer all information between handheld device 200 and computer system 250, i.e. video request 301 and messages 305 are transferred to and from computer system 250 only via circuit 392. In alternative embodiments, signal 552 is not used at all, and in these embodiments video navigation information is transmitted from handheld device 200 to computer system 250 directly, and then transmitted from computer system 250 to television 303.

In some alternative embodiments, a request 551 is transmitted by handheld device 200 in response to a pre-specified event occurring in handheld device 200, such as periodically every 15 minutes from the time an EPG app 202J is opened. In such alternative embodiments, TV programs are unicast to television 303 in signal 312, in response to a TV-program request (instead of a video request) in signal 301 from handheld device 200. In such alternative embodiments, act 412 is performed by computer system 250 in response to a TV program request (not shown) from handheld device 200 that does not identify any video on demand. Instead, as soon as an EPG app 202I is opened on handheld device 200, an act 432 is performed by a processor of handheld device 200 to transmit a TV program request that identifies a scheduled TV program. The scheduled TV program is implemented in some embodiments by a table in a memory of computer system 250, wherein one column has start time and another column has the name of a TV program to be transmitted in response to TV program requests (at the start time).

Television 303 of FIG. 3A can be, for example, an Internet-enabled television that includes a processor, a memory (including an authority-compatible set-top interface) and a receiver (including a tuner) in conformance with a specification published by the Advanced Television Systems Committee, such as the ATSC standard A/53 that was adopted by the Federal Communications Commission in the United States (US) in 1996 and has now replaced the NTSC television system in the US. Hence, in an embodiment of the type illustrated in FIG. 3A, television 303 is coupled to a router 502 that in turn is coupled to a data network 309 (e.g. Internet or an internal network of a cable TV service provider such as COMCAST). Note that in certain alternative embodiments, the user views video 302 on a normal television 313 that is externally coupled to data network interface circuit 392 (FIG. 7). In normal operation, data network interface circuit 392 is coupled by router 502 to a data network 309.

Moreover, in some embodiments, computer system 250 as illustrated in FIG. 3A includes a single computer that performs acts 411-417 described above in reference to FIG. 6B, although in other embodiments computer system 250 (see FIG. 7) includes multiple computers 281A-281N and 282 that are interconnected to one another. In several embodiments, computer 282 is operated as an authority server that authorizes the release of videos to internet-enabled televisions in users homes, and computers 281A-281N are operated by content providers that maintain repositories of videos to be authorized by computer 282 ("authority server"). Accordingly, in several illustrative embodiments shown in FIG. 7, authority server 282 performs act 414 (FIG. 6B) and another computer 281I ("content provider server") performs act 413. In several such embodiments, only a video request 301 (and no message request 551) is sent by handheld device 200 to authority server 282, and authority server 282 in turn sends another message to content provider server 281I, e.g. identifying a video 302 to be transmitted, and also identifying a specific television 303 as the destination for the identified video 302. In one example, computer system 250 is implemented by computers 282 and 281A-281N (FIG. 7) in a server farm operated by a data-center service provider, such as Amazon.com.

In some embodiments illustrated in FIG. 7, a handheld device 200 sends data to and receives data from authority server 282 using XML (extensible markup language) data format although in other embodiments the data may be transferred using other formats, such as JSON (javascript object notation), serialized objects in binary, and any custom format or public format. In several embodiments, handheld device 200 communicates with authority server 282 (e.g. to transfer data and/or commands) using the communication protocol HTTP (hyper text transfer protocol), although in other embodiments the following communication protocols are used: sockets, UDP (user datagram protocol), and any custom protocol or public protocol. Similarly, in several such embodiments, television 303 receives data from authority server 282 using XML data format over HTTP protocol although in other embodiments, commands are transmitted over sockets using an API of the authority-compatible set-top interface in television 303. Moreover, in several such embodiments, television 303 receives a sequence of frames of video from a content provider 281I using any one of various protocols such as RTSP (real time streaming protocol), HTTP, UDP and any custom format or public format.

In some embodiments illustrated in FIG. 8A, an authority server 282 performs acts 801-809, a content provider server 282I performs acts 811-818, and third computers 283 ("message client") and 838 ("message server") perform one or more of acts 821-826, as discussed below to implement a computer system 250 described above. Specifically, in act 801, computer 282 receives an identifier of a video 302 in a video request 301 (FIG. 8B) from a handheld device 200. In embodiments that support multiple content providers, computer 282 may also receive, in act 801, an identifier of the content provider that maintains a repository 834I (FIG. 8B) in

which a file containing video **302** is available. Repository **834**I is physically present in a storage device (such as a hard disk) of a computer **281**I of content provider I.

In several such embodiments, an identifier of each content provider computer **281**I and an identifier of each video **208**J available therefrom (see FIG. **2**B) are combined into (e.g. by concatenation to form) a single globally unique identifier (GUID) in computer system **250**. A number of GUIDs, of videos **302** that are available for on-demand download from computer system **250**, are transmitted by computer **282** to handheld device **200** prior to act **801**, e.g. during initialization of one or more lists in an EPG app therein (such as a favorites list described above). Accordingly, one such GUID, which was previously supplied to handheld device **200**, is now returned in video request **301**, and is received in act **801**.

Subsequently, in act **802** (FIG. **8**A) computer **282** uses an identifier of handheld device **200** (that originated video request **301**) to perform a table look up in a database **831** (FIG. **8**B) to find an identifier of a television **303** that has been previously associated with handheld device **200** (e.g. via signal **832** shown in FIG. **8**B, during initialization of the EPG app therein). In such embodiments, database **831** supports association of only one television **303** with each handheld device **200**, in a many to one relationship, i.e. multiple handheld devices can be associated with a single television but not vice versa. In some embodiments, in act **802** a television **303** is authorized by computer **282** using a table in database **831** that holds an association between handheld device **200** and television **303**, and optionally holds additional information on television **303**, e.g. identity of one or more module(s) in television **303** to be used to enforce digital rights management (DRM) on video **302** to be supplied by the content provider.

Thereafter, in act **803** (FIG. **8**A), computer **282** transmits to computer **281**I, an authorization **836** including the identifier of television **303** which is now authorized to receive the identified video **302** and additionally an identifier of video **302** (or a portion thereof, e.g. if video **302** is subdivided into multiple 15 minute portions). Depending on the embodiment, the identifier of video **302** which is transmitted in authorization **836** can be same as or different from the above-described GUID of video **302** which is received in act **801**. In embodiments wherein an identifier of video **302** ("content provider's video identifier") that is transmitted to computer **281**I is different, computer **282** additionally performs in act **802** a look up of a translation table in database **831** to obtain the content provider's video identifier from the above-described GUID. Such a translation table is populated in database **831** during initialization of computer **281**I. In certain embodiments, in act **803**, computer **282** optionally generates a unique number ("DRM token") that is also transmitted in authorization **836** and the same DRM token is used in act **804** as discussed in the next paragraph. The DRM token can be generated in any manner, e.g. using a pseudo-random number generator in computer **282**.

Subsequently, in act **804** (FIG. **8**A) computer **282** transmits to television **303** an identifier of the video **302** to be downloaded and also an identifier of a source of the video, such as an identifier of the content provider. In one illustrative embodiment shown in FIG. **8**B, in act **804** computer **282** transmits a URL of a file located on computer **281**I in a signal **833** to television **303** (which is associated with handheld device **200**). Depending on the embodiment, the URL may or may not be encrypted (e.g. using the HTTPS protocol of the World Wide Web). In certain embodiments, in act **804** computer **282** additionally transmits in signal **833** the same DRM token that is also transmitted to computer **281**I. In these embodiments, television **303** uses the DRM token when requesting a download of video **302** from computer **281**I of the content provider.

Thereafter, in act **805** (FIG. **8**A), computer **282** automatically selects a predetermined number of messages from one or more message repositories, such as message repository **835** (FIG. **8**B) and message repository **839**, based either directly or indirectly on user-selected video **302** or an attribute thereof and/or an attribute of the user. In one illustrative example, each video has associated therewith a list of keywords ("video keywords") e.g. in a table of database **831**, and in this particular example computer **282** searches message repository **835** to find any promotional messages with text that matches the video keywords associated with the user-selected video **302**. Similarly, computer **282** may issue a search request to computer **838** to find any social media messages that match the video keywords. Note that in some embodiments, each promotional message is itself associated with a list of keywords ("message keywords") and computer **282** matches the video keywords to the message keywords, in order to find matching promotional messages. In such embodiments, the text of a promotional message does not necessarily contain the message keywords, and instead is simply associated therewith in repository **835**.

In act **805** (FIG. **8**A), computer **282** of some embodiments sorts the results of the keyword search to form a list of matching messages, and identifies from the top of the list, the predetermined number of messages (e.g. four messages or five messages) in act **805**. In several such embodiments, each message in repository **835** (FIG. **8**B) has associated therewith, a criterion ("ranking criterion") whose value used in sorting the list of search results. In one such embodiment, the ranking criterion has a value set by an author of the message, e.g. an advertiser that originates a promotion message to sell a product or service may set as a value of the ranking criterion a price (also called "bid") that the advertiser is willing to pay for the message to be selected for display to the user, in act **805**. Depending on the embodiment, computer **282** may use other criteria, such as the user's profile (e.g. age, or gender) to select messages in act **805**.

Subsequently, in act **806** (FIG. **8**A) computer **282** of many embodiments transmits to handheld device **200**, a signal **311** (FIG. **8**B) containing a sorted list of the messages selected in act **805**, e.g. ranked by size of advertisers bids. In alternative embodiments, messages themselves are not transmitted in act **806** and instead only identifiers of the selected messages are transmitted in signal **311** at this stage. The identifiers in signal **311** are used within handheld device **200** to look up a local copy of a message repository **835** that is stored therein (either in whole or in part). Hence, in one such embodiment, as set of messages that are likely to be displayed are identified and transmitted by computer **282** to handheld device **200** ahead of time, prior to act **806**. In this particular embodiment, the likely-to-be-displayed messages are maintained by handheld device **200** in a local memory **385** (FIG. **3**E), and one or more such messages are subsequently displayed in response to receipt of corresponding message identifiers, selected by performance of act **805** in computer **282** as described above.

Thereafter, in act **807** (FIG. **8**A), computer **282** automatically checks whether transmission of the user-selected video has been completed. Depending on the embodiment, an event indicating completion of transmission of the user-selected video is received in computer **282** either from computer **281**I or from television **303**. Accordingly, in act **807**, computer **282** waits for such an event, and on occurrence thereof, computer **282** performs act **808**. In act **808**, computer **282** selects another portion of the user-selected video **302** (in those cases

wherein video **302** is subdivided into multiple portions), and alternatively selects another video to be displayed on television **303** and then returns to act **803** (discussed above).

In some embodiments, in an act **811** (FIG. **8**A), computer **281**I receives an authorization **836** (FIG. **8**B) from authority server **282** to transmit video **302** to television **303** each of which is specifically identified in the authorization **836**. As noted above, in certain embodiments, a first DRM token is included in authorization **836**. Subsequently, in act **812**, computer **281**I receives a video fetch **837** from television **303**, and in certain embodiments a second DRM token is included in video fetch **837**. Thereafter, in act **813**, computer **281**I checks if the video **302** identified in video fetch **837** is protected with DRM and if not protected goes to act **814** (FIG. **8**A). In act **814**, computer **281**I retrieves the video from video repository **834**I (FIG. **8**B), and goes to act **818**. In act **818**, computer **281**I transmits the video the authorized television **303**, and on completion of transmission notifies computer **282** (i.e. authority server). As noted above, computer **282** of some embodiments waits for this notification in act **807**.

In act **813**, if computer **281**I finds that the video **302** to be downloaded is protected with DRM, then computer **281**I goes to act **815** to check if the television **303** to receive this video has available therein, a DRM module (e.g. DRM decryption software of a specific version from a specific vendor) that matches the encryption of video **302**, in order to be able to decrypt the video. Depending on the embodiment, computer **281**I checks for the configuration of television **303** either directly by interacting with television **303** or indirectly by interacting with computer **282** that holds configuration information on television **303** in its database **831**.

If computer **281**I finds in act **815** that television **303** that is to receive video **302** does not have the matching DRM module, then act **817** is performed to transmit an error message to computer **282** (i.e. authority server), followed by returning to act **811** (described above). If computer **281**I finds in act **815** that television **303** does have a matching DRM module, then computer **281**I goes to act **816** to check if the DRM token received in video fetch **837** is valid. For example, in one illustrative embodiment, computer **281**I simply compares the DRM token received in act **811** from computer **282** is equal to the DRM token received in act **812** from television **303**, and if so goes to act **814**. If there is no match in act **816**, computer **281**I returns to act **817** (described above).

Message repositories **835** and **839** (FIG. **8**B) can be populated in different ways depending on the embodiment. In some embodiments, computers **838** and **283** ("message server" and "message client" respectively) perform one or more of acts **821**-**826** as follows. Specifically, in act **821**, computer **838** receives a message, which may be of a specific type, such as a social media message from a user. In some embodiments of act **821**, computer **282** retrieves a social media message from a computer **838** on the Internet at a predetermined address, e.g. at the address identified by the string www % twitter % com after replacing % with the period "." In other embodiments of act **821**, computer **282** receives a promotional message from a computer **283** on the Internet of an advertiser. Computer **838** of some embodiments stores messages in repository **839**, based on type, i.e. only social media messages are stored in repository **839** and they are made accessible to computer **282** via a public API.

Next, in some embodiments computer **282** performs an act **822** to automatically generate message keywords that are to be used in matching message of a specific type (e.g. social media messages) received in act **821** with the video keywords. The message keywords are generated, for example, by automatically parsing the received message (such as a social media message), to identify words therein, followed by filtering out predetermined words (such as "the", "he", "she", "it" etc) and using the results of filtering to generate additional words (e.g. using a thesaurus). In other such embodiments, in act **822** computer **282** receives message keywords to be associated with the received message (such as a promotional message), from a human (e.g. an advertiser) user of computer **283**.

Next, in several embodiments, computer **282** performs act **823** to receive from the human user of computer **283**, a value of a criterion to be used with messages of a specific type (e.g. promotional messages) received in act **821** at a future time, when computer **282** ranks matching messages in act **805**. As noted above, in some embodiments, the value is a price (in dollars) that an advertiser is willing to pay for their promotional message to be selected in act **805**. Next, in act **824**, computer **282** stores a promotional message received in act **821**, the keywords in act **822** and the value in act **823** in a message repository **835**. Eventually, in act **825**, computer **283** receives a report from computer **282** (e.g. in response to a query) containing statistics on selection of the promotional message, and displays the report to the advertiser in act **826**.

FIG. **9**A illustrates, in a high level block diagram, an internet-enabled television of the prior art, for use in some embodiments of the invention. Specifically, in FIG. **9**A, a data network interface circuit **900** is externally coupled to a normal television **313**, using a HDMI cable **909**. Data network interface circuit **900** includes a microcontroller **901** which, in an illustrative example, is a single chip that includes a processor, a read-only memory, a random-access memory (RAM), a television interface circuit, a USB interface circuit and an Ethernet interface circuit. An example of microcontroller **901** is the product ST-7105 available from STMicroelectronics. Microcontroller **901** is typically mounted on a printed circuit board **900** and connected therethrough to an external RAM **902**, an external FLASH memory **903**, a power supply **904**, a USB connector **905**, an Ethernet connector **906**, and an HDMI connector **907** and the resulting combination (data network interface circuit **392**) may be included in a set-top box, or a player of an optical disk (such as a DVD player, or a Blue-ray player), or an Internet-enabled TV. One illustrative embodiment of a television **303** in accordance with the invention uses BDP-N460HP Blu-ray DVD player available from Sony Corporation to display video **302** on TV screen **307** (described above).

Microcontroller **901** typically includes a processor **911**, such as the SuperHitachi RISC running software stored in memory. The software executed by processor **911** in some embodiments of the invention is illustrated in FIG. **9**B, and typically includes a Linux Kernel **912**, one or more device drivers **913** (e.g. for USB, Ethernet, and HDMI interfaces), and a software development kit (SDK) shared library **914** for media control of audio and video streams, such as RTSP, multi-cast, UDP and DVB. One example of the just-described SDK software is available from STMicroelectronics as STAPI. Processor **911** additionally executes predetermined software **915** that provides an interface between microcontroller **901** and computer system **250** (also called "authority-compatible set-top interface", or simply "set-top interface") by supporting various services, such as discovery, authentication, security, and video and audio streaming.

Set-top interface **915** is several embodiments of the invention is invoked by a set-top application **916** (FIG. **9**B) that is executed by processor **911** as follows. Specifically, in a setup mode, set-top application **916** causes circuit **900** to display on screen **307** a number of choices from which the user can use a normal remote control of television **313** to select a specific

choice. One of the displayed choices is a logo that is associated with authority-compatible set-top interface **915**. Therefore, on receipt of user input selecting the just-described logo, set-top application **916** invokes execution of authority-compatible set-top interface **915**, which performs acts **921-928** discussed below.

In act **921**, microcontroller **901** performs initialization operations, such as configuring an Ethernet port and an IP address for connector **906** coupled to data network **309** and communicates with computer system **250** to identify itself, e.g. with a unique name and password supplied by the user to set up television **303** on initial activation by connection to computer system **250**. The just-described name and password are hereinafter referred to as TV-name and TV-password. Next, in act **922** microcontroller **901** waits for computer system **250** to provide a command. Thereafter, in act **923**, when a command is received from computer system **250**, microcontroller **901** executes the received command. For example, the command may be to navigate a currently playing video (such as fast forward, rewind, pause, play), to increase/decrease volume, to turn on/off the television, to read or store information in the memory of microcontroller **901** (such as user name and password).

On receipt of a command from computer system **250** to play a specific video from a specific content provider, in act **924** microcontroller **901** checks if the video is protected with a DRM (digital rights management) encryption scheme, such as a scheme available from Verimatrix, Inc. If the video is unprotected, then microcontroller **901** plays the video on TV screen **307** without any decryption, as per act **925**. If the video is protected, then microcontroller **901** checks if the video can be decrypted in act **926** (e.g. if decryption software is present in memory) and if so uses a decryption scheme corresponding to the encryption scheme as per act **927** to decrypt the video and then plays the video on TV screen **307** as per act **925**. As per act **926**, if the video is found to be not authorized to be played by the DRM encryption scheme, then in act **927** microcontroller **901** transmits an error message to computer system **250** that in turn transmits the error message to handheld device **200** (and optionally microcontroller **901** additionally displays an error message on television **303**). Then microcontroller **901** returns to act **922** (described above).

FIG. **10**A illustrates, in a high level block diagram, a handheld device of the prior art, for use in some embodiments of the invention. Specifically, as shown in FIG. **10**A, a handheld device includes a microcontroller **1001**. Microcontroller **1001** in an illustrative embodiment of handheld device **200** is a single chip that includes a microprocessor, a read-only memory, a random-access memory (RAM), and an Ethernet interface circuit. An example of microcontroller **1001** is the product S5PC100 ARM Cortex-A8 available from Samsung Corporation, and used in the iPhone available from Apple, Inc. Microcontroller **801** is typically mounted on a printed circuit board and connected therethrough to an external memory **1004**, a re-chargeable battery **1005**, a wireless antenna **1002** and a touch-screen **1003**. One illustrative embodiment in accordance with the invention uses a touch-screen of 320×480 pixels, 3.5 in (810 mm), 2:3 aspect ratio, 18-bit (262,144-color) LCD with 163 pixels per inch (ppi).

Microcontroller **1001** in some embodiments of handheld device **200** executes an operating system software **1011** stored in its memory **1004**, such as the iPhone OS 3.1.2 (build 7D11), released Oct. 8, 20010 by Apple, Inc. Additionally, microcontroller **1001** of several such embodiments executes one or more EPG apps **202**A, **202**B, **202**I, **202**N also stored in memory **1004**, each of which includes an authority-compatible handheld interface **2010**I (FIG. **10**B) in accordance with the invention and a SDK shared library that is specific to handheld device **200**, and typically released by a manufacturer of handheld device **200**. In alternative embodiments, an authority-compatible handheld interface **2010** is used in a shared manner similar to (or is included in) an operating system of handheld device **200**. In the alternative embodiments, each of EPG apps **202**A, **202**B, **202**I, **202**N dynamically invokes execution of a function in the shared authority-compatible handheld interface **2010** (FIG. **10**C) that in turn may dynamically invoke a function in the shared SDK library **1012**.

In some embodiments, microcontroller **1001** is programmed by an authority-compatible handheld interface to perform acts **1021-1028** and **1031-1037** as follows. Specifically, in act **1021**, microcontroller **1011** performs initialization operations, such as configuring an IP address for a wireless connection using antenna **1002** coupled by a cellular base station **308**C to a wireless network **308**. Also in act **1021**, microcontroller **1001** communicates with computer system **250** to identify itself, e.g. by using an IP address of handheld device **200** used for the wireless connection. Next, in act **1022** microcontroller **1001** displays on the above-described handheld screen **204** (i.e. screen **1003** in FIG. **10**A), a prompt for the user to enter an identifier of the TV, i.e. a TV-ID. In response to receipt of input from the user, in act **1023** microcontroller **1001** transmits the TV-ID to computer system **250**. Note that a user's entry of a TV identifier is not required subsequently by certain embodiments that store the TV identifier locally within handheld device **200** or store such TV ID remotely in a database in computer system **250**.

Thereafter, in act **1024** microcontroller **1001** receives a response from computer system **250**, and checks the response in act **1025**. If the response indicates failure, in act **1025**E microcontroller **1001** displays an error message to the user on screen **204** (i.e. screen **1003**). In act **1025**, if the response is success, in act **1026** microcontroller **1001** sends a request to computer system **250** for lists of video descriptions. In act **1027**, microcontroller **1001** receives and displays a video list and then waits in act **1028** for the user's command.

In several embodiments of the type described above, the user can navigate to a set up function in handheld device **200** at any time, or go back to a home screen of the EPG app **202**I. The user can then select a video to be played from a list of videos, for example from a favorites screen. In act **1031**, microcontroller **1001** receives input from the user which identifies a specific video. In some embodiments, in an act **1032** microcontroller **1001** checks an attribute of the user-selected video to identify a payment procedure to be followed. For example, if the attribute indicates that the user-selected video is free, microcontroller **1001** transmits (in act **1035**) an identifier of the user-selected video in a video request **301** to computer system **250** and otherwise in act **1033** microcontroller **1001** displays on screen **204** (i.e. screen **1003** in FIG. **10**A) a list of payment plans. In this example, the list of payment plans includes (a) free with commercials and (b) a predetermined amount (e.g. $1.10) without commercials.

In certain embodiments, the user's response (a) or (b) is received in act **1034** and saved as a default in handheld device **200**, for use in future when the user selects another video. After act **1034**, in act **1035** microcontroller **1001** transmits to computer system **250** an identifier of the user-selected video and the user's response (a) or (b) as to the payment procedure to be followed. Next, in act **1036** microcontroller **1001** receives from computer system **250** and displays on screen **204** a set of messages, such as multiple automatically-scrolled messages **305** (and optionally automatically-locked EPG item **304** depending on the embodiment). Thereafter,

microcontroller **1001** determines the type of each received message in act **1037** and displays each received message after initializing (in act **1038**) a specific module to be used for displaying additional information (in response to user selection of the received message) based on message type, and then goes to act **1039**. Note that each specific module for displaying additional information is not invoked in act **1038** at this stage and instead invoked in response to user selection of the corresponding message displayed in window **251**. In act **1039**, microcontroller **1001** waits for a command from the user, and for additional messages from computer system **250**. Computer system **250** additionally responds to the video request **301** as noted above, and the user-selected video starts to play, on whichever television **303** was identified by a TV identifier earlier received by computer system **250** from the same handheld device **200** and associated therewith (in act **1023** discussed above).

The three methods of FIG. **8**A may be used to program three copies of a computer **1100** of the type illustrated in FIG. **11**A as discussed next, to create an authority server, a content provider computer, and a message server (or message client). Specifically, computer **1100** includes a bus **1102** or other communication mechanism for communicating information, and a processor **1101** coupled with bus **1102** for processing information. Computer **1100** includes a main memory **1103**, such as a random access memory (RAM) or other dynamic storage device, coupled to bus **1102** for storing information and instructions (e.g. for the method of FIG. **2**A) to be executed by processor **1101**.

Main memory **1103** also may be used for storing temporary variables or other intermediate information (such as a DRM token of the type described above) during execution of instructions to be executed by processor **1101**. Computer **1100** further includes a read only memory (ROM) **1104** or other static storage device coupled to bus **1102** for storing static information and instructions for processor **1105**, such as the software to implement acts illustrated in FIG. **8**A. A storage device **1105**, such as a magnetic disk or optical disk, is provided and coupled to bus **1102** for storing information and instructions.

Computer **1100** may be coupled via bus **1102** to a display device or video monitor **1113** such as a cathode ray tube (CRT) or a liquid crystal display (LCD), for displaying information to a human, e.g. information in database **831** (FIG. **8**B) may be displayed on display **1113**. An input device **1114**, including alphanumeric and other keys (e.g. of a keyboard), is coupled to bus **1102** for communicating information and changes to processor **1101**. Another type of user input device is cursor control **1115**, such as a mouse, a trackball, or cursor direction keys for communicating information and command selections to processor **1101** and for controlling cursor movement on display **1113**. This input device typically has two degrees of freedom in two axes, a first axis (e.g., x) and a second axis (e.g., y), that allows the device to specify positions in a plane.

As described elsewhere herein, the acts illustrated in FIG. **8**A are performed in some embodiments in response to processor **1101** executing one or more sequences of one or more instructions that are contained in main memory **1106**. Such instructions may be read into main memory **1103** from another computer-readable storage medium, such as storage device **1105**. Execution of the sequences of instructions contained in main memory **1103** causes processor **1101** to perform the acts illustrated in FIG. **8**A. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions to implement the invention. Thus, embodiments of the invention are not limited to any specific combination of hardware circuitry and software.

The term "computer-readable storage device" as used herein refers to any storage device that participates in providing instructions to processor **1101** for execution therein, or data for processor **1101** to operate on. Such a storage device may take many forms, and may include, for example one or more of the following: (1) non-volatile storage media, and (2) volatile storage media. Common forms of non-volatile storage media include, for example, a floppy disk, a flexible disk, hard disk, optical disk, magnetic disk, magnetic tape, or any other magnetic medium, a CD-ROM, any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, a PROM, and EPROM, a FLASH-EPROM, any other memory chip or cartridge that can be used as storage device **1105**. Volatile storage media include dynamic memory, such as main memory **1103** which may be implemented in the form of a random access memory or RAM.

Instead of or in addition to a storage device **1105**, transmission link may be used to provide instructions to processor **1101**. A transmission link includes coaxial cables, copper wire and fiber optics, including the wires that comprise bus **1102**. A transmission link can also take the form of acoustic or light waves, such as those generated during radio-wave and infra-red data communications, any of which can be used to implement a carrier wave as described herein.

Accordingly, instructions to processor **1101** can be provided by a transmission link or by a storage device from which a computer can read information, such as data and/or code. Specifically, various forms of transmission link and/or storage device may be involved in providing one or more sequences of one or more instructions to processor **1101** for execution. For example, the instructions may initially be comprised in a storage device, such as a magnetic disk, of a remote computer. The remote computer can load the instructions into its dynamic memory (RAM) and send the instructions over a telephone line using a modem.

A modem local to computer **1100** can receive information on a telephone line and use an infra-red transmitter to transmit the information in an infra-red signal. An infra-red detector can receive the information carried in the infra-red signal and appropriate circuitry can place the information on bus **1102**. Bus **1102** carries the information to main memory **1103**, from which processor **1101** retrieves and executes the instructions. The instructions received by main memory **1103** may optionally be stored on storage device **1110** either before or after execution by processor **1101**.

Computer **1100** also includes a communication interface **1106** coupled to bus **1102**. Communication interface **1106** provides a two-way data communication coupling to a network link **1107** that is connected to a local network **1108**. Local network **1108** may interconnect multiple computers (as described above). For example, communication interface **1106** may be an integrated services digital network (ISDN) card or a modem to provide a data communication connection to a corresponding type of telephone line. As another example, communication interface **1106** may be a local area network (LAN) card to provide a data communication connection to a compatible LAN. Wireless links may also be implemented. In any such implementation, communication interface **1106** sends and receives electrical, electromagnetic or optical signals that carry digital data streams representing various types of information.

Network link **1107** typically provides data communication through one or more networks to other data devices. For

example, network link **1107** may provide a connection through local network **1108** to a local computer **1109** or to data equipment operated by an Internet Service Provider (ISP) **1111**. ISP **1111** in turn provides data communication services through the world wide packet data communication network **1111**, commonly referred to as the "Internet". Local network **1108** and network **1124** both use electrical, electromagnetic or optical signals that carry digital data streams. The signals through the various networks and the signals on network link **1107** and through communication interface **1106**, which carry the digital data to and from computer **1100**, are exemplary forms of carrier waves transporting the information.

Computer **1100** can send messages and receive data, including program code, through the network(s), network link **1107** and communication interface **1106**. Computer **1100** might transmit information related a television **303** or a video **302** retrieved from a distributed database system in storage device **1105** through Internet **1111**, ISP **1113**, local network **1108** and communication interface **1106**. The instructions for performing the operations of FIG. **8**A may be executed by processor **1101** as they are received, and/or stored in storage device **1105**, or other non-volatile storage for later execution.

FIGS. **11**B-**11**J illustrate, in flow charts, acts performed by computer **282** operating as an authority server in the illustrative implementation. Specifically, in some embodiments, authority server **282** receives a connection request from an internet-enabled TV **303** in act **1121** (FIG. **11**B) and goes to act **1122**. In act **1122**, authority server **282** checks if a record exists in database **831** (FIG. **8**B) for internet-enabled TV **303** and if not goes to act **1125**. In act **1125**, authority server **282** creates a new record in database **831** using the information received in act **1121**, and then goes to act **1124**. In act **1124**, authority server **282** marks TV **303** as being available and sends an instruction to TV **303** to await its next command. Then authority server **282** waits for a signal from handheld device **200** to be used to display video on TV **303**. In act **1122** if authority server **282** finds that a record already exists in database **831**, authority server **282** retrieves the record in act **1123** and then goes to act **1124** (described above).

In some embodiments, authority server **282** receives an application launch signal from a handheld device **200** in act **1126** (FIG. **11**C) and goes to act **1127**. In act **1127**, authority server **282** checks if a record exists in database **831** (FIG. **8**B) for handheld device **200** and if not goes to act **1130**. In act **1130**, authority server **282** creates a new record in database **831** using the information received in act **1126**, and goes to act **1129**. In act **1129**, authority server **282** marks handheld device **200** as being available and sends a session identifier to handheld device **200**, and then waits for any command from handheld device **200**. The session identifier can be any number that uniquely identifies a session with a handheld device **200**, e.g. from a counter that is sequentially incremented each time act **1129** is performed. In act **1127** if authority server **282** finds that a record already exists in database **831**, authority server **282** retrieves the record in act **1128** and then goes to act **1129** (described above).

In some embodiments, in an act **1131** (FIG. **11**D), authority server **282** receives a command to form an association, from a handheld device **200** identifying an internet-enabled TV, and goes to act **1132**. In act **1132**, authority server **282** checks if the identified TV has been marked as available and if not goes to act **1133**. In act **1133**, authority server **282** sends an error message to the handheld device **200** indicating that the identified TV is not available, and then returns to act **1131** (described above). In act **1132**, if authority server **282** finds that the identified TV is marked available, then authority server **282** goes to act **1134**. In act **1134**, authority server **282** marks handheld device **200** as being associated with TV **303**, e.g. identified by a session identifier. Next, authority server **282** goes to act **1135** and sends a signal to handheld device **200** indicating the command was successfully executed. Next, in act **1136**, authority server **282** awaits a command from handheld device **200**.

In some embodiments, in an act **1137** (FIG. **11**E), authority server **282** receives from handheld device **200**, a request for one or more list(s) of EPG items. Next, in act **1138**, authority server **282** retrieves the requested list(s) from database **831** that contains a table of lists, indexed by user. Then, in act **1139**, authority server **282** sends the retrieved list(s) to handheld device **200**, and goes to act **1140**. In act **1140**, authority server **282** waits for a next command from handheld device **200**.

In some embodiments, in an act **1141** (FIG. **11**F), authority server **282** receives from handheld device **200**, the identity of an EPG item that has been selected by the user, e.g. including a video identifier and an identifier of a content provider. Next, in act **1142**, authority server **282** retrieves from a computer **281**I of content provider, a video description identified by the EPG item selected by the user. Next, in act **1143**, authority server **282** sends the retrieved video description to the handheld device **200**. Thereafter, in act **1144**, authority server **282** waits for another command from handheld device **200**.

In some embodiments, authority server **282** receives the user's selection to pay for a video including a video identifier, in an act **1145** (FIG. **11**G) and goes to act **1146**. In act **1146**, authority server **282** processes a payment for the video, e.g. using payment information in a profile of the user and then goes to act **1147**. In act **1147**, authority server **282** checks if the payment transaction completed successfully, and if not goes to act **1149**. In act **1149**, authority server **282** sends an error message to handheld device **1149**, indicating that payment failed. In act **1147** if the answer is yes, then authority server **282** goes to act **1148** and invokes a procedure to play the video ("committed play"), illustrated in FIG. **11**H and described next.

In some embodiments, authority server **282** receives a command to play a video in an act **1151** (FIG. **11**H) and goes to act **1152**. In act **1152**, authority server **282** retrieves from database **831**, an identifier of the TV **303** which is associated with the handheld device **200** and goes to act **1153**. In act **1153**, authority server **282** sends a command to play the video to computer **281**I of the content provider and goes to act **1154**. The command transmitted in act **282** includes an identifier of video **302** and an identifier of the TV **303** and optionally a DRM token of the type described above. In act **1154**, authority server **282** sends to TV **303** a URL of a file containing the video at computer **281**I, and optionally the same DRM token. Next, in act **1155**, authority server **282** retrieves from database **831**, a list of frames in the video **302** that are to trigger messages to be sent to handheld device **200** and thereafter sends the list to TV **303**. Next, in act **1156**, authority server **282** retrieves a list of keywords that are associated with the current frame number and goes to act **1157**. Note that during a first iteration at the start of video **302**, the current frame number is zero and on successive iterations the current frame number is received by authority server **282** from TV **303** as discussed below in reference to act **1163**.

In act **1157**, authority server **282** matches the retrieved keywords (at the current frame number), with keywords associated with messages in repository **835** (FIG. **8**B) and goes to act **1158**. During matching in act **1157**, authority server **282** may use one or more attributes of the user of handheld device

200, depending on the embodiment. In act 1158, authority server 282 sorts messages resulting from act 1157, using a ranking criterion (e.g. if each message is associated with a value of a ranking criterion) and goes to act 1159.

Depending on the embodiment, the messages are sorted to be displayed at different positions in window 251 (FIG. 2G) relative to one another based on type, including two types namely a social media message and a promotional message. In one embodiment of act 1157, computer system 250 prepares a list of social media messages interspersed between promotional messages for display by handheld device 200, so that social media messages are displayed in areas 251A and 251J in FIG. 2G and promotional messages are displayed in areas 251I and 251M. In one such embodiment, the promotional messages are positioned in the list prepared by computer system 250 so that they are displayed in a specified order in the vertically downward direction on screen 204, the specified order being decided by computer system 250 based on bids by the corresponding advertisers in descending order.

In act 1159, authority server 282 sends to handheld device 200, a predetermined number of messages (e.g. four or five messages) from the top of the list of sorted messages and goes to act 1160. In act 1160, authority server 282 checks if all handheld devices that are associated with TV 303 have been messaged and if not returns to act 1157. If the answer in act 1160 is yes, then authority server 282 goes to act 1161. In act 1161, authority server 282 waits for a command from TV 303, and on receipt of the command goes to act 1162.

In act 1162, authority server 282 checks whether the display of video 302 has ended, and if so goes to act 1164 and otherwise goes to act 1163. In act 1163, authority server 282 checks whether a frame number has been received from TV 303 and if not goes to act 1161 (described above) and alternatively goes to act 1156 (described above). In act 1164, authority server 282 automatically selects a TV channel and transmits the channel number to TV 303. Accordingly, in such embodiments, on completion of video 302, TV 303 receives a channel number from authority server 282 and automatically tunes to the received channel number to display the TV program being received therefrom.

An alternative embodiment of authority server 282 performs the method illustrated in FIG. 11K instead of the method illustrated in FIG. 11H. In the method illustrated in FIG. 11K, acts 1151-1154 are performed in a manner identical to the method illustrated in FIG. 11H. In the method of FIG. 11K, after act 1154, authority server 282 goes to act 1155A to check if an event denoting a trigger has been received (e.g. from computer 281I of the content provider), and if not received loops back to again perform act 1155A (e.g. after a predetermined time period of waiting, such as 1 minute). In act 1155A of FIG. 11K, if the answer is yes, then authority server 282 goes to act 1155B to check if the trigger denotes the end of the video. If in act 1155B, authority server 282 finds that the display of the video has ended (e.g. as notified by computer 281I of a content provider), authority server 282 goes to act 1164 (and act 1164 is performed identical to the same act in FIG. 11H).

If in act 1155B, authority server 282 finds that the display of the video has not ended, then authority server 282 performs act 1156. In act 1156, authority server 282 retrieves keywords associated with the trigger received in act 1155A, and goes to act 1157A. In act 1157A, authority server 282 matches the trigger keywords (from act 1155A) with keywords associated with messages in the message repository and goes to act 1158. In performing the matching, authority server 282 may optionally use various attributes of the user of the handheld device, such as age and gender. Next, in act 1158, authority server 282 sorts the matching messages in a manner identical to the same act in FIG. 11H, followed by acts 1159 and 1160 also identical to FIG. 11H. If the answer in act 1160 is no in FIG. 11K, authority server 282 returns to act 1157A (described above), and alternatively if the answer is yes authority server 282 goes to act 1155A (also described above).

In several embodiments, in an act 1171 (FIG. 11I), authority server 282 receives configuration information (such as a URL) from computer 281I of a content provider and goes to act 1172. In act 1172, authority server 282 stores the received configuration information in database 831 and goes to act 1173. In act 1173, authority server 282 receives metadata of each video 302 that is accessible via computer 281I, including specific keywords that are to be used by authority server 282 in matching messages and goes to act 1174. In act 1174, authority server 282 stores the metadata and the keywords in its database 831 and goes to act 1175. In act 1175, authority server 282 receives edits (i.e. changes) to the keywords of a message in database 831, and goes to act 1174 (described above).

In certain embodiments, in an act 1176 (FIG. 11J), authority server 282 receives configuration information (such as a URL) from computer 283 of a message provider (e.g. an advertiser) and goes to act 1177. In act 1177, authority server 282 stores the received configuration information in database 831 and goes to act 1178. In act 1178, authority server 282 receives metadata of each message that is to be displayed, including specific keywords that are to be used by authority server 282 in matching videos and a value of a ranking criterion, and goes to act 1179. In act 1179, authority server 282 stores the message in repository 835 and the keywords in its database 831 and goes to act 1180. In act 1180, authority server 282 receives edits to the keywords of a message or an edit to the value of the ranking criterion and goes to act 1179 (described above).

In many embodiments, in an act 1201 (FIG. 12), computer 281I of a content provider receives instructions for logic to be used in an EPG app, from a human ("app developer") and goes to act 1202. In act 1202, computer 281I downloads from authority server 282, a most-current version of authority-compatible handheld interface software of the type described above and goes to act 1203. In act 1203, computer 281I builds an EPG app by compiling and linking instructions for the logic received from the developer, with the authority-compatible handheld interface software. Next, in act 1204, computer 281I uploads the EPG app to an app server (see top left corner of FIG. 8B), thereby to make it available for download into handheld device 200.

In certain illustrative embodiments of the invention, authority-compatible handheld interface software is implemented as an implementation library specific to the circuitry in handheld device 200. For example on the APPLE iPhone the implementation library for the authority-compatible handheld interface software is built on top of iPhone SDK (current version 3.1) and is referred to below as the iLook iPhone SDK. Note that the word "iLook" is used herein to denote one specific illustrative embodiment, and other embodiments will be readily apparent in view of this detailed description. In such embodiments, an EPG app 202I connects with computer system 250 using the iLook iPhone SDK. The following commands are supported on the iLook iPhone SDK. The typical invocation of commands using the iLook iPhone SDK API, is an invocation of a "sendCommand" function, with the appropriate command and its optional associated data (required for the command). The data is a dictionary (with Key and Value pairs) structure. Note that the word

Key is used in the following description, synonymously with the word Name (e.g. Name and Value pairs).

In the iLook iPhone SDK API, RequestEPG is a command to request an electronic program guide i.e. a list of videos. The input data for this command contains the list type keyword with value of either "featured", "mostviewed", "favorite", "search". The return data is a list of videos in XML format contains text and graphics. RequestMessages is a command to request RADs (i.e. promotional messages from advertisers). The input data for this command contains the keyword VideoID with value of the video ID. The return is a list of messages in XML format contains text and graphics. SetVolume is a command to set the volume level. The input data for this command contains the volume level key word and the value of the volume. The return is the volume level set.

In the iLook iPhone SDK API, SetVideoRate is a command to set the video rate of play. Useful for fast forward and rewind. A positive value indicates fast forward and a negative values is rewind. Values can range from −16 to 16. The input data for this command contains the keyword VideoRate and the value has the video rate. The return is the video rate set. PlayVideo is a command to play video on the TV. The input data for this command contains the key VideoID and has value the Video ID. The return is success or failure. MessageSelected is a command to select a message and receive details about the message. The input data for this command contains a key for message and the value is the identifier of the message. The return is the message expressed in XML data, containing text and graphics.

In the iLook iPhone SDK API, BuyNowSelected is a command to purchase a selected product described in the promotional message. The input data for this command contains key for the message and the value is the identifier of the message, key for the product with value being the product ID, key for Quantity and the value of quantity, key for price and the value is the price. The return is either a success with transaction ID or a failure with message. RequestAssociation is a command to associate the iPhone with a television. The input data for this command contains an identifier of the television (e.g. in the form of a nickname previously registered with the authority server) and optionally a password for the TV. The return is success or failure.

In the iLook iPhone SDK API, SetVideoPosition is a command to set the position of the video. A position from 0 to the length of the video can be set. The return is the position of the video set. SaveFavorite is a command to save a video as a user favorite. The video id is added to the favorites list. The return is success or failure. PauseStream is a command to pause the video at the current play time. The return is success or failure. ResumeStream is a command to resume the video (usually a paused video). The return is success or failure. GetStatus is a command to get the status such as video play or pause, volume level, current location in video, video rate. The return is status message in XML format that contains text.

In several embodiments, in addition to using the iLook iPhone SDK API, the above-described EPG app **202**I additionally uses the following functions of the iPhone SDK, after registering as a callback listener with event handling software in the iPhone SDK. A Volume Control key function that allows a user to use increase/decrease volume by pressing a physical key provided at the side of the handheld device, e.g. the APPLE iPhone. Every key press received from the iPhone SDK is tied to SetVolume function in the iLook iPhone SDK API. Wake up key—this key allows a user to wake up a program after sleep. When no activity is detected then the iPhone automatically shuts down the application in sleep mode. Invoking the wake up key reactivates the program display. Several embodiments of handheld device **200** support a Dismissing Application Key whereby EPG app **202**I can be dismissed (closed down) by invoking the "dismiss" key function. The authority-compatible handheld interface software supports the dismissal of the EPG app with this key.

The above-described EPG app **202**I also uses the following event keys of the iPhone SDK. A touch event key of the iPhone is generated whenever the user touches a certain area on the display. The touch event key is tied to various above-described actions performed by the EPG app **202**I, such as scrolling a list of displayed items in response to flicking the finger up and down, or displaying additional detailed information in response to touching on a displayed message. For example, when an icon of EPG app **202**I is touched, EPG app **202**I is automatically launched, and when an EPG item in a list of EPG items is touched a video description is displayed. A button press event key of the iPhone invokes the action embodied behind the button in the EPG app **202**I. Expansion using two fingers allows increasing the zoom into level, the opposite action of decrease reduces the zoom level.

In certain illustrative embodiments of the invention, authority-compatible set-top interface software is implemented as an implementation library specific to the circuitry in a data network interface circuit **392**. Authority-compatible set-top interface software provides a common set-top API (called iLook set-top SDK API) for any chip vendor implementation of set top functionality. The iLook set-top SDK API is implemented in some embodiments using the existing chip vendor API functions. The iLook set-top SDK API includes a set of C code Bindings provided in a shared library (e.g. named iLookClient.so) that any developer of a set-top application can dynamically link and call in their application code. Since the iLook set-top SDK API is dependent on the chip vendor API implementation, several C Bindings are wrappers to existing functions in the chip vendor API. In some cases multiple DRM solutions are integrated in the end product by the developer. The following functions are supported by the iLook set-top SDK API in some embodiments of the invention.

In the iLook set-top SDK API, a function Init allows for initialization. Typically, the initialization function in the chip vendor API is invoked first. Next a series of initializations for iLook set-top SDK API are carried out, e.g. the authority server configuration parameters, IP settings, initialization of supported DRM modules, initialization of supported protocols for streaming. The return is success or failure. The function Terminate terminates the session and disconnects from the authority server. All associated resources are free-ed up, and processes, threads, state machines, etc. are shut down in an orderly manner. The return is success or failure. The function Connect connects to the authority sever and presents its credentials. During this process an authentication scheme is invoked to identify the set top with the authority server. After successful connection a connection handle is established with the authority server. The return is success or failure.

In the iLook set-top SDK API, a function VideoPlay allows a video content to be played. The current video streaming protocols supported are RTSP, UDP and HTTP Streaming. The later is preferred since this an established standard. RTSP, even though a standard has varying implementation depending on the content provider and service. To support various RTSP players there could be several implementations of VideoPlay. The parameters for video play function include the handle of the video (URL in HTTP Streaming), video handle ID and optionally video PIDs, audio PIDs, synch PIDs. The performance of the video play is highly dependent on the chip vendor's supported video formats, streaming

buffer size/and its management, real time video codecs and video display layers. The return is success or failure.

In the iLook set-top SDK API, a function VideoPause pauses the video handle ID. The video stops play and the last frame is frozen on the TV screen. The return is success or failure. The function VideoResume resumes the video handle ID. The video resume to play from the last frozen frame on the TV screen. The return is success or failure. The function VideoSeek allows the user to seek anywhere within the length of the video. Video lengths are expressed in total number of frames of the entire content. Any number from 0 to the length of the video can be set at random. Seek values outside the range would result in a failure. The video resumes play after positioning at the seek value. The return is success or failure. The function VideoFastforward allows for fast forward of the video content. Supported fast forward speeds include 1×, 2×, 4×, 8× and 16×. During fast forward, selected in-between video frames are shown briefly on the TV display. If fast forward is not stopped the video will stop at the end of the video. The return is success or failure. The function VideoRewind allows for rewind of the video content. Supported rewind speeds include 1×, 2×, 4×, 8× and 16×. During fast forward, selected in-between video frames are shown briefly on the TV display. If rewind is not stopped the video will stop at the beginning of the video. The return is success or failure.

In the iLook set-top SDK API, a function SetAudioLevel sets the audio level. Audio levels are usually between 0 and 1. Some chip vendor may implement the scale differently and may choose logarithmic scales. The implementation of the function may include corrections to scales, such that the user experience appears to be linear. The return is success or failure. The function SetAudioMute mutes the audio, e.g. in response to touching button **252**D illustrated in FIG. **2**G. This is a convenience function and preserves the current volume level when unmute is called. The return is success or failure. The function SetAudioUnmute un-mutes the audio. This is a convenience function and preserves the volume level when mute was invoked. The return is success or failure. The function GetAudioLevel returns the current audio level. Audio levels are usually between 0 and 1. Some chip vendor may implement the scale differently and may choose logarithmic scales. The implementation of the function may include corrections to scales, such that the user experience appears to be linear. The return is success or failure.

A set-top application **916** (FIG. **9**B) of some embodiments uses several underlying normal functions for the set top chip, in conjunction with the iLook Set top SDK API described above. The chip vendor usually implements user chip control by porting an existing Operating System such as Linux. A base chip instruction set is mapped to the operating system calls. Device drivers also use the base chip instruction set. Certain custom device drivers are implemented by the chip vendor to exercise the chip functions like codecs. Usually, the chip vendor publishes a standard API, implemented in C language code. Higher level functions that perform video play are usually supplied by the chip vendor or a 3rd party source. The iLook set-top SDK API uses existing implementations provided by the chip vendor or 3rd party to control video. However, the iLook set-top SDK API is agnostic with respect to the underlying chip set and base applications running on the chip. The implementation code for the iLook set-top SDK API resides in chip flash memory and is referred to as firmware. It is possible to periodically re-flash the contents in chip flash memory, thereby updating the firmware to the latest revision of the implementation of the iLook set-top SDK API.

In some embodiments, a startup screen displayed upon power up by an internet-enabled television **303** includes a list of icons, and one of the icons in this list is an iLook icon. The iLook icon, when invoked, displays on the television screen, a graphical user interface (GUI) for the user to interact with the television using a normal infrared remote control ("IR remote"). A set-top application that displays the graphical user interface uses the iLook set-top SDK API. A set-top chip's vendor-supplied graphical user interface implementation libraries are used by set-top application to paint the TV screen with a predetermined GUI layout for the iLook set-top SDK API. In several embodiments, a user pressing any button on the IR Remote invokes the iLook set-top SDK API, which in turn displays the iLook GUI on the television screen. In alternative embodiments, the iLook GUI is displayed on the television screen only in response to the user pressing a specific predetermined button on the IR Remote.

In certain embodiments of the type described in the immediately preceding paragraph above, if the iLook set-top SDK API is controlled by the IR remote (e.g. EPG items share television screen **307** with video), when the user operates an EPG app in handheld device **200**, the iLook set-top SDK API automatically changes the display on the television screen (e.g. moves the EPG items from the TV screen **307** to handheld screen **204**). If the iLook set-top SDK API is controlled by the handheld device **200** (e.g. EPG items are shown on handheld screen **204** and only video is displayed on TV screen **307**), when the user operates an IR remote, the iLook set-top SDK API automatically changes the display on the television screen (e.g. moves the EPG items from handheld screen **204** to the TV screen **307**).

Such interactions with TV screen are supported in the iLook set-top SDK API using standard up, down, left, right, enter buttons on the IR remote, although selection using the IR remote is a cumbersome two step process. For example a keyboard display using the IR remote requires navigation to a specific key and requires the enter button to be invoked. iLook set-top SDK API makes the TV Screen and its interaction with the IR remote consistent with the corresponding interaction with handheld device **200**. In some embodiments, software included in a handheld device contains the following: a list of commands, and lists of data relevant to each command (used by a program that communicates with authority server).

In one embodiment, a minimal configuration of the handheld device is limited to only an identifier of the handheld device, whereas other embodiments maintain in local storage a list of messages, that were recently displayed, and additional information for each message such as: (a) unique identifier of message (b) graphics or text content of the message. Other embodiments of the handheld device maintain certain configuration information either locally or within a data base of the authority server as follows: user's name and password, TV-name and TV-password, multiple lists of videos that may be of interest to the user, such as (A) featured, (B) most-viewed, (C) search and (D) favorites, wherein each video is described by an EPG item in each video list. Specifically, one embodiment of a video list maintains the following metadata for each EPG item in the list: a) title of the movie, (b) ratings, (c) number of times viewed globally by all users in the world (d) description of the movie, (e) pricing (free or specific price), (f) a globally unique video identifier, (g) thumbnail logo image of the movie, (h) an identifier of the content provider and (i) logo of the content provider—these are a sequence of EPG items in the EPG app.

In some embodiments, a handheld device **200** locally maintains in its own memory **385**, certain video navigation information, such as (a) current status of display: such as play,

fast forward, rewind, pause (b) length of currently playing movie (c) currently-playing movie—globally unique id (d) current location within the currently playing movie, (e) current volume level.

In some embodiments, software included in an internet-enabled television **303** in accordance with the invention contains a list of commands, and list of data relevant to each command (used by a program that communicates with authority server). Such a television **303** also maintains configuration information, either locally or within a database in the authority server as follows: identifier of the data network interface circuit of the TV, IP address, optionally DRM information such as a private encryption key supplied by a DRM vendor like Verimatrix.

In some embodiments, an authority server in accordance with the invention maintains in its database, the following information. Association information (also called "pairing") includes: identifier of the handheld device, user's name, Identifier of the data network interface circuit of the TV, IP address, TV-name and TV-password. USER INFORMATION—user's name and password, credit card information, user profile information (such as user's age, user's gender, user's height and weight, user's default preference of payment procedure for video display, user's education, user's salary, user's home address, shipping address, billing address, user's preference of movie ratings such as PG-13), Log of messages (optionally all messages historically displayed to the user), Log of videos played to user. MESSAGE (RADS) INFORMATION—database of messages (including author, amount of money paid by the author for the message to be displayed, date of submission, date of expiry, number of times shown to users, identity of each user to whom the message has been shown, identity of each user who has purchased a product or service identified in the message, keywords).

In some embodiments, an authority server in accordance with the invention maintains in its database, the following information on each content provider: name of content provider, URL of content provider, metadata to access videos at the content provider (such as identifier of video, rating of video, name of the DRM vendor (such as Verimatrix), and content provider's API for searching videos. In some embodiments, an authority server in accordance with the invention maintains in its database, the following information on each video: a temporary list of video descriptions including (a) title of the movie, (b) ratings, (c) number of times viewed globally by all users in the world (d) description of the movie, (e) pricing (free or specific price), (f) a globally unique video identifier, (g) thumbnail logo image of the movie, (h) an identifier of the content provider and (i) logo of the content provider and (j) keywords. Note that keywords are not sent to the user—and they can be static or they can be replaced periodically as the movie is played (i.e. dynamic).

In some embodiments, an authority server in accordance with the invention maintains in its database, the following information on each user: user's name and password, credit card information, user profile information (such as user's age, user's gender, user's height and weight, user's default preference of payment procedure for video display, user's education, user's salary, user's home address, shipping address, billing address, user's preference of movie ratings such as PG-13), Log of messages (optionally all messages historically displayed to the user), Log of videos played to user.

In some embodiments, an authority server in accordance with the invention maintains in its database, the following information on each message: repository of messages (including author, amount of money paid by the author for the message to be displayed, date of submission, date of expiry, number of times shown to users, identity of each user to whom the message has been shown, identity of each user who has purchased a product or service identified in the message, keywords).

In some embodiments, an authority server in accordance with the invention receives the following information from a handheld device: identifier of the handheld device, user's name and password, TV-name and TV-password, credit card information, user profile information (such as user's age, user's gender, user's height and weight, user's default preference of payment procedure for video display, user's education, user's salary, user's home address, shipping address, billing address, user's preference of movie ratings such as PG-13). VIDEO REQUEST includes: a globally unique video identifier, an identifier of the content provider, identifier of the handheld device, SEARCH REQUEST includes: a string of text to be used in searching videos.

In some embodiments, an authority server in accordance with the invention receives the following information from a handheld device for each purchase: identifier of product to be purchased, quantity, payment method, and a unique identifier of the transaction, all of which except for quantity originate from a message server computer. Moreover, each social media message received from the handheld device includes: a string of text, a destination identifier (such as a TWITTER ID).

In some embodiments, an authority server in accordance with the invention receives the following information from a handheld device: a social media message including: a string of text, a source identifier (such as a TWITTER ID)—e.g. from the TWITTER database, as a result of a search.

In some embodiments, an authority server in accordance with the invention transmits the following information to a handheld device: a social media message including: string of text, a source identifier (such as a TWITTER ID)—comes in real time from a person as a response to the user's text message, a promotional message including: a globally unique advertisement identifier, text and/or graphics, a product identifier, text string description of product and a list of EPG items, each EPG item including: text string of title, rating, number of views, text string description of video, a globally unique video identifier, and an identifier of the content provider. In some embodiments, an authority server in accordance with the invention receives the following information from a television: REGISTRATION information including an IP address, identifier of a chip in the set-top device, TV-name and TV-password. Moreover, the authority server transmits the following information to the television: a VIDEO STREAM including video and optionally a public encryption key, and COMMANDS including start, play, pause, stop, fast forward, change volume, turn on/off. In an iLook embodiment, computer system **250** supports three types of promotional messages ("RADs") whose placement on screen **204** changes depending on predetermined events, pricing mechanisms and targeting criteria. The three supported RAD types are: (1) associated with keywords (KRAD), (2) TV Commercials (CRAD) and (3) guaranteed placement (GRAD), as described below.

Computer system **250** of some embodiments selects each of the three types of RADs using a predetermined technique, e.g. using keywords associated with each RAD that are received from the RAD's advertiser. As noted above, in one predetermined technique, the RAD keywords are matched by authority server **282** to video keywords received from a content provider, e.g. in a list of video keywords ranked by relevance. Specifically, video keywords of a secondary video

are matched by authority server **282** to keywords of a CRAD, whereas video keywords of a primary video are matched to a KRAD. Moreover, in some embodiments authority server **282** selects a RAD using another predetermined technique, independent of the user-selected video being played on television **303**, and instead uses a keyword associated with a trigger event (e.g. 8 PM every day a RAD of a specific advertiser, such as COKE is displayed). Additionally, in some embodiments authority server **282** selects a RAD using yet another predetermined technique, independent of any keywords (and also independent of the video being played on television **303**) and simply uses a size of each bid in selecting a RAD in response to a trigger event (e.g. 8 PM every day a RAD of the highest bidding advertiser, such as COKE is displayed).

A list of the first type of RADs, namely KRADs is created (e.g. see act **1302** in FIG. **13**A) by computer system **250** based on matches between keywords associated with messages (also called "RADWords") that are paid for by advertisers (e.g. via an automatic auction mechanism implemented by computer system **250**, also called "RADAuction") and a combination of keywords associated with videos (also called "RADSense") that are provided by Content Providers, and additional keywords associated with users (also called Profile keywords). This list of KRADs is sorted according to the size of each bid (e.g. a dollar amount) from each advertiser (which is an example of a ranking criterion, as described above) as illustrated by act **1304** in FIG. **13**A and a new list containing the top five KRADs is prepared as illustrated by act **1306**, and the new list is transmitted for display on handheld device **200** as illustrated by act **1307**. In this list, the cost of a current KRAD charged to each advertiser is equal to the bid of the advertiser of a next KRAD located immediately below the current KRAD in the list. In some embodiments, advertisers only pay this cost when a KRAD is clicked by a user on a handheld device **200**.

Content providers may associate RADSense keywords with specific frames of a video **302** (i.e. the video to be selected by the user for display on their television) in the list received in act **1301**. In some embodiments, these RADSense keywords are associated with video frames at least 30 seconds apart in video **302**. As a user watches their selected video on television **303** and during the video play clicks on RADs, the authority server (called iLook Back-end) accumulates matching RADSense and RADWord keywords, respectively, in the user's profile in database **831**. This data is used to enhance the accuracy of matches between RADWords and Profile keywords in order to more effectively target KRADs.

As used below, a TV program is any video (such as a primary video described above) other than a TV commercial. A TV commercial is a video (such as a secondary video) that is transmitted on behalf of an advertiser. In some embodiments, when a Content provider inserts a TV commercial into a TV program, computer system **250** is notified, and computer system **250** provides the advertiser of the TV commercial with an opportunity to transmit to handheld screen **204**, a second type of RAD namely a CRAD, at the same time the associated TV commercial is playing on TV screen **307**.

Several CRADs are typically transmitted by various advertisers via a message sever computer to the message repository used by computer system **250**. These advertisers also submit, a bid for each CRAD and a number of keywords to be used by computer **250** in matching each CRAD to a video, e.g. as illustrated in act **1312** (FIG. **13**B). Computer **250** sorts all matching CRADs (for a given video) based on the size of the advertiser's bid as illustrated in act **1313**. The top-most CRAD in the sorted list is selected by computer **250** as illustrated by **1314**, and the bid of the selected CRAD is used to decide whether or not to display the CRAD on the handheld device **200**. As illustrated by act **1315** in FIG. **13**B, in making this decision, computer **250** uses a KRAD list prepared as described above in reference to act **1302** of FIG. **13**A. Specifically, in act **1316**, computer system **250** sorts the KRAD list, by size of the advertisers bids for each KRAD in the list.

Next, computer **250** checks if the CRAD bid is higher than the highest bid for a KRAD (see act **1318** in FIG. **13**B), and if yes computer system **250** prepares a new list including the CRAD (see act **1320**) and transmits the new list to handheld device **200** as illustrated by act **1321**. In act **1318** if the answer is no, then no message is transmitted by computer **250** to handheld device **200**. In some embodiments, only one CRAD is served by computer system **250**, for each TV commercial inserted by the content provider. In some embodiments, when a user clicks on a CRAD on their handheld device **200**, computer system **250** charges the advertiser of the CRAD for an amount of the top KRAD bid (selected as per act **1317** in FIG. **13**B) plus half of the difference between the CRAD bid and the top KRAD bid. In other embodiments, when a user clicks on a CRAD on their handheld device **200**, computer system **250** charges the advertiser of the CRAD for the exact amount of the top KRAD bid. The top KRAD bid is the highest amount that has been bid for any KRAD currently displayed on handheld device **200**. When the CRAD bid does not exceed the top KRAD bid, the CRAD is not displayed by handheld device **200** (i.e. the KRADs displayed on handheld screen **204** remain unchanged as illustrated by act **1319**). The just-described difference splitting approach provides benefits in such embodiments of the invention, from added value that advertisers realize in their campaigns when their CRADs are displayed on handheld devices overlapping in time with their TV commercials being displayed on televisions.

In several of the above-described embodiments, an advertiser is charged whenever the KRAD or CRAD is touched by ("clicked by") a user of handheld device **200**. In contrast, an advertiser of a third type of RAD, namely GRAD is charged in two different ways in combination with each other. Firstly, the GRAD advertiser is charged based on the total number of handheld devices **200** on which the GRAD has been displayed by computer system **250**. Secondly, the GRAD advertiser is further charged whenever the GRAD is touched ("clicked") on handheld device **200**. As used herein, a "CPM bid" is the amount an advertiser is willing to pay to have their GRAD displayed on one thousand (1000) handheld devices **200**. Hence, the GRAD advertiser supplies computer system **250** with two bids for each GRAD, which are used as discussed next.

In some embodiments, GRADs are transmitted to handheld device **200** by computer system **250**, based on the size of two bids: a first bid based on click-throughs to compete with the top KRAD, and a second bid to compete with other GRADs in an auction as follows. If the GRAD click-through bid is found during auction to be higher than the top KRAD's bid, and the GRAD's CPM bid is higher than CPM bids of other GRADs, the GRAD is transmitted to handheld device **200** by computer system **250**. Identical to CRADs, the GRAD advertiser is charged the amount of the top KRAD bid plus half of the difference between the GRAD bid and the top KRAD bid each time the user clicks the GRAD. In addition, GRAD Advertisers are charged **1/1000** of their CPM bid each time their GRAD is transmitted. The transmission of GRADs is limited by computer system **250** of some embodiments using the same keywords that are used to filter the transmission of KRADs. For example, the transmission of a GRAD can be limited by computer system **250** to the display of a

Super-bowl game (depending on the embodiment, either during an on-demand display or during a live broadcast). In another example, a GRAD can be transmitted by computer system **250** only to handheld devices **200** of women who are known to be pregnant (as per their user profile in database **831**).

In some embodiments, computer system **250** is coupled to and uses multiple message repositories, for example a first message repository **835** maintained locally by computer **282** to hold promotional messages, and a second message repository **839** holding social media messages and made accessible by computer **838**. Accordingly, in such embodiments, second message repository **839** is used by computer system **250** as illustrated by act **1303** in FIG. **13**A, to generate a list of social media messages by matching video keywords to the keywords of all messages in the second message repository **839**. Computer system **250** then sorts messages in this list, based on relevance of the video keywords that match each social media message as illustrated in act **1305** in FIG. **13**A. The sorted list resulting from act **1305** is used with the sorted list from act **1304** to generate a new list as discussed above in reference to act **1306**.

Note that act **1303** searches for social media messages using keywords that were automatically generated as noted above, for example, by automatically parsing. For this reason, the relevance of social media messages in the list generated in act **1303** is improved, by use of relevance of video keywords which is provided by a content provider, e.g. in a sorted list discussed above in reference to act **1301** in FIG. **13**A. Moreover, the relevance to a user of handheld device **200** is further improved because only the top few (e.g. only two or three) social media messages at the top of the sorted list resulting from act **1305** are included in the new list created in act **1306**.

In some embodiments, a user's selection ("first user input") of an EPG item **291**A identifying a video **208**A (FIG. **2**B) on a handheld device **200** results in the video **208**A being displayed on an associated television **303**, and additionally also results in the following information being displayed on the handheld device **200**: the same EPG item **291**A identifying the now playing video **208**A, and a window **251** (FIG. **2**G) of one or more messages, such as promotional messages and/or social media messages (any of which is hereinafter "first information"). In these embodiments, when the user touches ("second user input") on the touch-sensitive screen **204** of the handheld device **200** in the area displaying a message (i.e. first information) in window **251**, the handheld device **200** displays additional information ("second information") that is related to the displayed message (i.e. first information). Examples of additional information are illustrated in FIG. **2**F for an EPG item, FIG. **2**M for a promotional message, and FIG. **2**H for a social media message. In these embodiments, when the user touches ("third user input") on the touch-sensitive screen of the handheld device **200** in the area displaying the additional information ("second information"), the handheld device **200** transmits a signal to the computer system **250**, e.g. to buy an advertised product or to send a text message to a tweeter. Although only one display of additional information is shown in FIGS. **2**F and **2**M for EPG items and promotional messages, other embodiments may display further additional information ("third information") in response to third user input during the display of the second information, as illustrated for a social media message shown in FIGS. **2**J and **2**K, and still more additional information ("fourth information") as illustrated in FIG. **2**L in response to another user input, e.g. touching of an area labeled "Friends" in the top right corner of FIG. **2**K.

In some embodiments, in response to user selection ("first user input") of a video **302** in a list of EPG items displayed on a handheld screen **204**, the handheld device **200** automatically displays a video description of the user-selected video **302** as illustrated in FIG. **2**F. As noted above, the user may provide additional input ("second user input") by touching one of areas **276** or **278** during the display of the video description. In this example, handheld device **200** transmits to computer system **250** an identifier of the user-selected video **302** only in response to receipt of the second user input. In other embodiments, e.g. if a user-selected video **302** is free, the handheld device **200** does not display the video description of user-selected video **302** and instead directly responds to receipt of the first user input by transmitting the identification of the user-selected video **302** to computer system **250**.

Numerous modifications and adaptations of the embodiments described herein will become apparent to the skilled artisan in view of this disclosure.

Numerous modifications and adaptations of the embodiments described herein are encompassed by the scope of the invention.

What is claimed is:

1. A method of displaying video on a television and displaying information on a handheld device, using a computer system coupled to at least the television, the computer system comprising a computer, each of the computer, the handheld device and the television comprising at least a processor and a memory, the method comprising:

the handheld device displaying a plurality of items in an electronic program guide, of a corresponding plurality of videos available for display on the television via a network;

the handheld device receiving user input indicative of an item selected from among the plurality of items in the electronic program guide, corresponding to a video comprised in the plurality of videos available for display;

the handheld device transmitting to the computer system, an identification of the video;

in response to receipt of the identification, the computer system transmitting to the television, a sequence of frames in the video;

in response to receipt of the identification, the computer system additionally transmitting to the handheld device, a signal comprising at least one of (a) information to be displayed or (b) an identifier of said information;

the television automatically displaying on a television screen therein, the sequence of frames on receipt thereof from the computer system; and

the handheld device automatically displaying on a handheld screen therein, said information on receipt of the signal from the computer system.

2. The method of claim **1** wherein said user input is hereinafter "first user input", and said information to be displayed is hereinafter "first information", the method further comprising:

the handheld device receiving a second user input during the display of said first information;

in response to the second user input, the handheld device automatically displaying second information related to said first information; and

the handheld device transmitting to the computer system, another signal based on receipt of a third user input.

3. The method of claim **1** further comprising:

the computer system using a keyword associated with the video to select said information to be displayed.

4. The method of claim 1 further comprising:

the computer system using a keyword associated with a frame comprised in the sequence of frames in the video, to select from a storage device, said information to be displayed.

5. The method of claim 1 further comprising:

the computer system additionally transmitting to the television, an additional series of frames in an additional video;

the television automatically displaying on the television screen, the additional series of frames; and

the computer system using a keyword associated with one of the video and the additional video, to select from a storage device, said information.

6. The method of claim 1 further comprising:

the computer system using a criterion associated with the handheld device to filter said information prior to transmission to the handheld device.

7. The method of claim 1 further comprising:

the computer system selecting said information independent of the video, from a repository.

8. The method of claim 1 wherein:

the video is associated with a first keyword;

at least a portion of said information is associated with a second keyword; and

the method further comprises the computer system matching the first keyword and the second keyword to one another.

9. The method of claim 1 further comprising:

the computer system automatically identifying a subset of computer files from among a plurality of computer files using a predetermined technique;

the computer system automatically sorting identifiers of computer files in the subset into a sorted list based on a ranking criterion; and

the computer system automatically identifying a computer file from the top of the sorted list;

wherein at least a portion of said information is comprised in the computer file.

10. The method of claim 1 wherein:

a first computer comprised in the computer system performs the transmitting of the signal to the handheld device;

a second computer comprised in the computer system performs the transmitting of the sequence of frames to the television;

the first computer transmits to the second computer, another signal comprising the identification of the video and an identification of the television; and

the second computer comprises a storage device and said storage device comprises the video.

11. The method of claim 1 further comprising:

at least one of the television or the handheld device transmitting to the computer system an association between an identification of the handheld device and an identification of the television.

12. The method of claim 1 wherein:

the handheld device comprises a cellular phone;

said identification is transmitted by the cellular phone to a cellular base station outside a building comprising the television.

13. The method of claim 1 wherein:

the handheld device comprises a cellular phone;

the method further comprises downloading into the cellular phone an application comprising the electronic program guide.

14. The method of claim 1 wherein said user input is hereinafter "first user input", the method further comprising:

in response to the first user input, the handheld device automatically displaying a description of the video; and

the handheld device receiving a second user input during the display of said description;

wherein the handheld device performs said transmission of the identification of the video in response to receipt of the second user input.

15. The method of claim 1 wherein the handheld device performs said transmission of the identification of the video in response to receipt of said user input.

16. The method of claim 1 wherein:

said information comprises a plurality of messages;

a first message in said plurality of messages is a social media message comprising a user name and a string of text input by a user having said user name; and

a second message in said plurality of messages is a promotional message comprising a name of a product.

17. The method of claim 1 wherein:

the handheld device comprises a wireless antenna;

said identification is transmitted by the wireless antenna to a wireless access point inside a building comprising the television.

18. The method of claim 1 further comprising:

the computer system maintaining in a database, additional information in which the television and the handheld device are associated with one another.

19. The method of claim 1 wherein:

the computer is hereinafter first computer;

the signal is transmitted by the first computer; and

the sequence of frames are transmitted by a second computer in the computer system.

20. The method of claim 1 wherein:

said information is matched to the sequence of frames by use of a globally unique identifier associated with each of said information and the sequence of frames.

21. The method of claim 1 wherein:

said information is transmitted from the computer system, through a data network, to the handheld device.

22. The method of claim 1 wherein:

said identification is transmitted from the handheld device, through a data network, to the computer system.

23. The method of claim 22 wherein:

said identification is transmitted from the handheld device, via a data network interface circuit, to the data network; and

the data network interface circuit is comprised in an Internet-enabled television.

24. A system for displaying video on a television and displaying information on a handheld device, the system comprising a computer system coupled to at least the television, each of the computer system, the handheld device and the television comprising at least a processor and a memory, wherein:

the handheld device comprises means for displaying a plurality of items in an electronic program guide, of a corresponding plurality of videos available for display on the television;

the handheld device comprises means for receiving user input indicative of an item selected from among the plurality of items in the electronic program guide, corresponding to a video comprised in the plurality of videos available for display;

the handheld device comprises means for transmitting to the computer system, an identification of the video;

the computer system comprises means, responsive to receipt of the identification, for transmitting to the television, a sequence of frames in the video;

the computer system further comprises means, responsive to receipt of the identification, for additionally transmitting to the handheld device, a signal comprising at least one of (a) information to be displayed or (b) an identifier of said information;

the television comprises means for automatically displaying on a television screen therein, the sequence of frames on receipt thereof from the computer system; and

the handheld device comprises means for automatically displaying on a handheld screen therein, said information on receipt of the signal from the computer system.

25. The system of claim **24** wherein:

the computer system comprises means for using a keyword associated with the video to select said information to be displayed.

26. The system of claim **24** wherein:

the computer system comprises means for using a keyword associated with a frame comprised in the sequence of frames in the video, to select from a storage device, said information to be displayed.

27. The system of claim **24** wherein:

the means for transmitting is comprised in a first computer in the computer system; and

the means for additionally transmitting is comprised in a second computer in the computer system.

28. One or more non-transitory computer-readable storage media comprising a plurality of instructions to cause displaying of video on a television and to cause displaying of information on a handheld device, using a computer system coupled to at least the television, the computer system comprising a computer, each of the computer, the handheld device and the television comprising at least a processor and a memory, the plurality of instructions comprising:

instructions to the handheld device to display a plurality of items in an electronic program guide, of a corresponding plurality of videos available for display on the television via a network;

instructions to the handheld device to receive user input indicative of an item selected from among the plurality of items in the electronic program guide, corresponding to a video comprised in the plurality of videos available for display;

instructions to the handheld device to transmit to the computer system, an identification of the video;

responsive to receipt of the identification, instructions to the computer system to transmit to the television, a sequence of frames in the video;

responsive to receipt of the identification, instructions to the computer system to additionally transmit to the handheld device, a signal comprising at least one of (a) information to be displayed or (b) an identifier of said information;

instructions to the television to automatically display on a television screen therein, the sequence of frames on receipt thereof from the computer system; and

instructions to the handheld device, to automatically display on a handheld screen therein, said information on receipt of the signal from the computer system.

29. The one or more non-transitory computer-readable storage media of claim **28** wherein said user input is hereinafter "first user input", and said information to be displayed is hereinafter "first information", wherein the plurality of instructions further comprise:

instructions to the handheld device to receive a second user input during the display of said first information;

instructions to the handheld device, responsive to the second user input, to automatically display second information related to said first information; and

instructions to the handheld device to transmit another signal based on receipt of a third user input.

30. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions further comprise:

instructions to the computer system to use a keyword associated with the video to select said information to be displayed.

31. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions further comprise:

instructions to the computer system to use a keyword associated with a frame comprised in the sequence of frames in the video, to select from a storage device, said information to be displayed.

32. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions further comprise:

instructions to the computer system to additionally transmit to the television, an additional series of frames in an additional video;

instructions to the television to automatically display on the television screen, the additional series of frames; and

instructions to the computer system to use a keyword associated with one of the video and the additional video, to select from a storage device, said information.

33. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions further comprise:

instructions to the computer system to use a criterion associated with the handheld device to filter said information prior to transmission to the handheld device.

34. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions further comprise:

instructions to the computer system to select said information independent of the video, from a repository.

35. The one or more non-transitory computer-readable storage media of claim **28** wherein:

the video is associated with a first keyword;

at least a portion of said information is associated with a second keyword; and

the plurality of instructions further comprise instructions to the computer system to match the first keyword and the second keyword to one another.

36. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions further comprise:

instructions to the computer system to automatically identify a subset of computer files from among a plurality of computer files using a predetermined technique;

instructions to the computer system to automatically sort identifiers of computer files in the subset into a sorted list based on a ranking criterion; and

instructions to the computer system to automatically identify a computer file from the top of the sorted list;

wherein at least a portion of said information is comprised in the computer file.

37. The one or more non-transitory computer-readable storage media of claim **28** wherein:

a first computer comprised in the computer system executes the instructions to transmit the signal to the handheld device;

a second computer comprised in the computer system executes the instructions to transmit the sequence of frames to the television; and

the plurality of instructions further comprise instructions to the first computer to transmit to the second computer, another signal comprising the identification of the video and an identification of the television.

38. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions further comprise:

instructions to at least one of the television or the handheld device transmitting to the computer system an association between an identification of the handheld device and an identification of the television.

39. The one or more non-transitory computer-readable storage media of claim **28** wherein the handheld device comprises a cellular phone and the plurality of instructions comprise:

instructions to the cellular phone to transmit said identification to a cellular base station outside a building comprising the television.

40. The one or more non-transitory computer-readable storage media of claim **28** wherein the handheld device comprises a cellular phone and the plurality of instructions comprise:

instructions to download into the cellular phone an application comprising the electronic program guide.

41. The one or more non-transitory computer-readable storage media of claim **28** wherein said user input is hereinafter "first user input" and the plurality of instructions comprise:

instructions, responsive to the first user input, to the handheld device to automatically display a description of the video; and

instructions to the handheld device to receive a second user input during the display of said description.

42. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions comprise:

instructions to the handheld device to perform said transmission of identification of the video in response to receipt of said user input.

43. The one or more non-transitory computer-readable storage media of claim **28** wherein:

said information comprises a plurality of messages;

a first message in said plurality of messages is a social media message comprising a user name and a string of text input by a user having said user name; and

a second message in said plurality of messages is a promotional message comprising a name of a product.

44. The one or more non-transitory computer-readable storage media of claim **28** wherein the handheld device comprises a wireless antenna and the plurality of instructions comprise:

instructions to the handheld device to transmit said identification via the wireless antenna to a wireless access point inside a building comprising the television.

45. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions comprise:

instructions to the computer system to maintain in a database, additional information in which the television and the handheld device are associated with one another.

46. The one or more non-transitory computer-readable storage media of claim **28** wherein the computer is hereinafter first computer, the signal is transmitted by the first computer, and the plurality of instructions comprise:

instructions to a second computer in the computer system to transmit the sequence of frames.

47. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions comprise:

instructions to match said information to the sequence of frames by use of a globally unique identifier associated with each of said information and the sequence of frames.

48. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions comprise:

instructions to transmit said information from the computer system, through a data network, to the handheld device.

49. The one or more non-transitory computer-readable storage media of claim **28** wherein the plurality of instructions comprise:

instructions to transmit said identification from the handheld device, through a data network, to the computer system.

50. The one or more non-transitory computer-readable storage media of claim **49** wherein the plurality of instructions comprise:

instructions to transmit said identification from the handheld device, via a data network interface circuit, to the data network;

wherein the data network interface circuit is comprised in an Internet-enabled television.

* * * * *