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Roman et al.

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(54) **SHARING IMAGES AND COMMENTS ACROSS DIFFERENT DEVICES**

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(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 212 days.

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(22) Filed: **Sep. 29, 2012**

(65) **Prior Publication Data**

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Related U.S. Application Data

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(51) **Int. Cl.**

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G06F 3/0488	(2013.01)
G06F 3/0484	(2013.01)
H04L 12/58	(2006.01)

(52) **U.S. Cl.**

CPC ***G06F 3/0481*** (2013.01); ***G06F 3/0488*** (2013.01); ***G06F 3/04842*** (2013.01); ***H04L 51/32*** (2013.01)

(58) **Field of Classification Search**

CPC G06F 3/00; G06F 3/048; G06F 3/0481; G06F 9/44543; G06F 3/0482; G06F 3/04817; G06F 15/16; G06F 3/01; G06F 3/041; G06Q 50/01; G06Q 10/10

USPC 715/751, 753, 764, 765, 810, 835, 838; 705/319; 709/204

See application file for complete search history.

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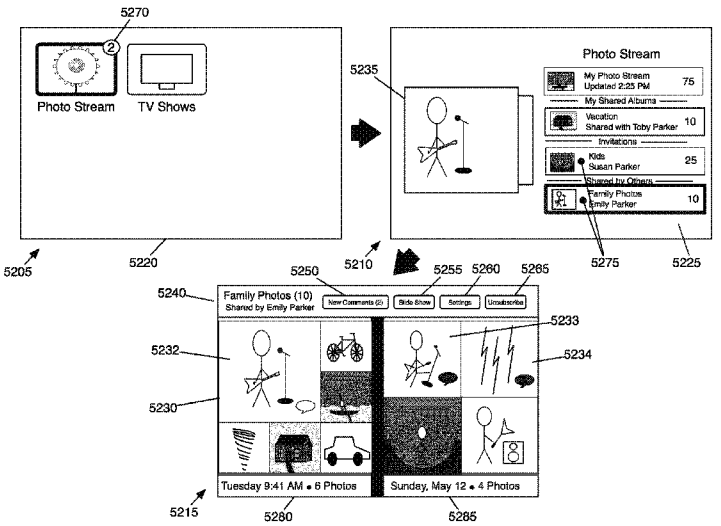
Primary Examiner — Xiomar L Bautista
(74) *Attorney, Agent, or Firm* — Adeli LLP

(57) **ABSTRACT**

Some embodiments provide tools that allow a user to share content on one device with multiple other users using different devices. To facilitate the sharing operations, the content sharing tools allow the user to (1) create a shared stream that represents a set of shared content and (2) invite one or more recipients to subscribe to the shared stream. When a recipient subscribes to the shared stream, the set of content is streamed across one or more of his or her devices. The content sharing tools of some embodiments can be used to exchange comments regarding the stream's content.

22 Claims, 74 Drawing Sheets



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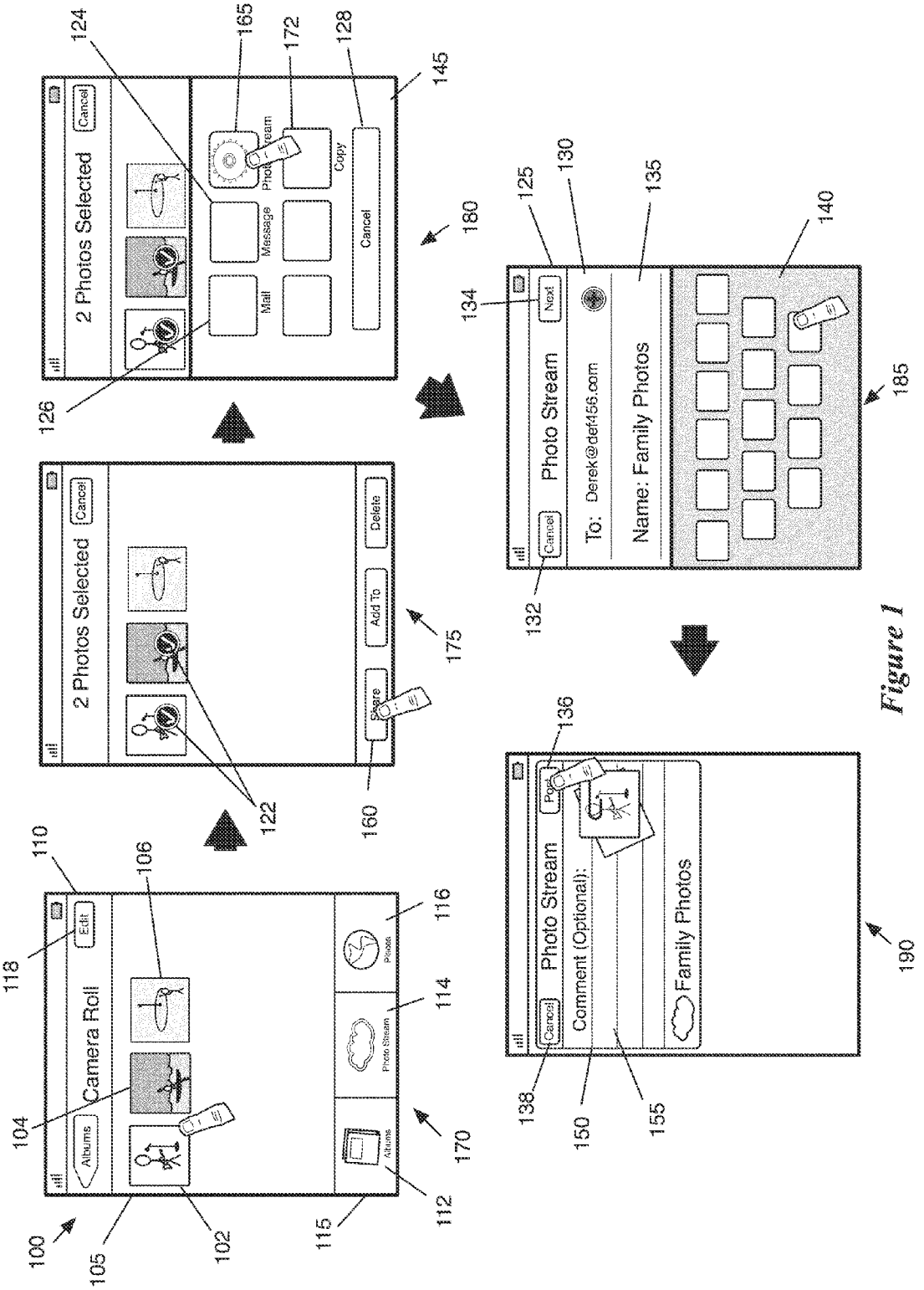

Camera Roll
Albums
Edit
Photo Stream
Albums
Photos
2 Photos Selected
Cancel
Add To
Delete
Share
Mail
Message
Photo Stream
Copy
Cancel
Photo Stream
Cancel
Next
To: Derek@def456.com
Name: Family Photos
Photo Stream
Cancel
Post
Comment (Optional):
Family Photos
100
102
104
105
106
110
112
114
115
116
118
122
124
125
126
128
130
132
134
135
136
138
140
145
150
155
160
165
170
172
175
180
185
190

Figure 1

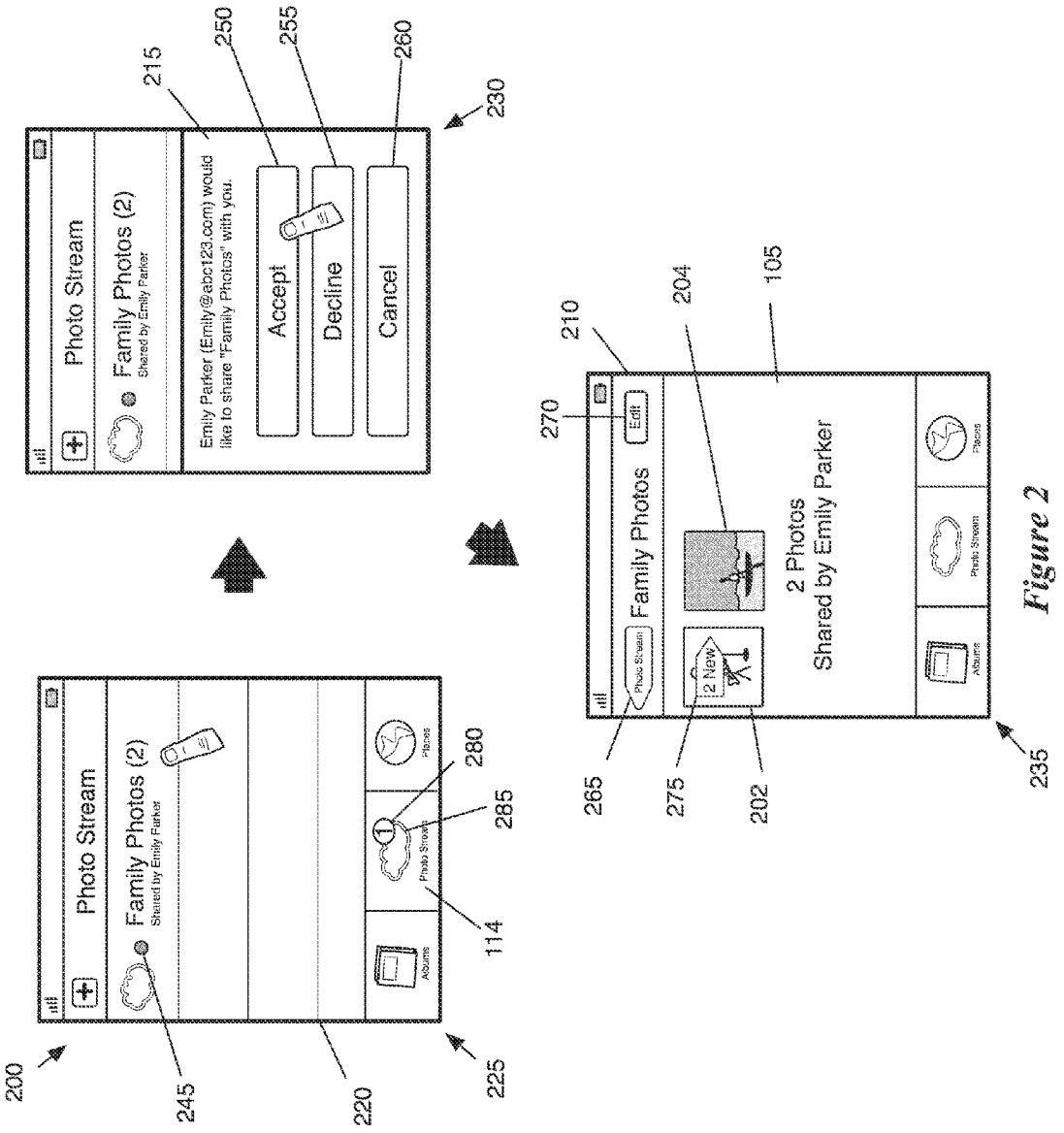


Photo Stream
Family Photos (2)
Shared by Emily Parker
Emily Parker (Emily@abc123.com) would like to share "Family Photos" with you.
Accept
Decline
Cancel
215
250
255
260
230
200
245
220
225
280
285
114
Albums
Photo Stream
Places
Edit
Family Photos
2 Photos
Shared by Emily Parker
2 New
210
204
105
270
265
275
202
235

Figure 2

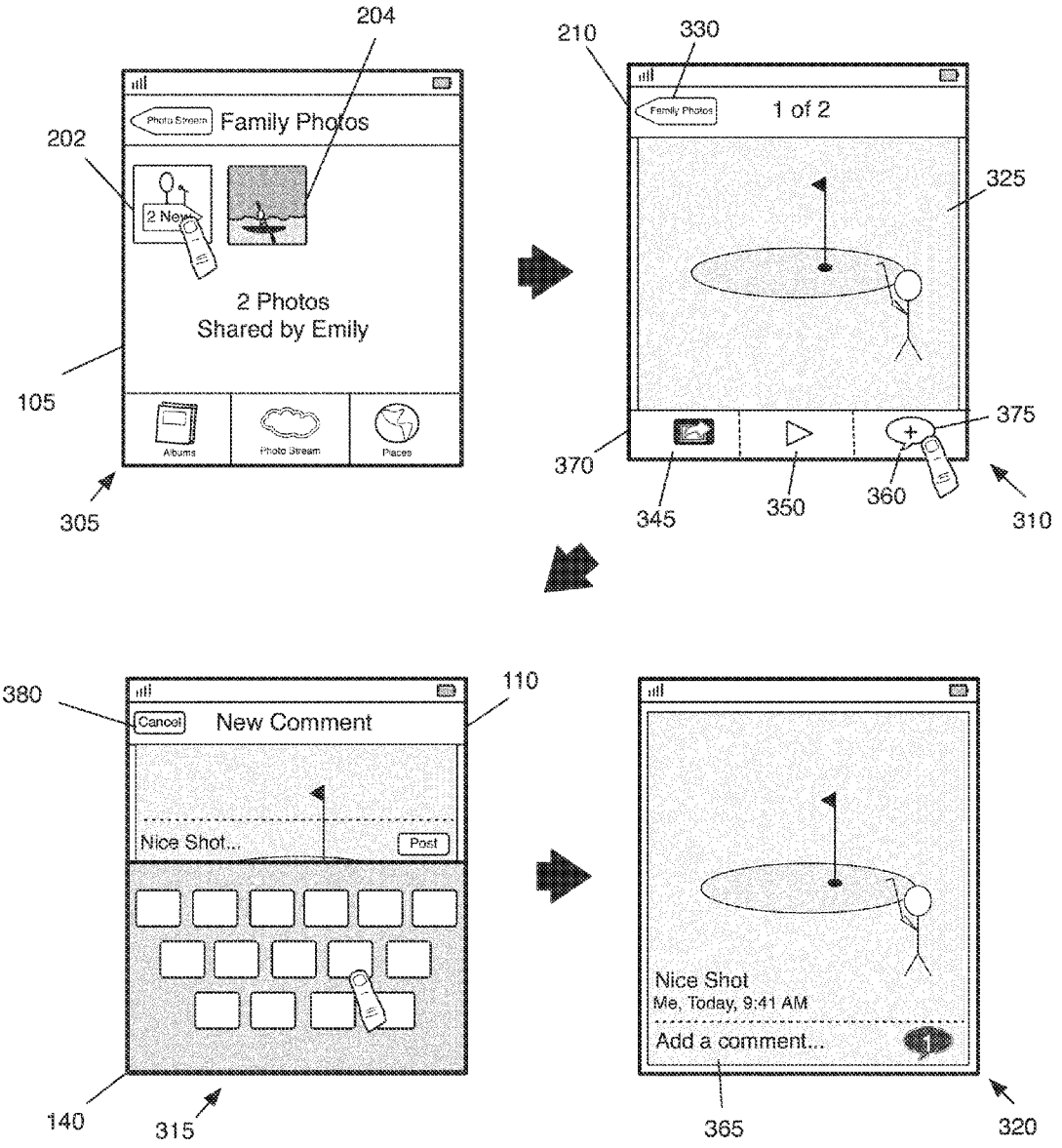
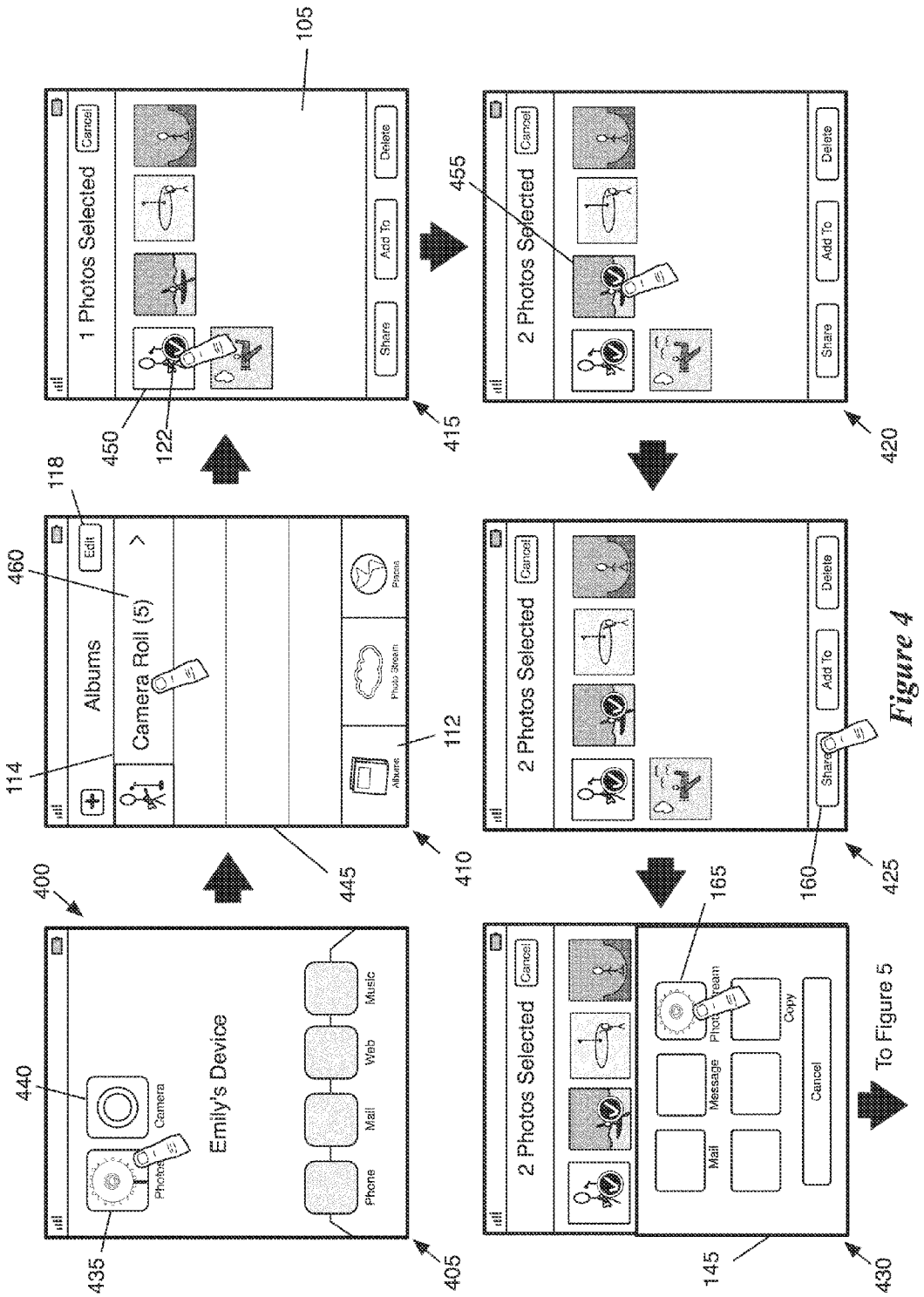

204
202
Photo Stream
Family Photos
2 New
2 Photos
Shared by Emily
105
Albums
Photo Stream
Places
305
210
330
Family Photos
1 of 2
325
375
370
345
350
360
310
380
110
Cancel
New Comment
Nice Shot...
Post
140
315
Nice Shot
Me, Today, 9:41 AM
Add a comment...
365
320

Figure 3



Emily's Device
Photos
Camera
Phone
Mail
Web
Music
Albums
Camera Roll (5)
Edit
Albums
Photo Stream
Places
1 Photos Selected
Cancel
Share
Add To
Delete
2 Photos Selected
Cancel
Share
Add To
Delete
2 Photos Selected
Cancel
Share
Add To
Delete
2 Photos Selected
Cancel
Mail
Message
Photo Stream
Copy
Cancel
To Figure 5
400
405
410
415
420
425
430
435
440
445
450
455
460
105
112
114
118
122
145
160
165

Figure 4

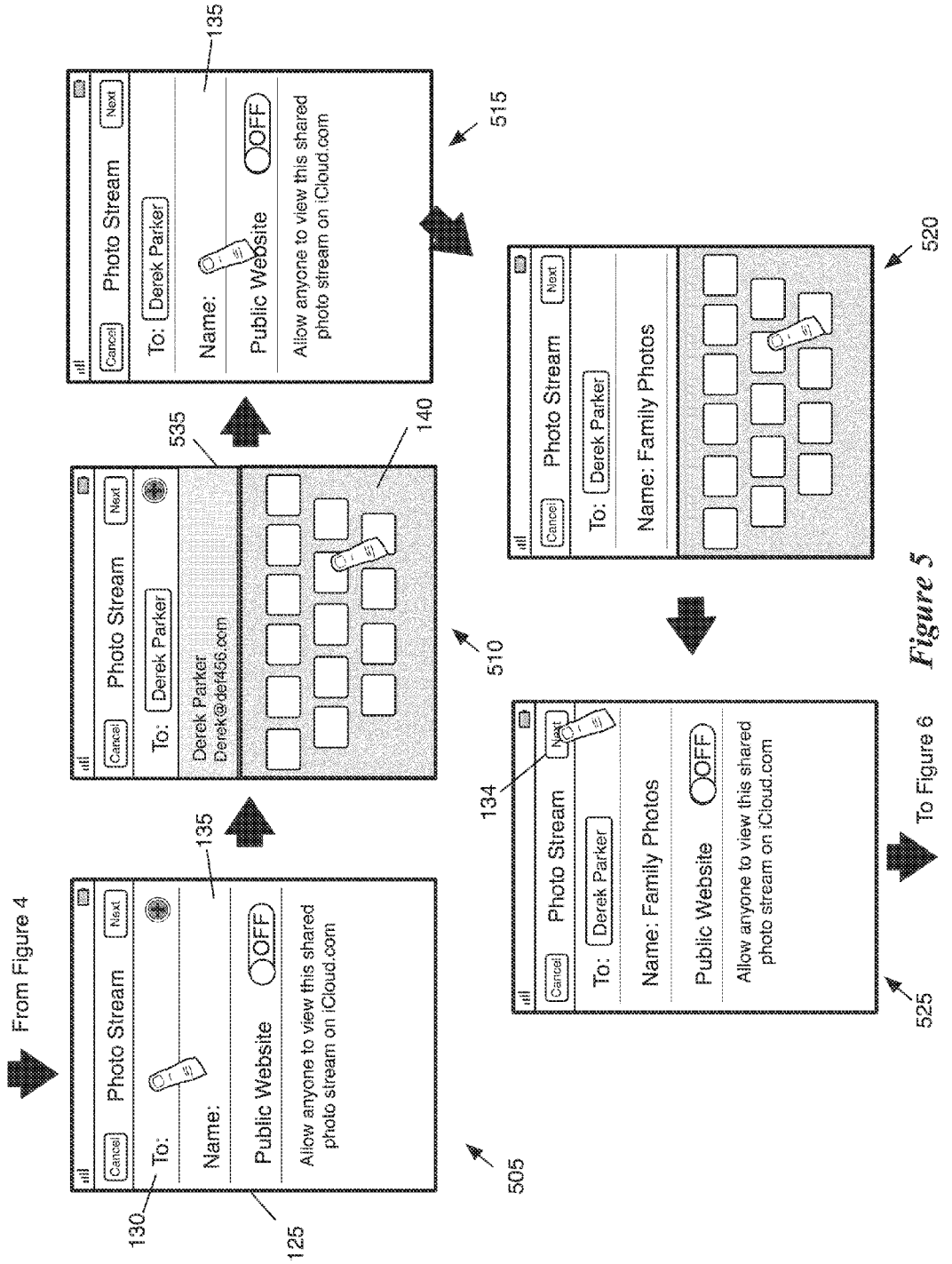

From Figure 4
Cancel
Photo Stream
Next
To:
Derek Parker
Name:
Public Website
OFF
Allow anyone to view this shared photo stream on iCloud.com
Derek Parker
Derek@def456.com
Name: Family Photos
130
125
135
140
505
510
515
520
525
534
535
To Figure 6

Figure 5

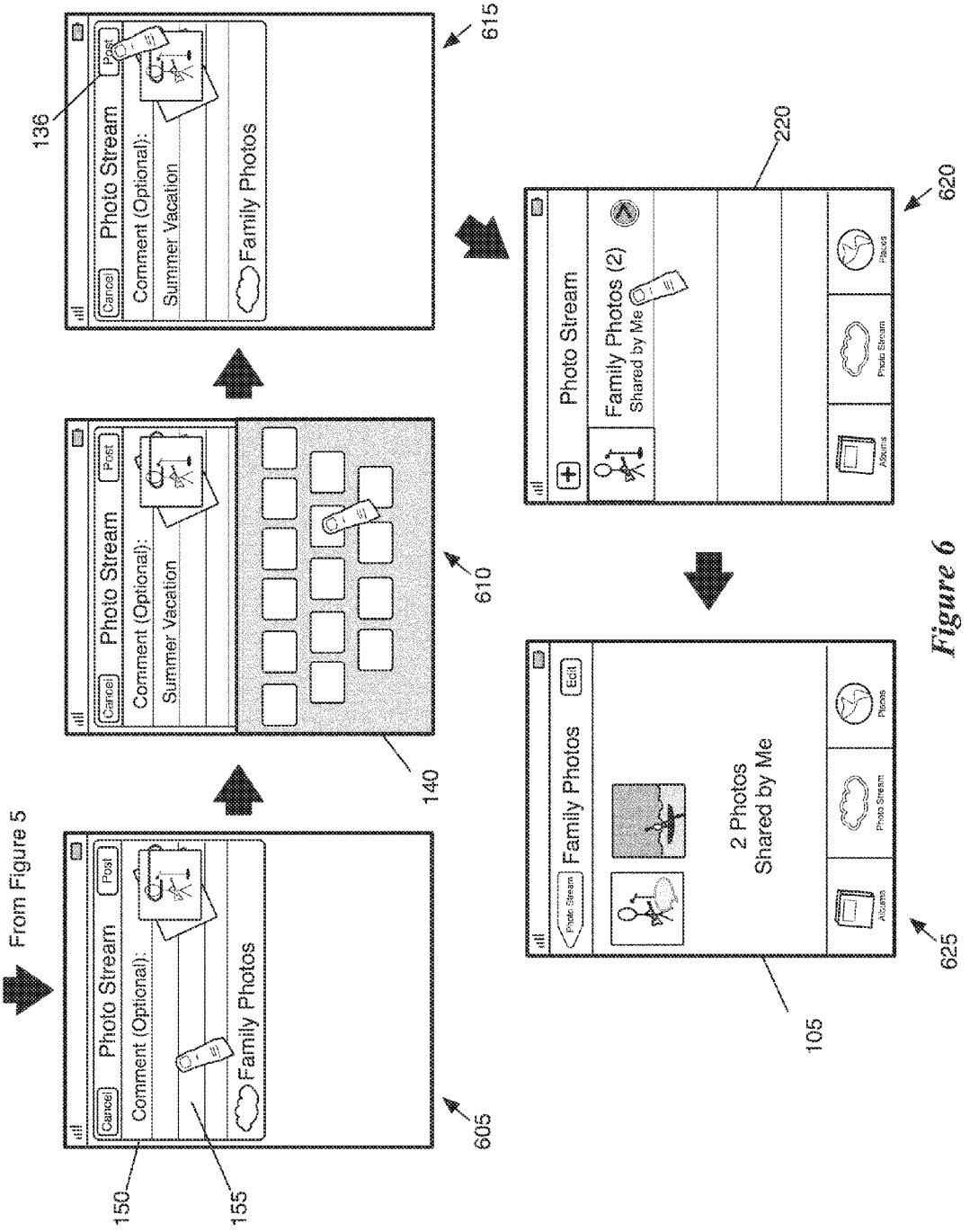

From Figure 5
Cancel
Photo Stream
Post
Comment (Optional):
Summer Vacation
Family Photos
150
155
605
140
610
136
615
Photo Stream
Family Photos (2)
Shared by Me
220
620
Family Photos
Edit
Photo Stream
2 Photos
Shared by Me
Albums
Photo Stream
Places
105
625

Figure 6

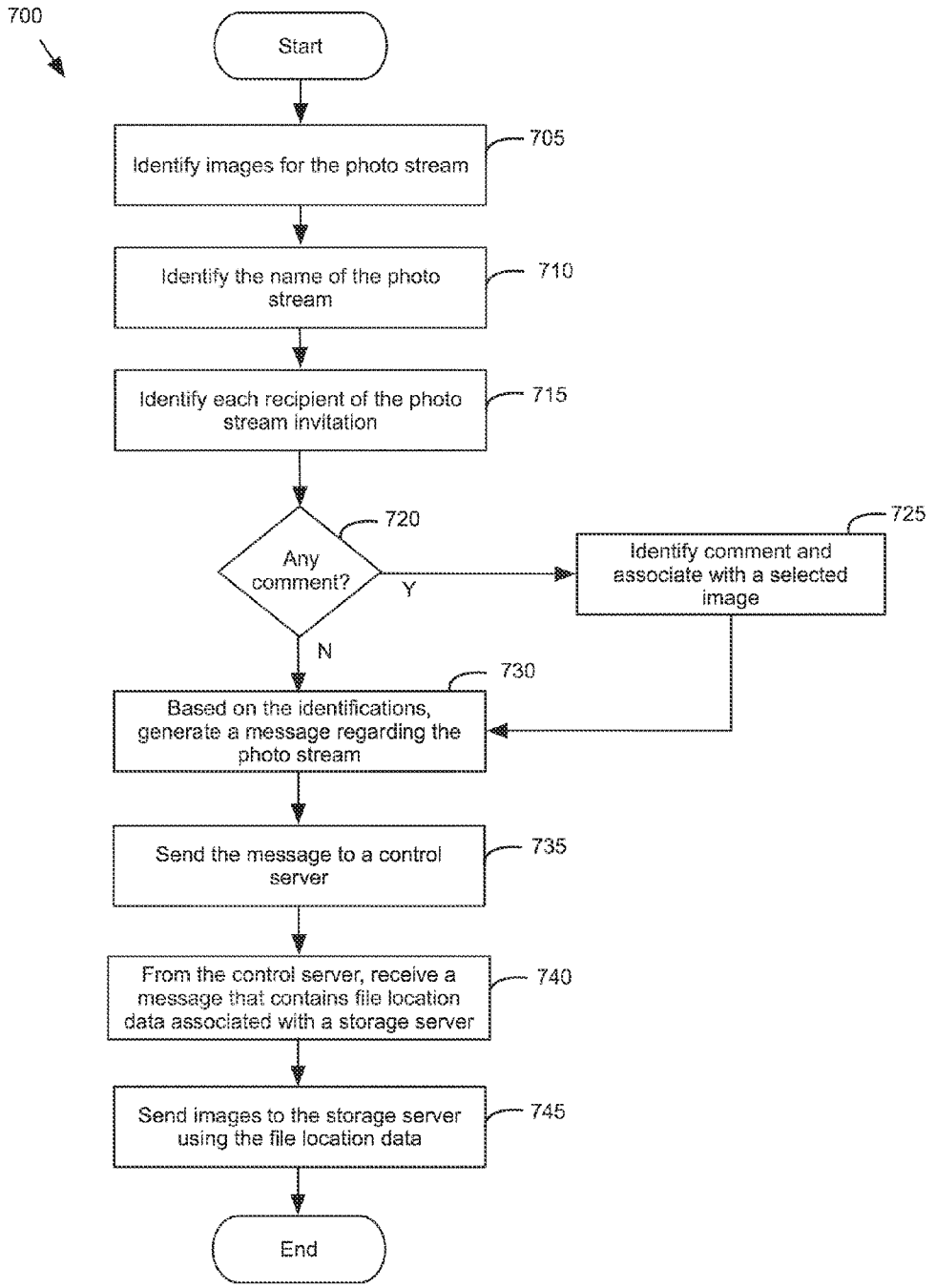

700
Start
Identify images for the photo stream
705
Identify the name of the photo stream
710
Identify each recipient of the photo stream invitation
715
Any comment?
720
Y
N
Identify comment and associate with a selected image
725
Based on the identifications, generate a message regarding the photo stream
730
Send the message to a control server
735
From the control server, receive a message that contains file location data associated with a storage server
740
Send images to the storage server using the file location data
745
End

Figure 7

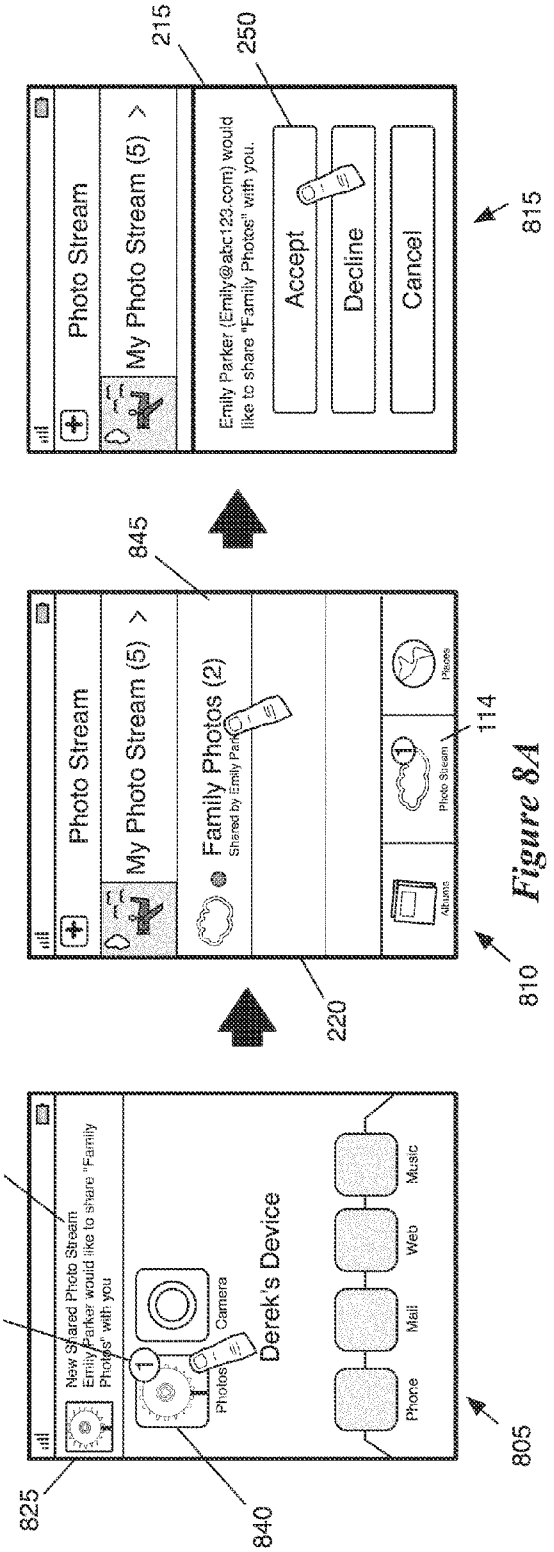


Figure 8A

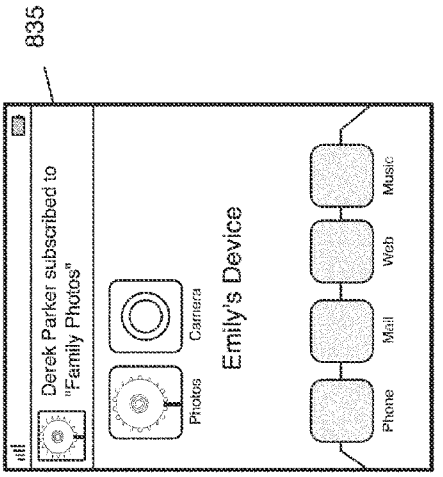


Figure 8B

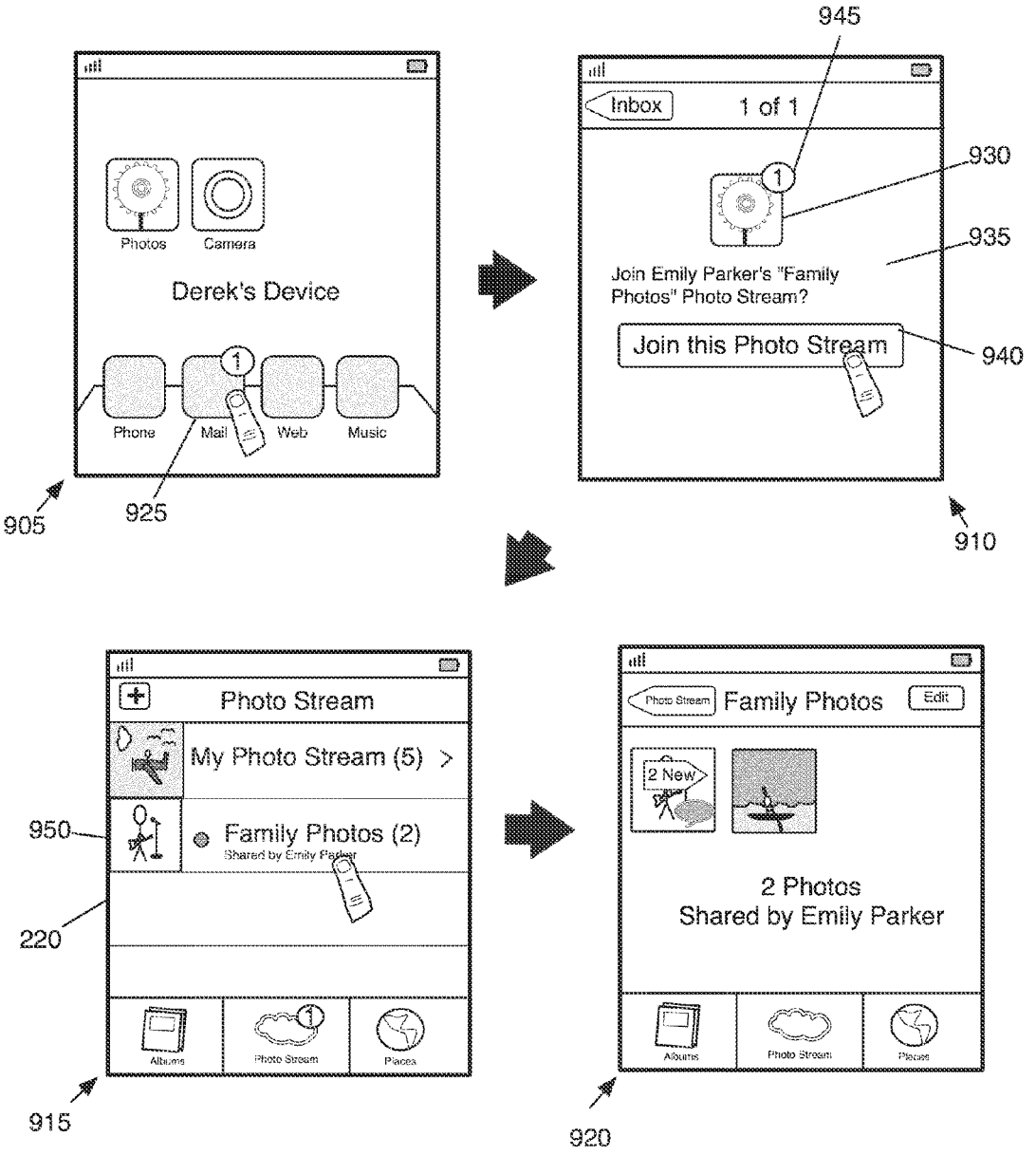

945
Inbox
1 of 1
930
935
Join Emily Parker's "Family Photos" Photo Stream?
Join this Photo Stream
940
Photos
Camera
Derek's Device
Phone
Mail
Web
Music
905
925
910
Photo Stream
My Photo Stream (5)
950
Family Photos (2)
Shared by Emily Parker
220
Albums
Photo Stream
Places
915
Photo Stream
Family Photos
Edit
2 New
2 Photos
Shared by Emily Parker
920

Figure 9

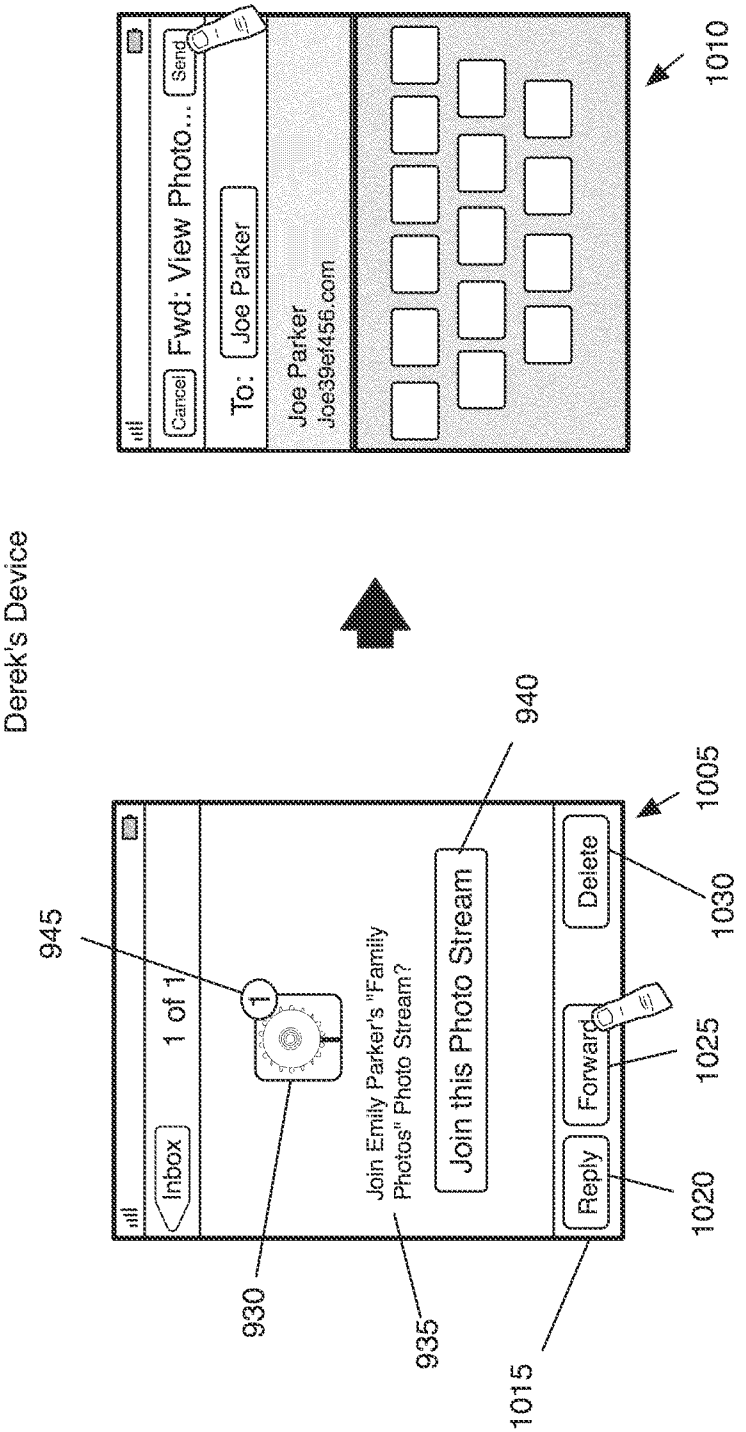

Derek's Device
Inbox
1 of 1
Join Emily Parker's "Family Photos" Photo Stream?
Join this Photo Stream
Reply
Forward
Delete
Cancel
Fwd: View Photo...
Send
To:
Joe Parker
Joe Parker
Joe39ef456.com
945
930
935
940
1010
1015
1020
1025
1030
1035

Figure 10

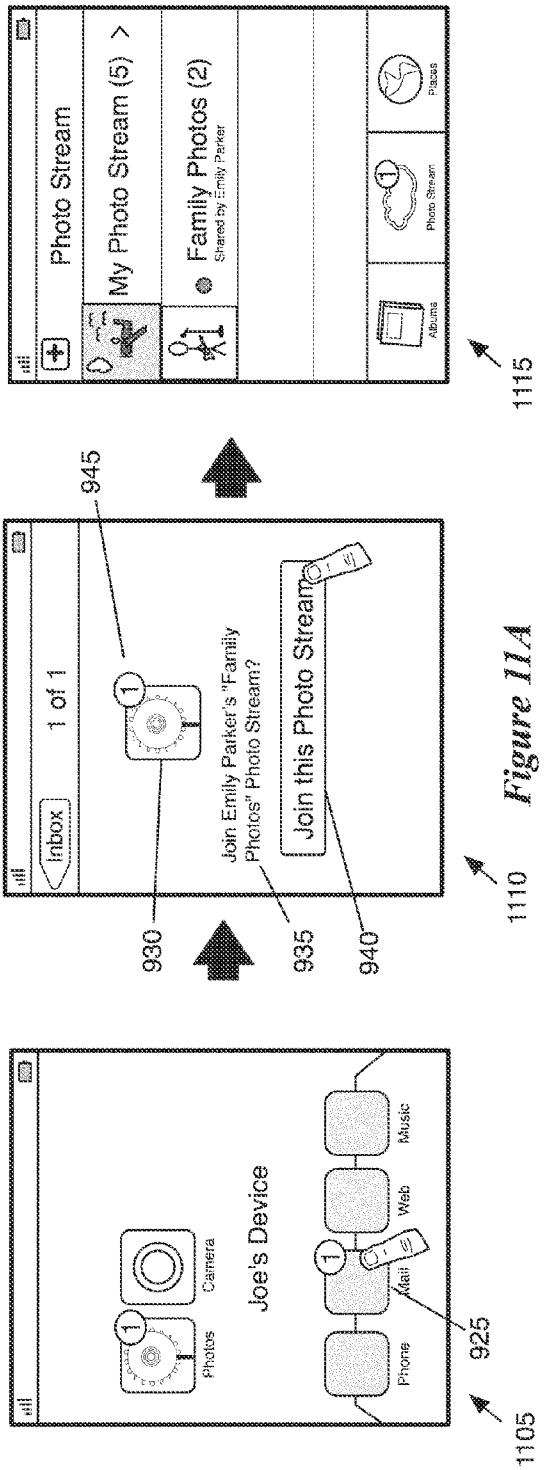


Figure 11A

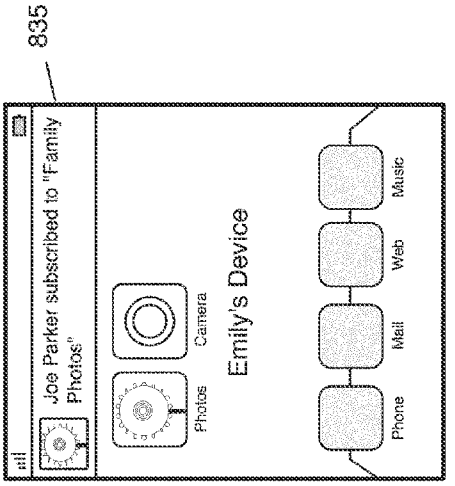


Figure 11B

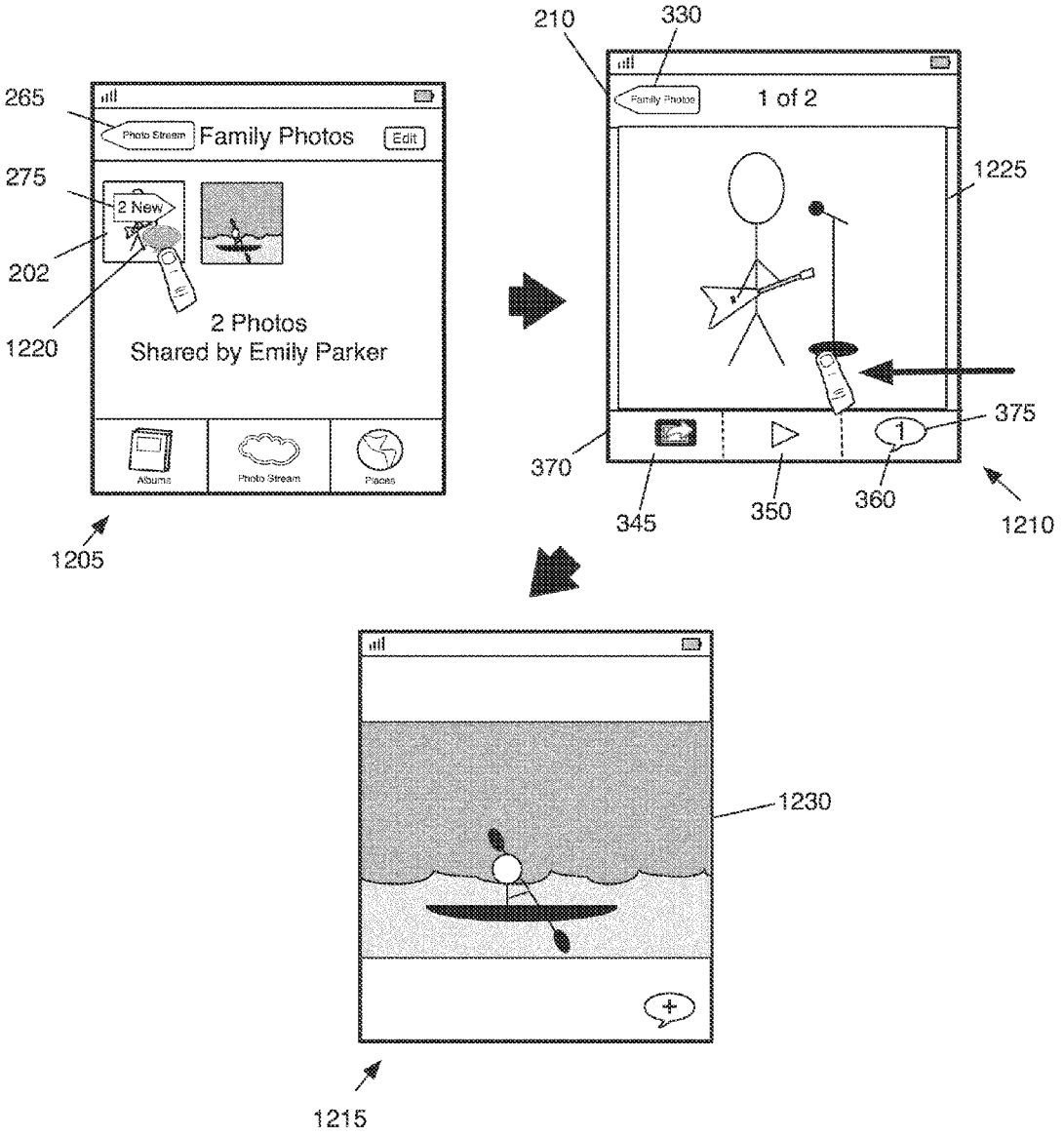

265
Photo Stream
Family Photos
Edit
275
2 New
202
1220
2 Photos
Shared by Emily Parker
Albums
Photo Stream
Places
1205
210
330
Family Photos
1 of 2
1225
375
370
345
350
360
1210
1230
1215

Figure 12

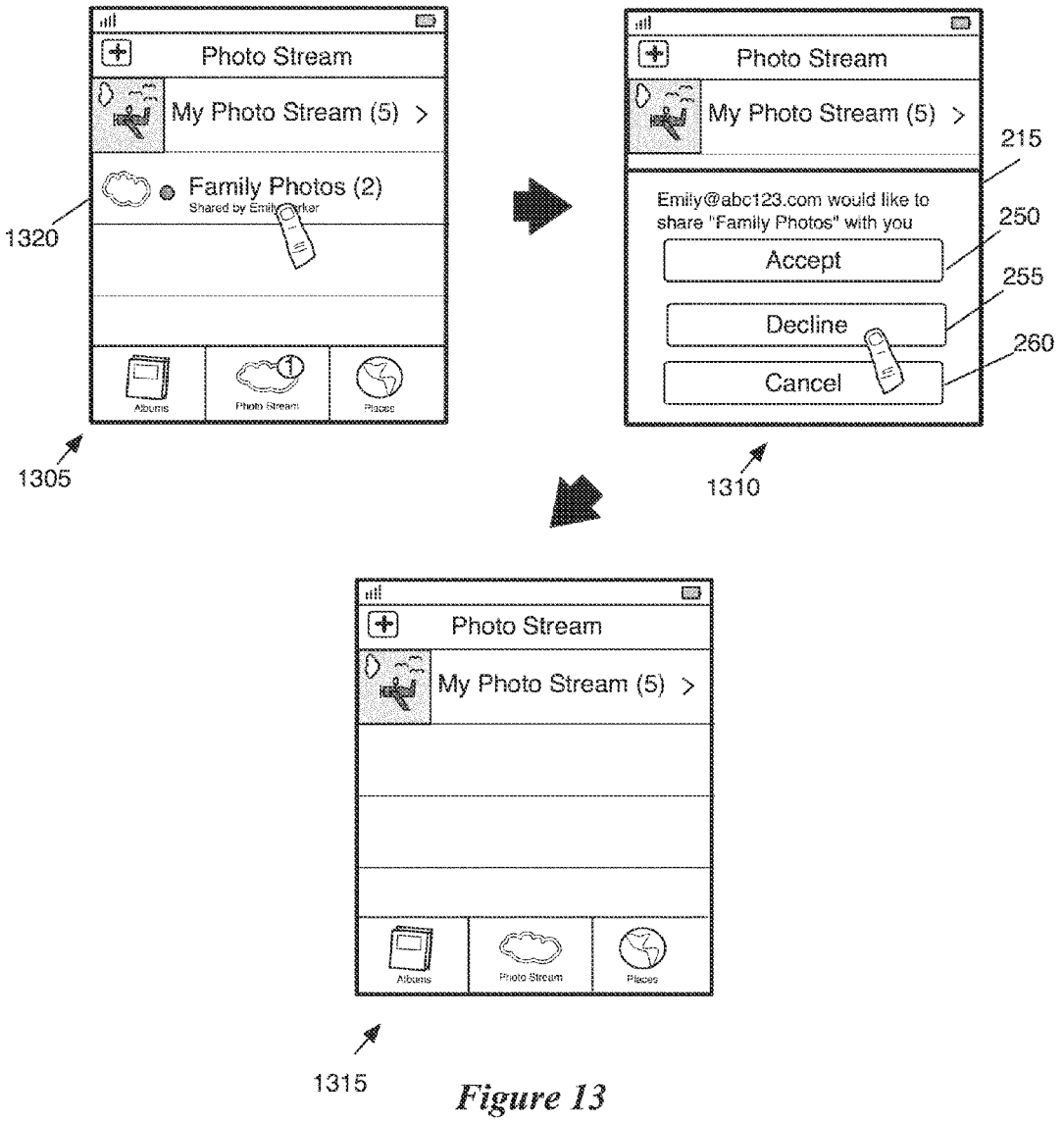


Photo Stream
My Photo Stream (5) >
Family Photos (2)
Shared by Emily Parker
1320
Albums
Photo Stream
Places
1305
Photo Stream
My Photo Stream (5) >
215
Emily@abc123.com would like to share "Family Photos" with you
250
Accept
255
Decline
260
Cancel
1310
Photo Stream
My Photo Stream (5) >
Albums
Photo Stream
Places
1315

Figure 13

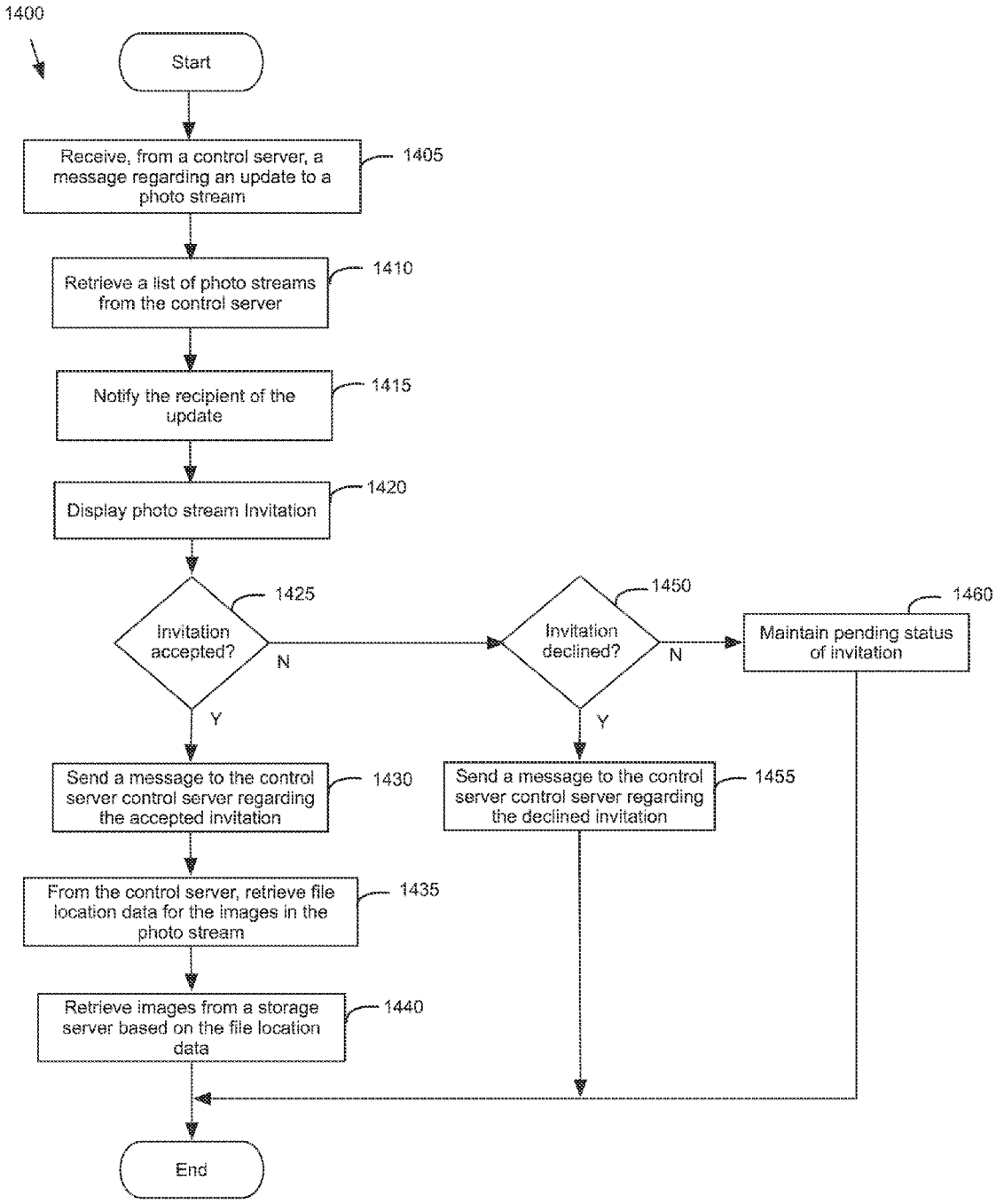

1400
Start
Receive, from a control server, a message regarding an update to a photo stream
1405
Retrieve a list of photo streams from the control server
1410
Notify the recipient of the update
1415
Display photo stream Invitation
1420
Invitation accepted?
1425
N
Y
Invitation declined?
1450
N
Y
Maintain pending status of invitation
1460
Send a message to the control server control server regarding the accepted invitation
1430
Send a message to the control server control server regarding the declined invitation
1455
From the control server, retrieve file location data for the images in the photo stream
1435
Retrieve images from a storage server based on the file location data
1440
End

Figure 14

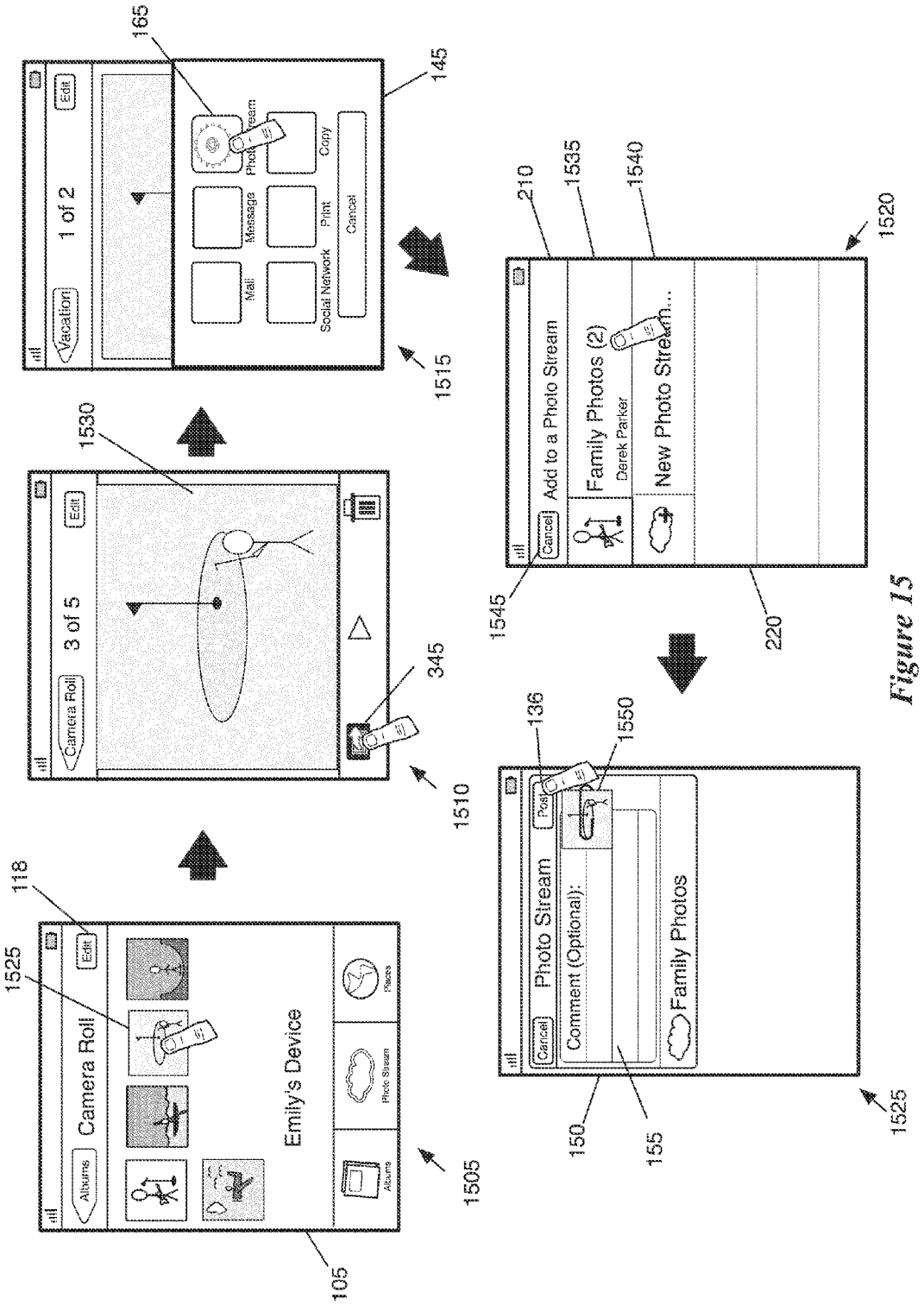

Albums
Camera Roll
Edit
Emily's Device
Albums
Photo Stream
Places
105
118
1525
1505
Camera Roll
3 of 5
Edit
345
1510
1530
Vacation
1 of 2
Edit
Mail
Message
Social Network
Print
Copy
Cancel
Photo Stream
165
145
1515
Cancel
Photo Stream
Post
Comment (Optional):
Family Photos
136
1550
150
155
1525
Cancel
Add to a Photo Stream
Family Photos (2)
Derek Parker
New Photo Stream...
210
1535
1540
1520
1545
220

Figure 15

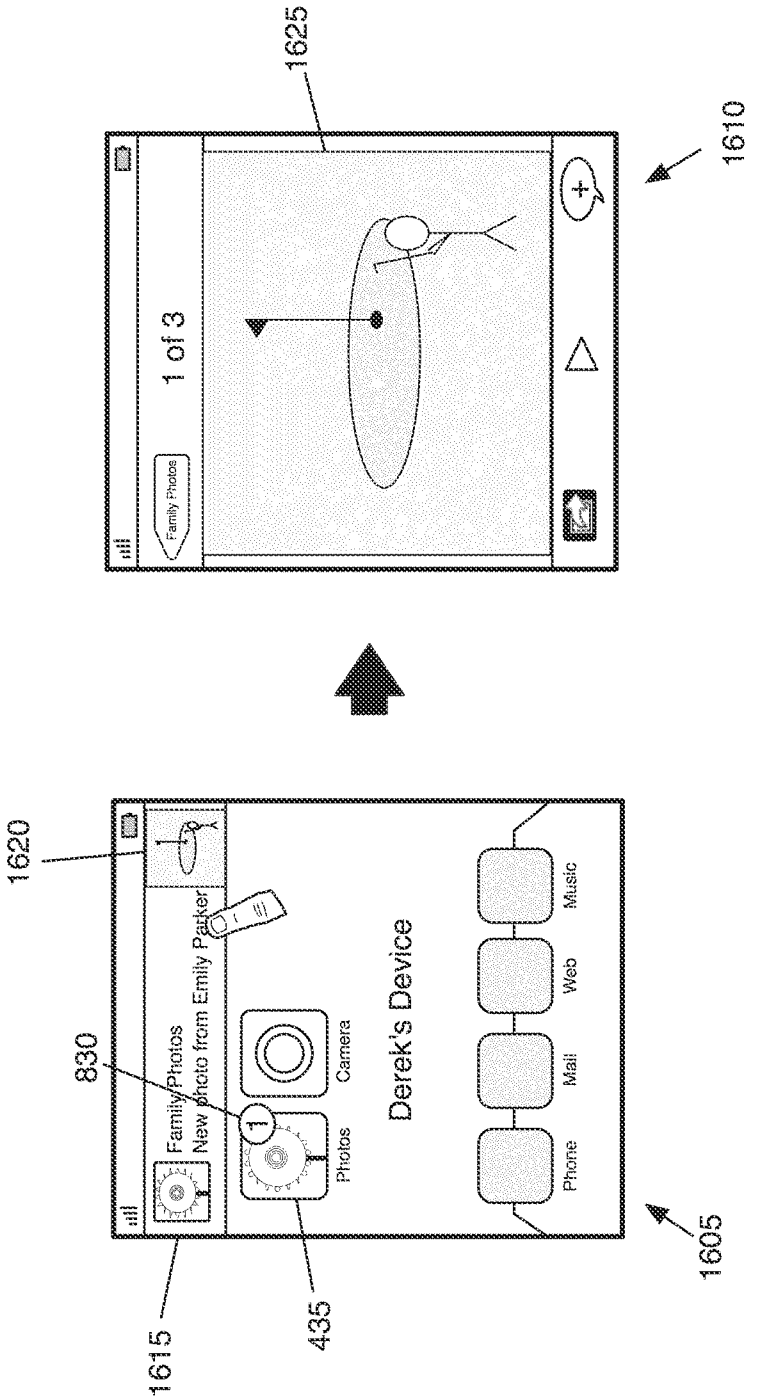

1625
1610
1 of 3
Family Photos
1620
830
Family Photos
New photo from Emily Parker
Camera
Photos
Derek's Device
Phone
Mail
Web
Music
1615
435
1605

Figure 16

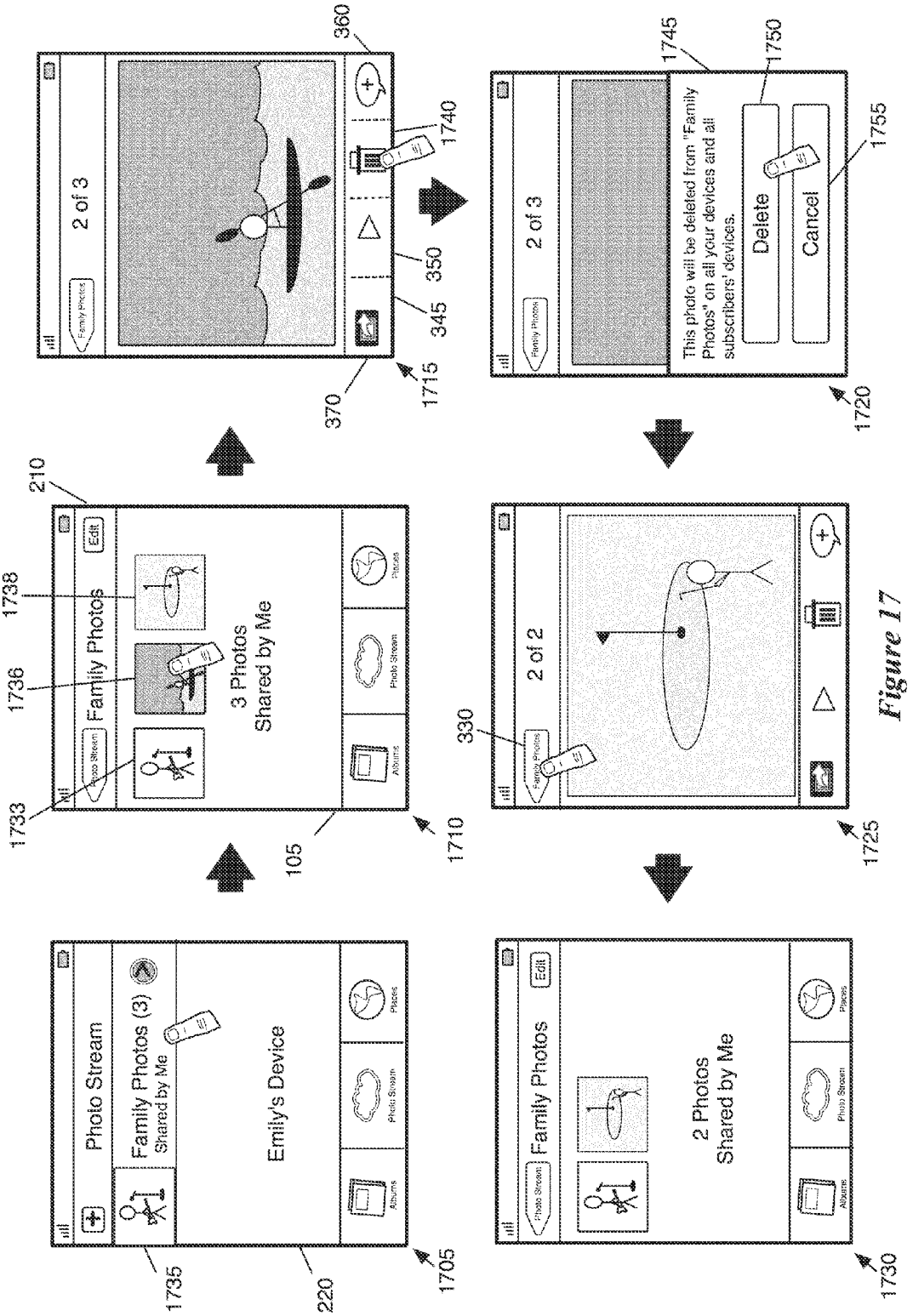


Photo Stream
Family Photos (3)
Shared by Me
Emily's Device
Albums
Photo Stream
Places
1735
220
1705
Family Photos
Edit
Photo Stream
2 Photos
Shared by Me
1730
2 of 2
Family Photos
1725
330
Family Photos
Edit
Photo Stream
3 Photos
Shared by Me
1738
1736
1733
210
105
1710
2 of 3
Family Photos
370
1715
345
350
360
1740
2 of 3
Family Photos
This photo will be deleted from "Family Photos" on all your devices and all subscribers' devices.
Delete
Cancel
1745
1750
1755
1720

Figure 17

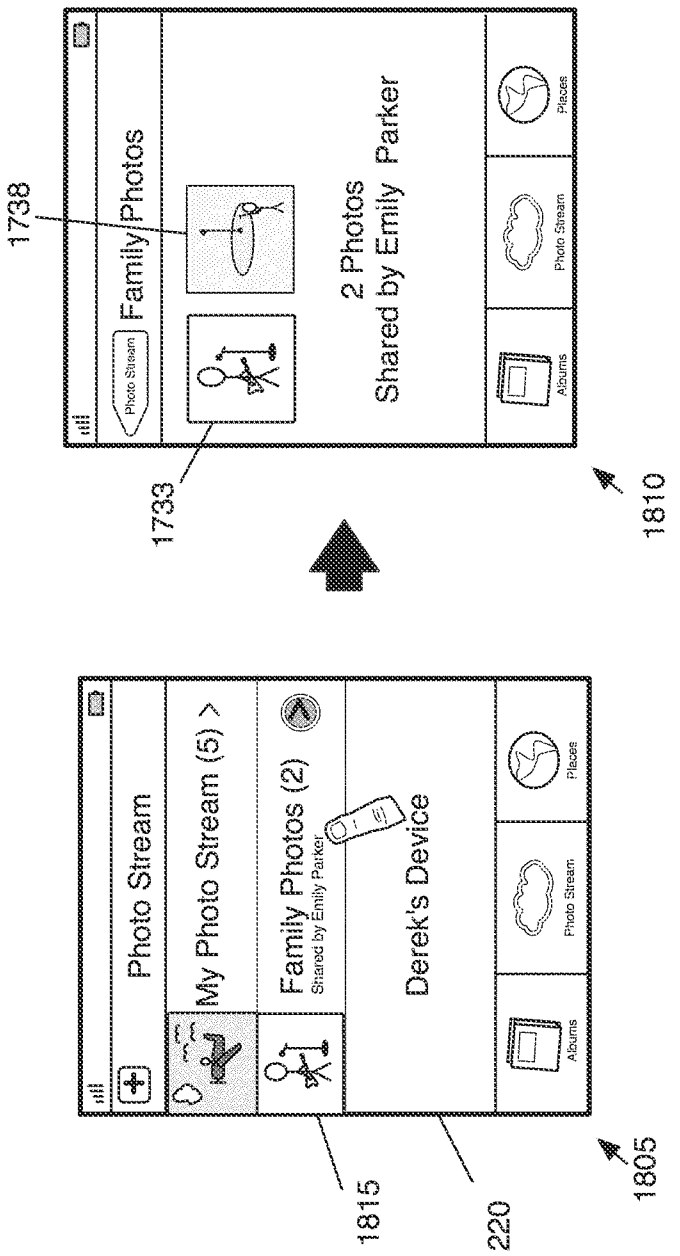


Photo Stream
My Photo Stream (5) >
Family Photos (2)
Shared by Emily Parker
Derek's Device
Albums
Photo Stream
Places
1815
220
1805
1738
Family Photos
Photo Stream
2 Photos
Shared by Emily Parker
1733
1810

Figure 18

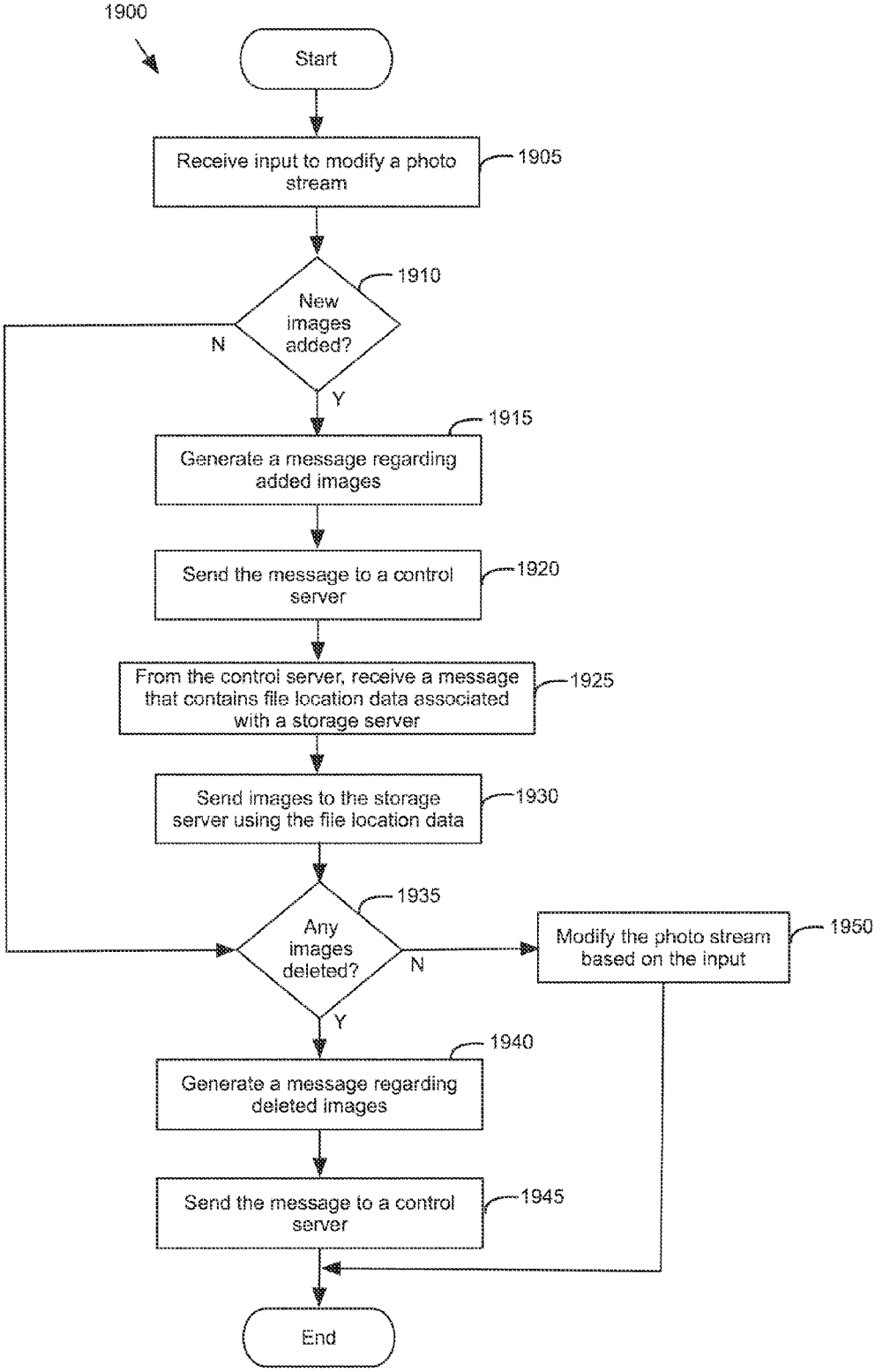

1900
Start
Receive input to modify a photo stream
1905
New images added?
1910
N
Y
Generate a message regarding added images
1915
Send the message to a control server
1920
From the control server, receive a message that contains file location data associated with a storage server
1925
Send images to the storage server using the file location data
1930
Any images deleted?
1935
N
Y
Modify the photo stream based on the input
1950
Generate a message regarding deleted images
1940
Send the message to a control server
1945
End

Figure 19

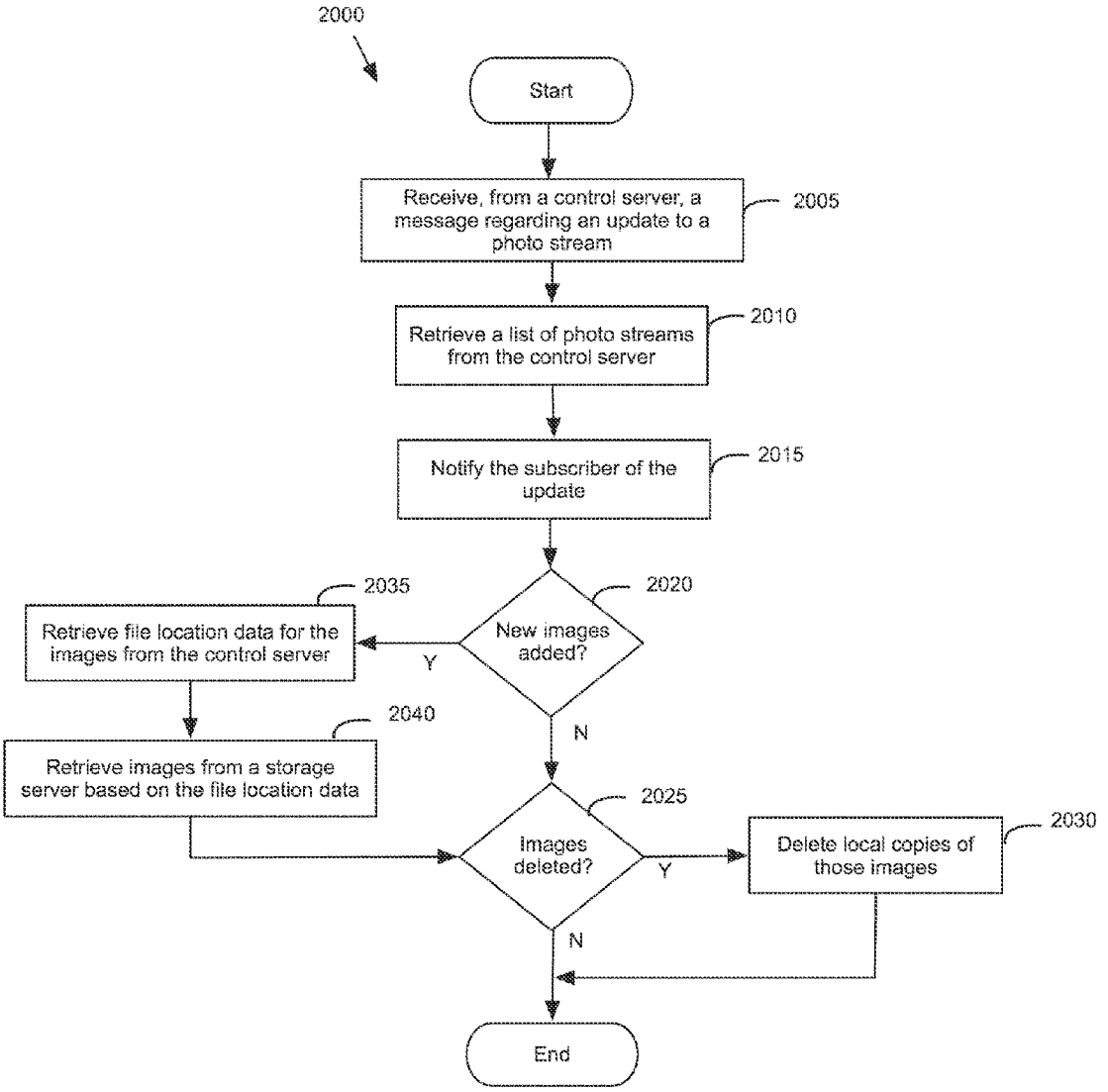

2000
Start
Receive, from a control server, a message regarding an update to a photo stream
2005
Retrieve a list of photo streams from the control server
2010
Notify the subscriber of the update
2015
New images added?
2020
Y
Retrieve file location data for the images from the control server
2035
N
Retrieve images from a storage server based on the file location data
2040
Images deleted?
2025
Y
Delete local copies of those images
2030
N
End

Figure 20

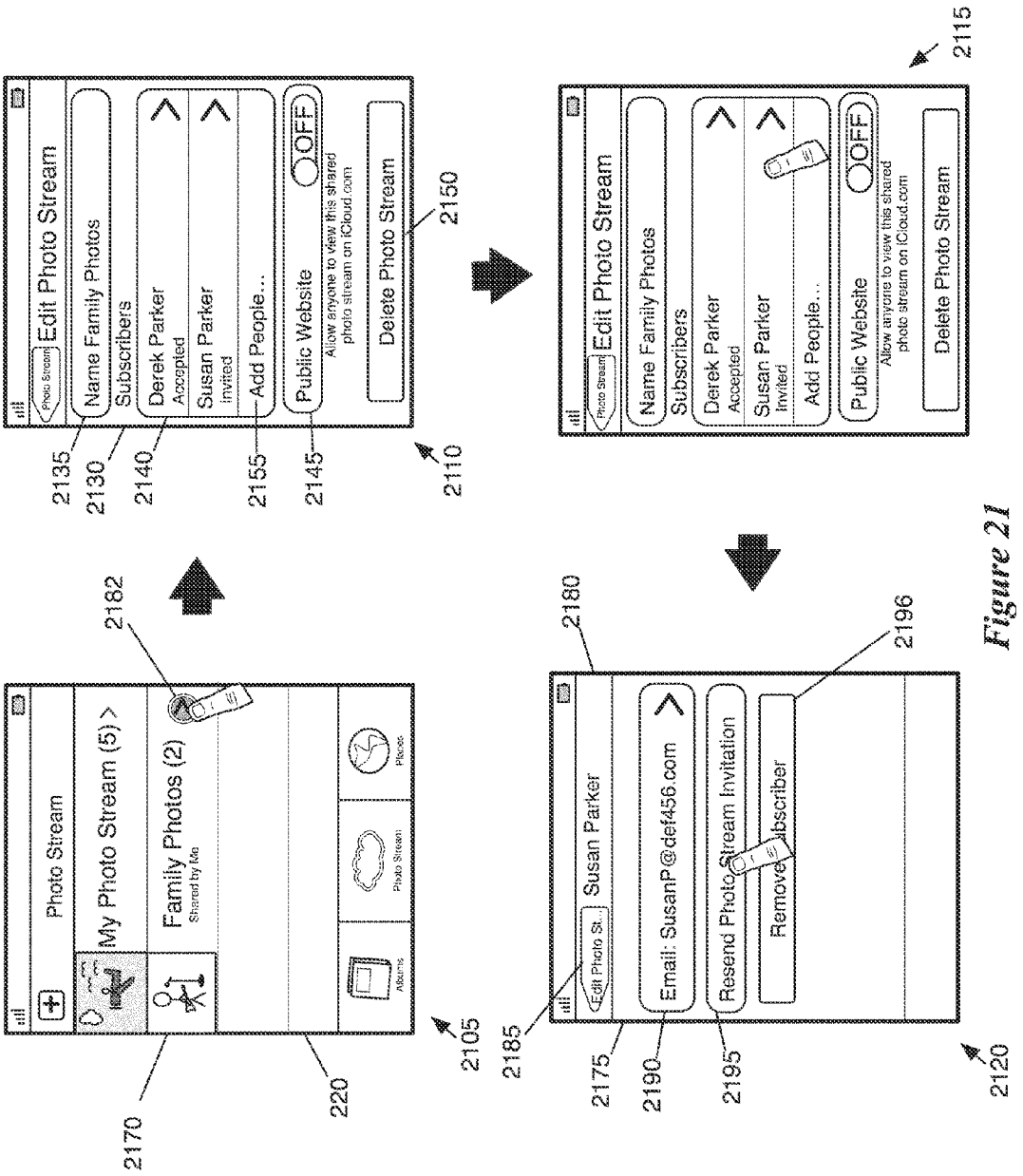


Photo Stream
My Photo Stream (5) >
Family Photos (2)
Shared by Me
Albums
Photo Stream
Places
2105
2170
2182
220
Photo Stream
Edit Photo Stream
Name Family Photos
Subscribers
Derek Parker
Accepted
Susan Parker
Invited
Add People...
Public Website
OFF
Allow anyone to view this shared photo stream on iCloud.com
Delete Photo Stream
2110
2135
2130
2140
2155
2145
2150
2115
Edit Photo St...
Susan Parker
Email: SusanP@def456.com
Resend Photo Stream Invitation
Remove Subscriber
2120
2185
2175
2190
2195
2180
2196

Figure 21

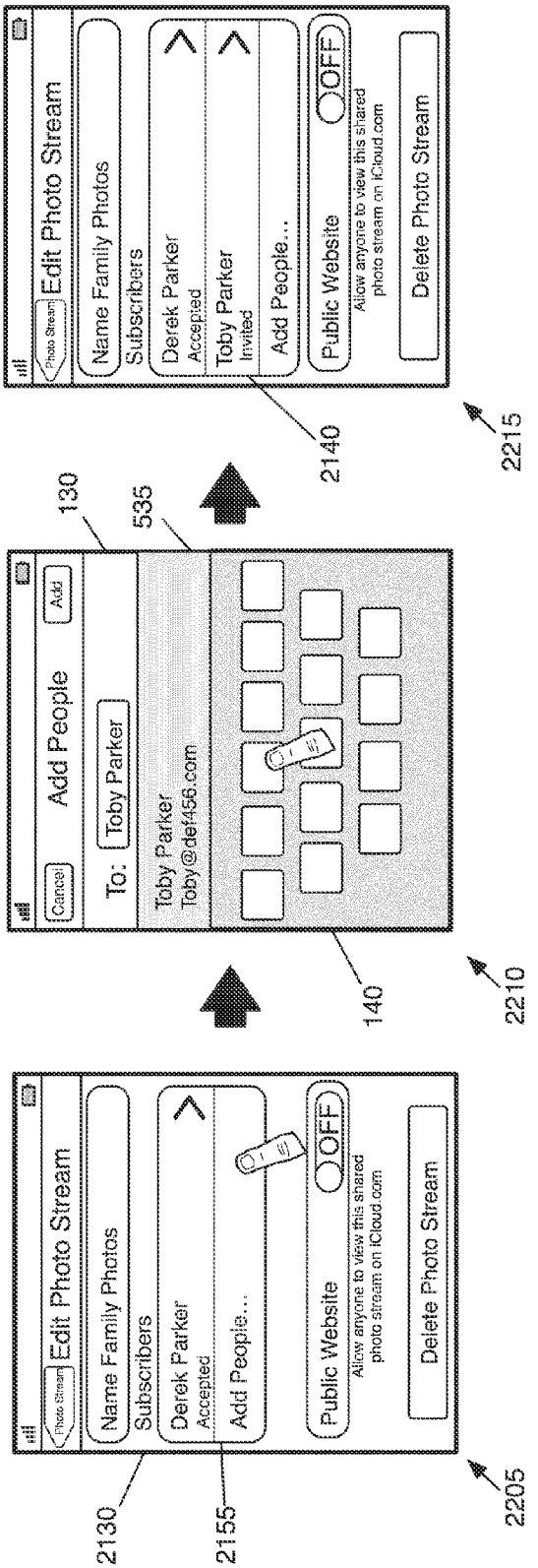


Photo Stream
Edit Photo Stream
Name Family Photos
Subscribers
Derek Parker
Accepted
Add People...
Public Website
OFF
Allow anyone to view this shared photo stream on iCloud.com
Delete Photo Stream
2130
2155
2205
Cancel
Add People
Add
To:
Toby Parker
Toby Parker
Toby@def456.com
130
535
140
2210
Toby Parker
Invited
2140
2215

Figure 22

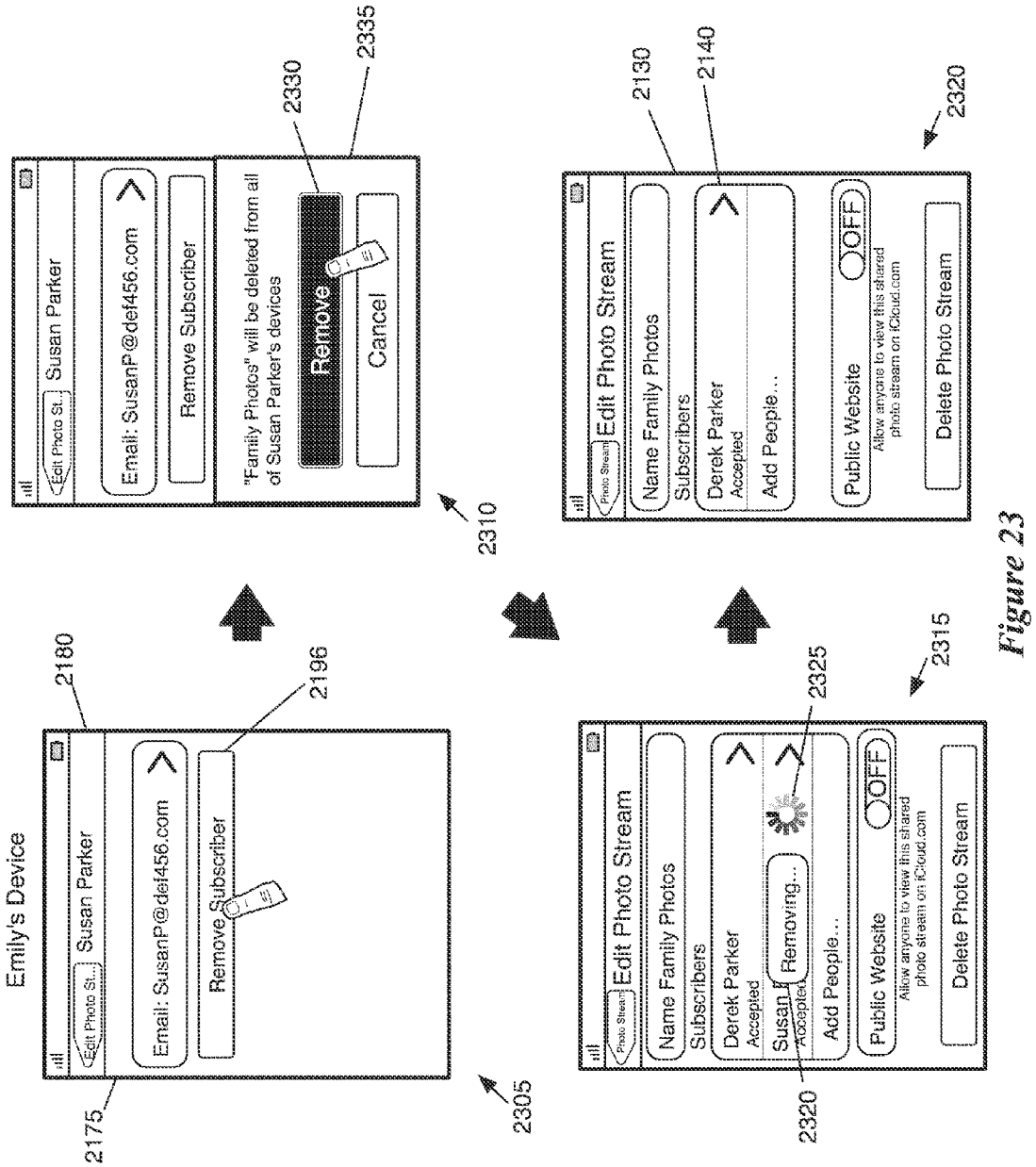

Emily's Device
Edit Photo St...
Susan Parker
Email: SusanP@def456.com
Remove Subscriber
2180
2196
2175
2305
Edit Photo Stream
Photo Stream
Name Family Photos
Subscribers
Derek Parker
Accepted
Susan P...
Accepted
Removing...
Add People...
Public Website
OFF
Allow anyone to view this shared photo stream on iCloud.com
Delete Photo Stream
2325
2320
2315
2130
2140
2320
"Family Photos" will be deleted from all of Susan Parker's devices
Remove
Cancel
2330
2335
2310

Figure 23

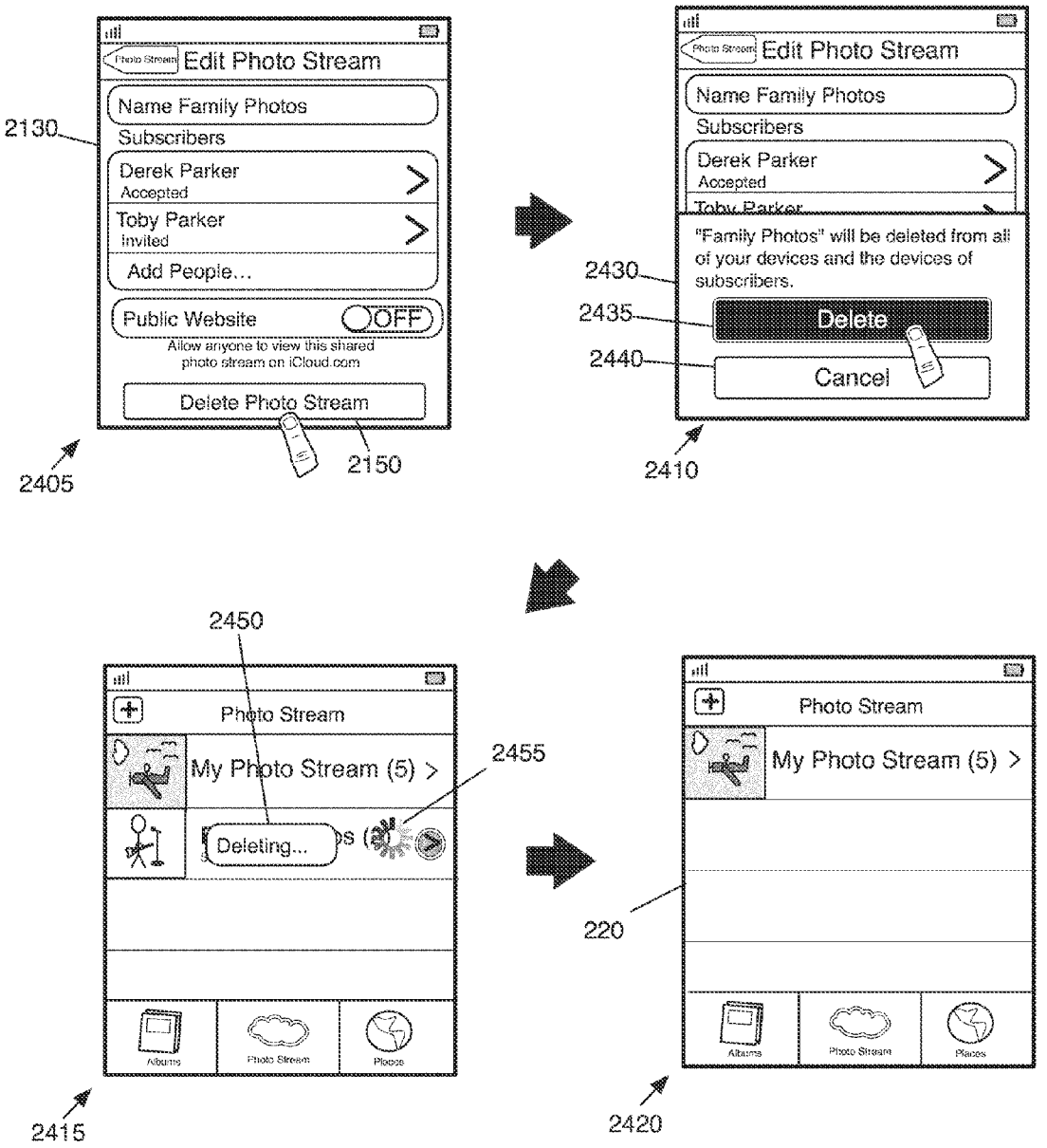


Photo Stream
Edit Photo Stream
Name Family Photos
Subscribers
Derek Parker
Accepted
Toby Parker
Invited
Add People...
Public Website
OFF
Allow anyone to view this shared photo stream on iCloud.com
Delete Photo Stream
2130
2150
2405
"Family Photos" will be deleted from all of your devices and the devices of subscribers.
Delete
Cancel
2430
2435
2440
2410
2450
My Photo Stream (5)
Deleting...
2455
Albums
Photo Stream
Places
2415
220
2420

Figure 24

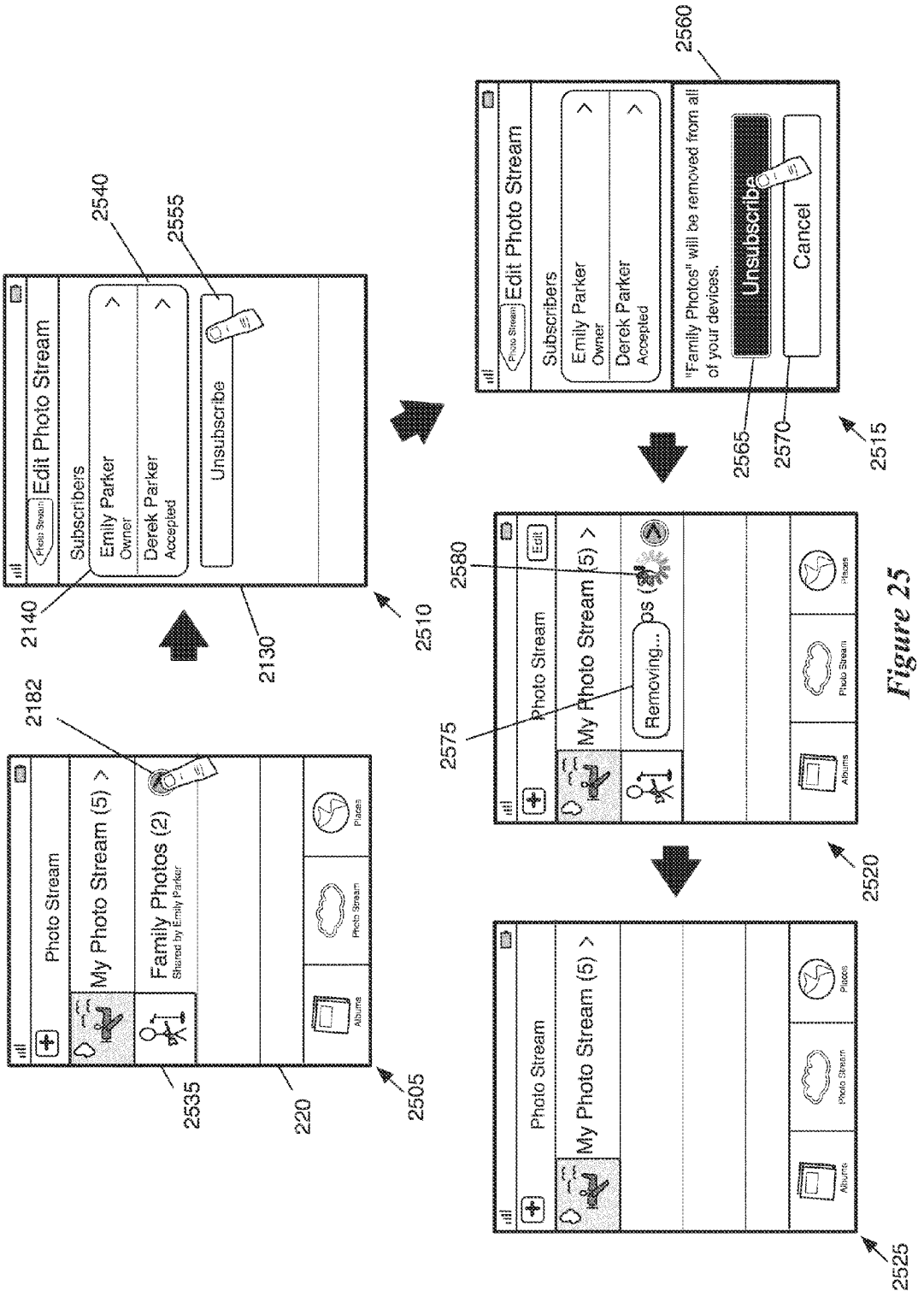


Photo Stream
My Photo Stream (5) >
Family Photos (2)
Shared by Emily Parker
Albums
Photo Stream
Places
2505
2535
220
2182
Edit Photo Stream
Subscribers
Emily Parker
Owner
Derek Parker
Accepted
Unsubscribe
2130
2140
2510
2540
2555
Edit
Removing...
2520
2575
2580
"Family Photos" will be removed from all of your devices.
Unsubscribe
Cancel
2515
2560
2565
2570
2525

Figure 25

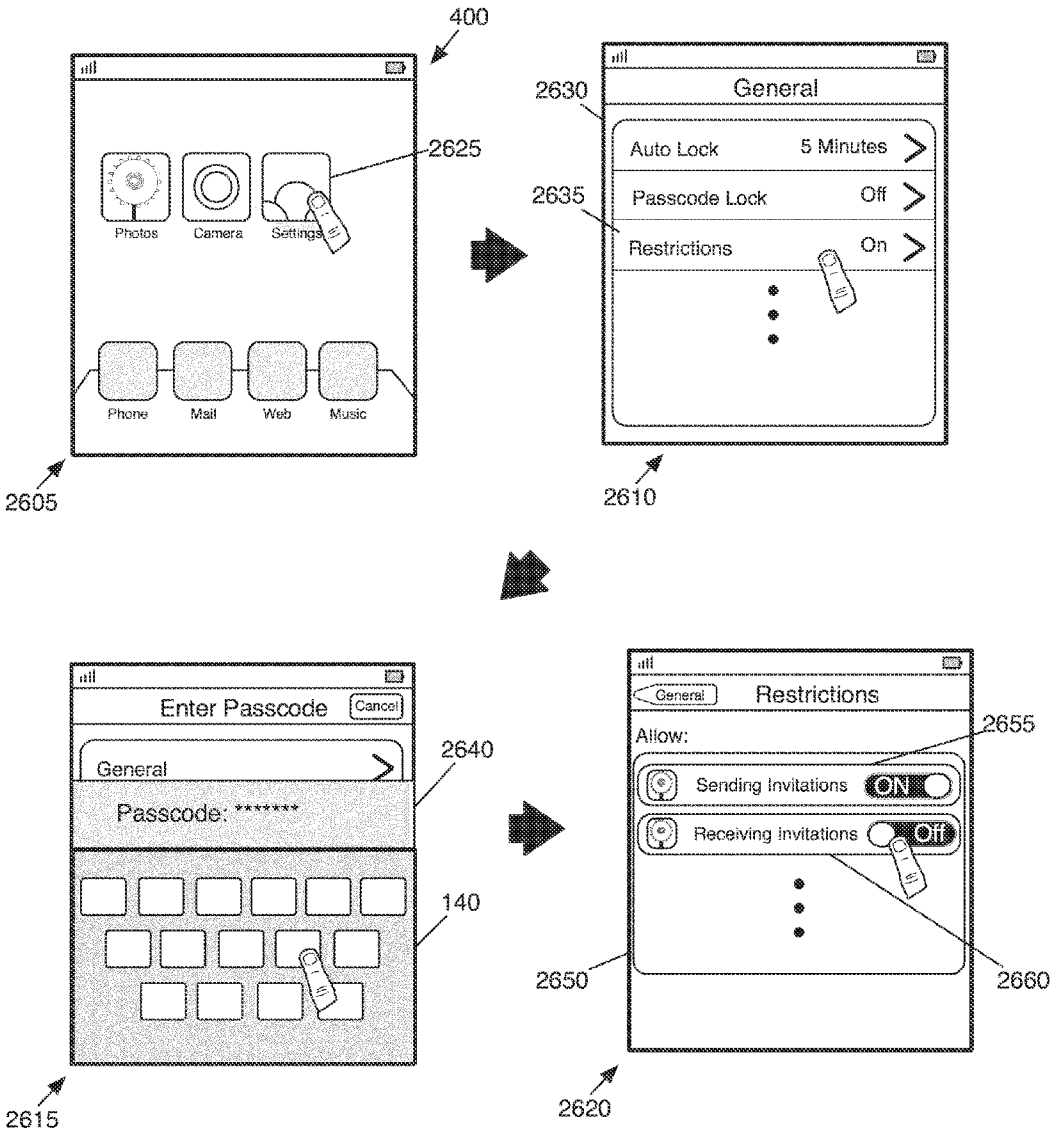

400
2625
Photos
Camera
Settings
Phone
Mail
Web
Music
2605
2630
General
Auto Lock
5 Minutes
2635
Passcode Lock
Off
Restrictions
On
2610
Enter Passcode
Cancel
General
2640
Passcode: ********
140
2615
General
Restrictions
Allow:
2655
Sending Invitations
ON
Receiving Invitations
Off
2650
2660
2620

Figure 26

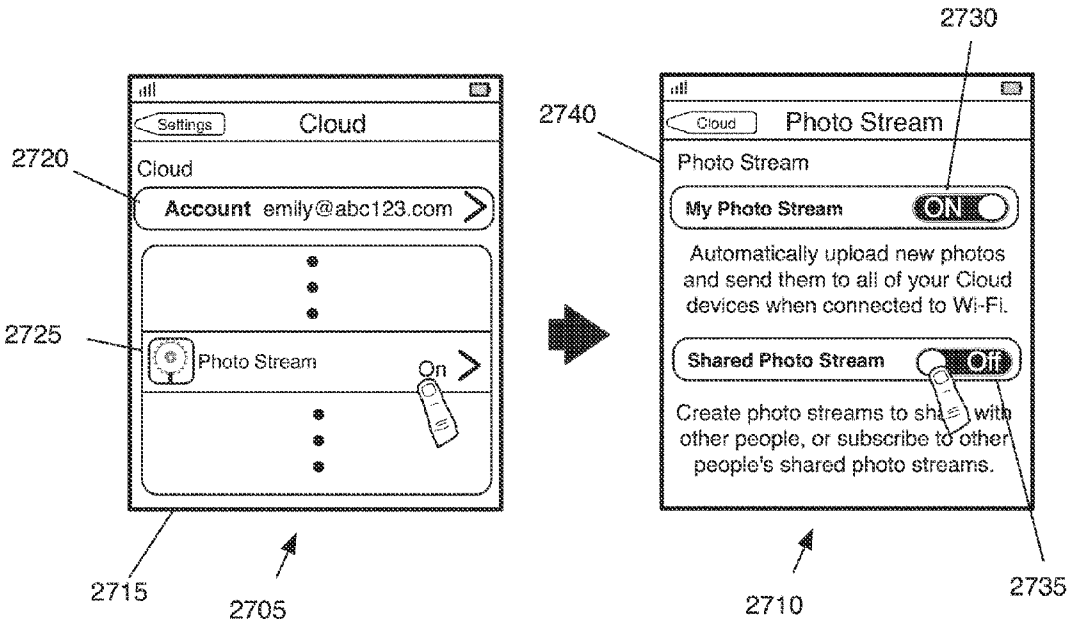

2730
2740
2720
2725
Settings
Cloud
Cloud
Account emily@abc123.com
Photo Stream
On
Cloud
Photo Stream
Photo Stream
My Photo Stream
ON
Automatically upload new photos and send them to all of your Cloud devices when connected to Wi-Fi.
Shared Photo Stream
Off
Create photo streams to share with other people, or subscribe to other people's shared photo streams.
2715
2705
2710
2735

Figure 27

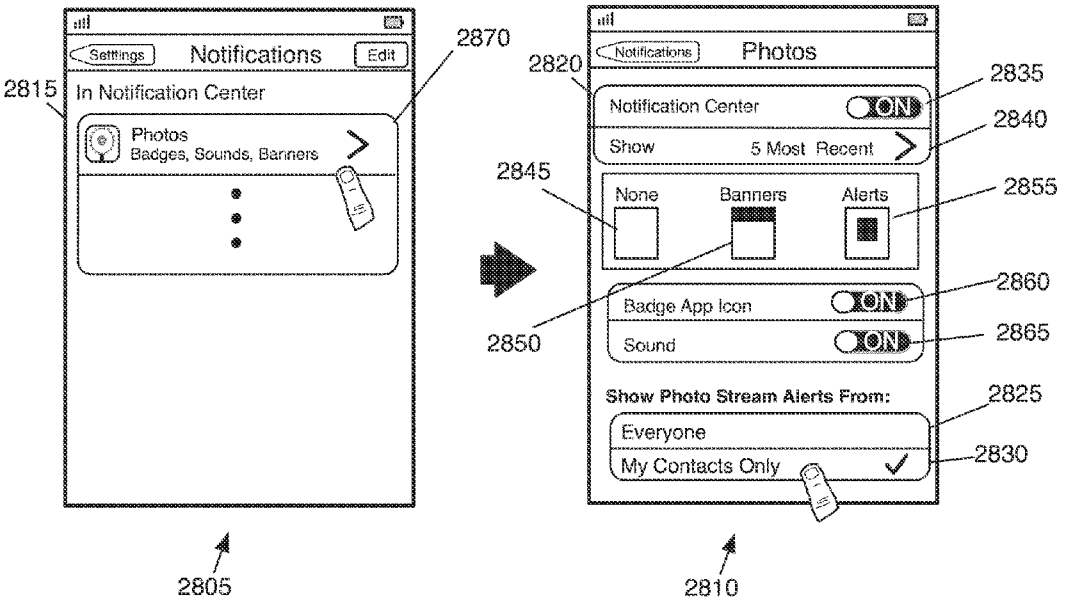

Settings
Notifications
Edit
In Notification Center
Photos
Badges, Sounds, Banners
2815
2870
2805
Notifications
Photos
2820
Notification Center
ON
2835
Show
5 Most Recent
2840
2845
None
Banners
Alerts
2855
Badge App Icon
ON
2860
Sound
ON
2865
2850
Show Photo Stream Alerts From:
2825
Everyone
My Contacts Only
2830
2810

Figure 28

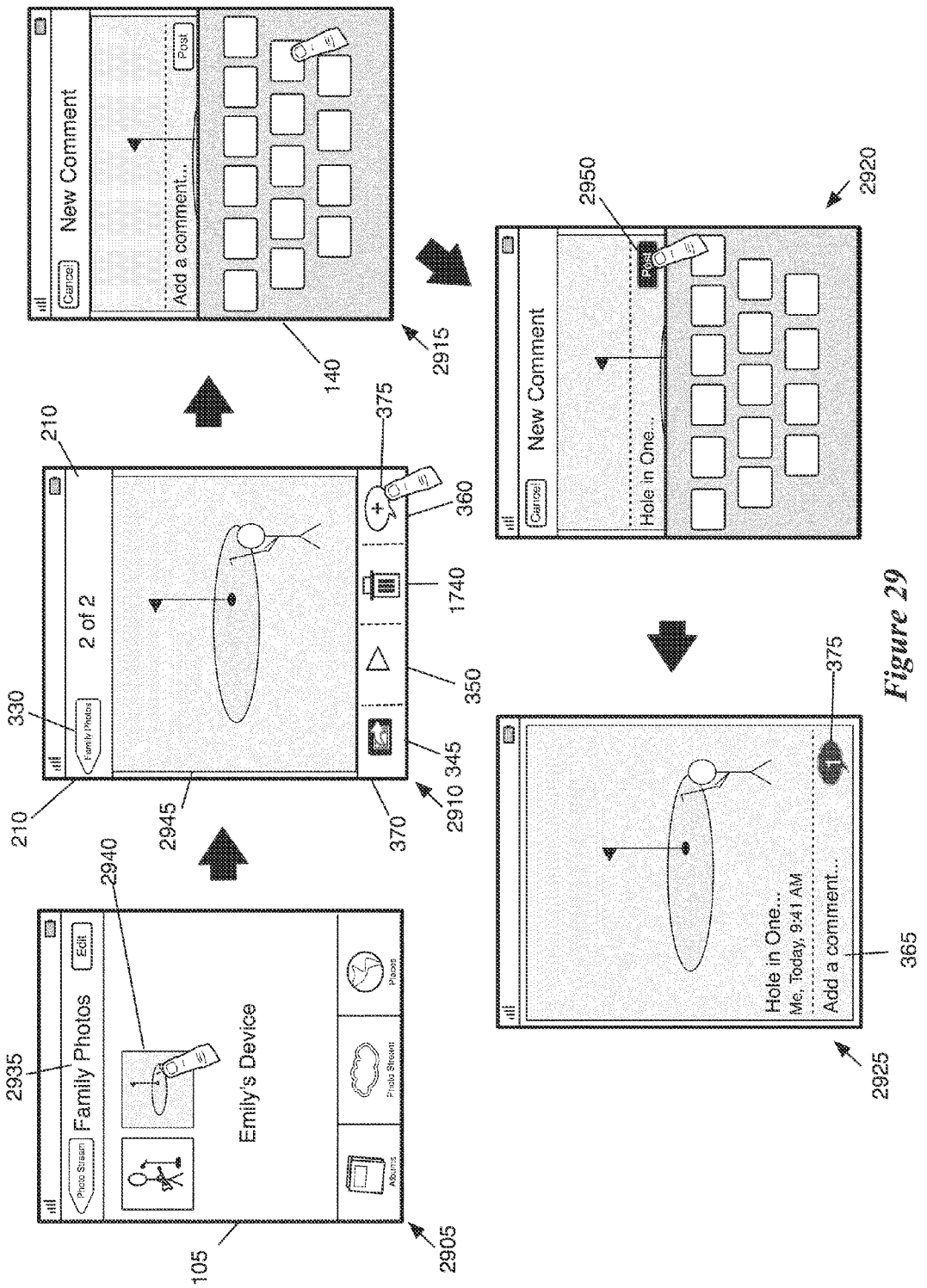

Family Photos
Photo Stream
Edit
Emily's Device
Albums
Photo Stream
Places
2 of 2
Family Photos
New Comment
Cancel
Add a comment...
Post
Hole in One...
Me, Today, 9:41 AM
105
2905
2935
2940
210
330
2945
370
2910
345
350
1740
360
375
140
2915
2950
2920
2925
365

Figure 29

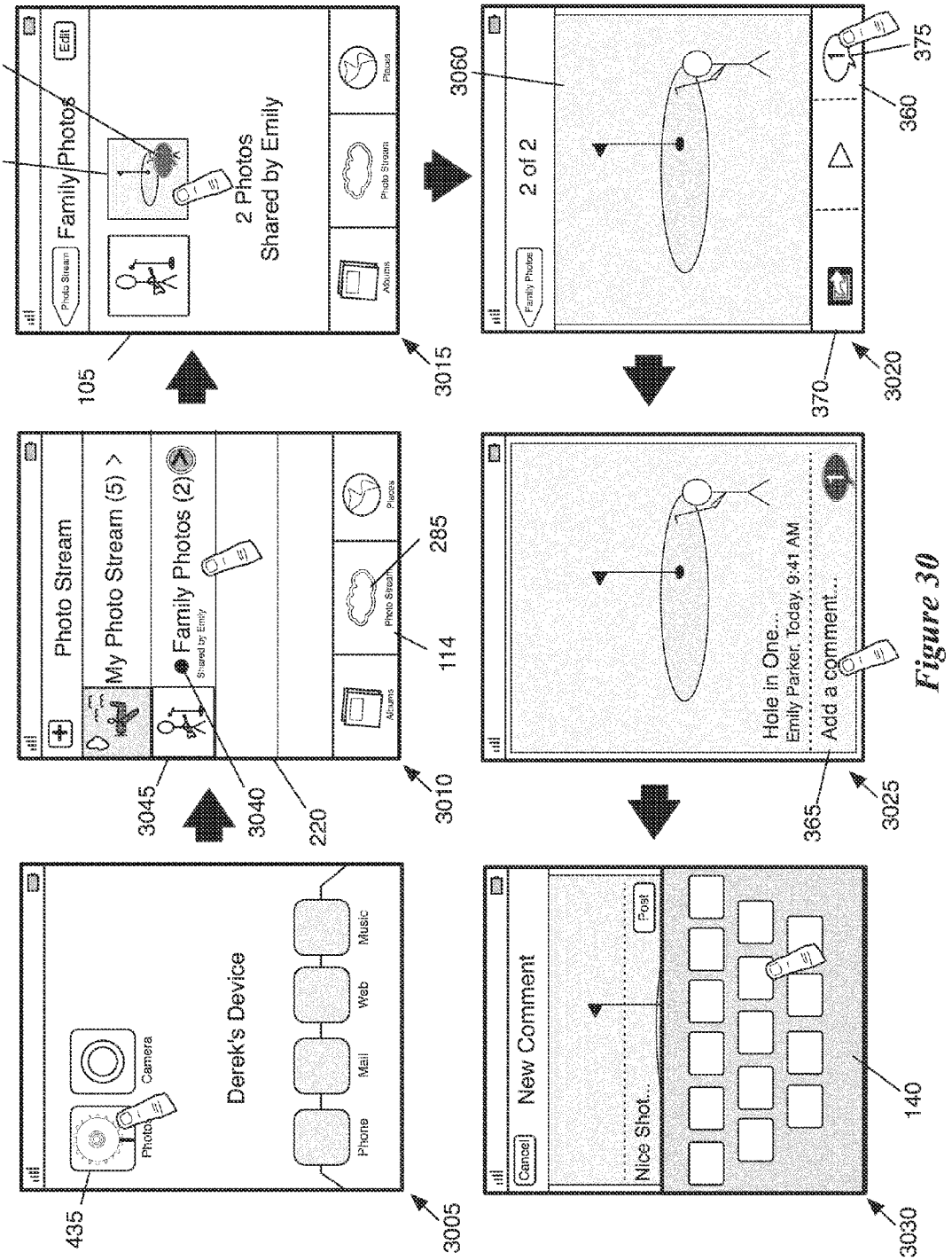


Photo Stream
My Photo Stream (5) >
Family Photos (2)
Shared by Emily
Albums
Photo Stream
Places
Derek's Device
Camera
Photos
Phone
Mail
Web
Music
Family Photos
Edit
2 Photos
Shared by Emily
2 of 2
Hole in One...
Emily Parker, Today, 9:41 AM
Add a comment...
Cancel
New Comment
Post
Nice Shot...
105
220
285
114
140
365
370
375
360
435
3005
3010
3015
3020
3025
3030
3040
3045
3050
3055
3060

Figure 30

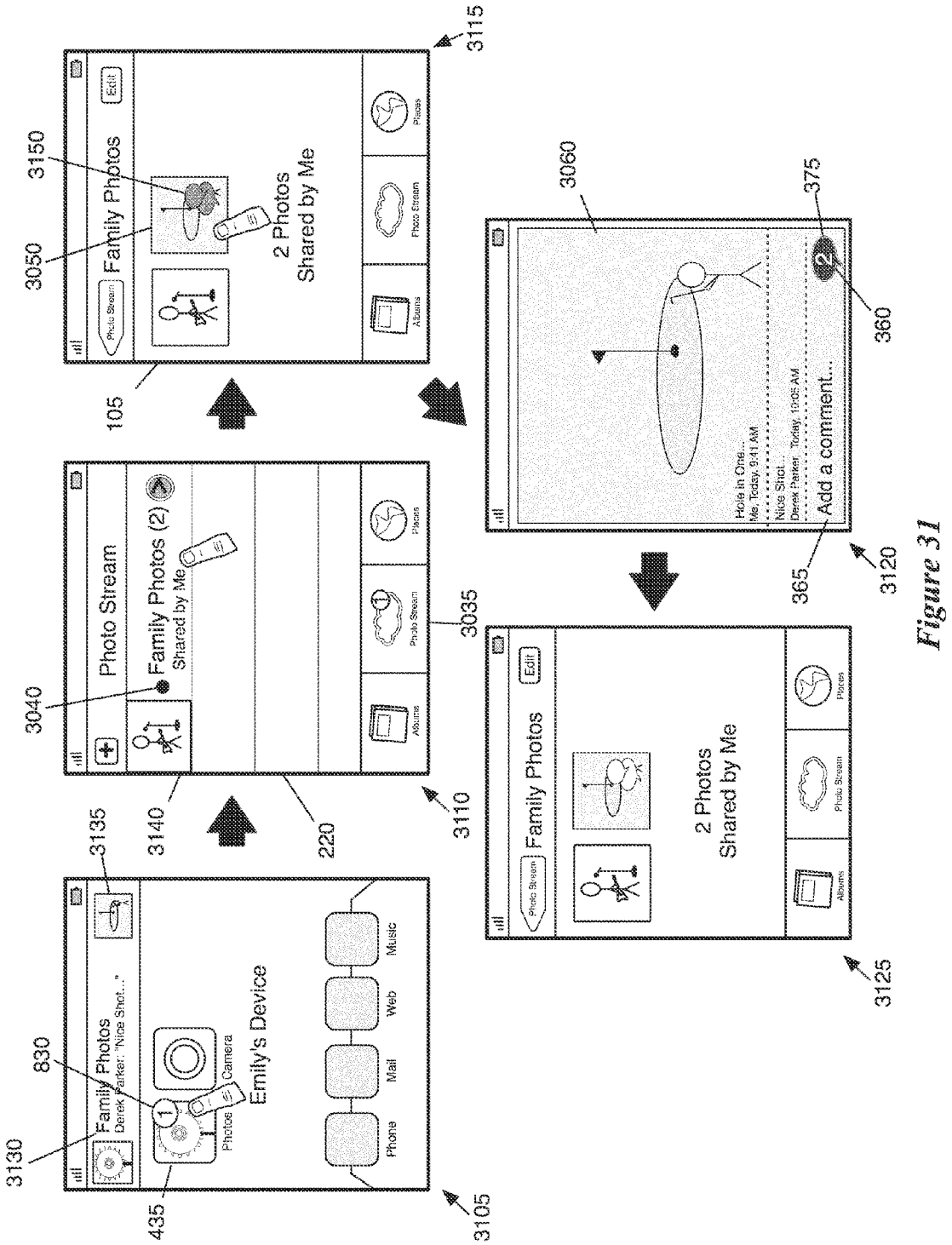

3115
3150
3050
Photo Stream
Family Photos
Edit
2 Photos
Shared by Me
Albums
Photo Stream
Places
105
3060
375
360
Hole in One...
Me, Today, 9:41 AM
Nice Shot...
Derek Parker, Today, 10:05 AM
Add a comment...
365
3120
3035
3040
Photo Stream
Family Photos (2)
Shared by Me
3140
220
3110
3135
3130
830
Family Photos
Derek Parker: "Nice Shot..."
Photos
Camera
Emily's Device
Phone
Mail
Web
Music
435
3105
Photo Stream
Family Photos
Edit
2 Photos
Shared by Me
Albums
Photo Stream
Places
3125

Figure 31

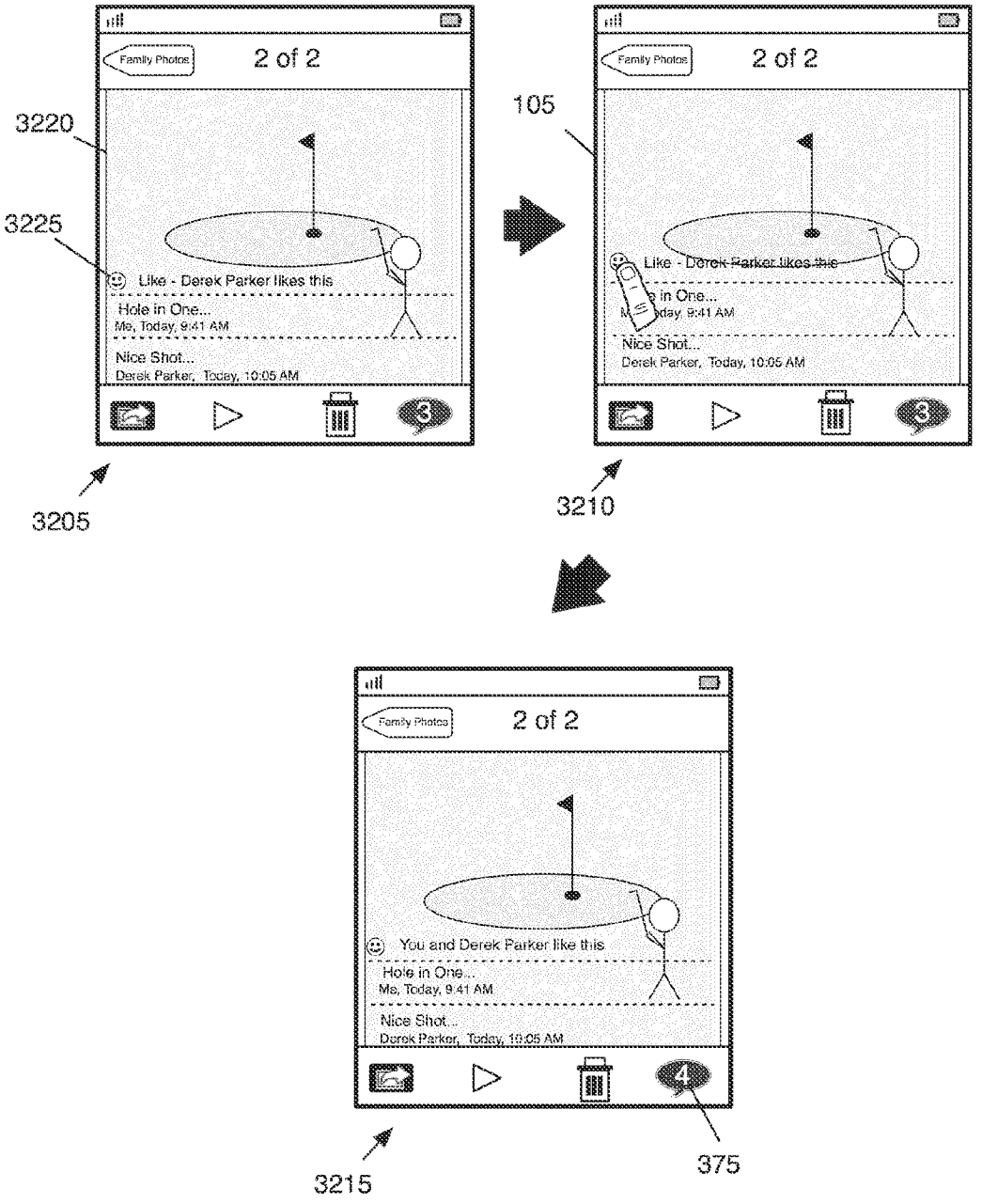

Family Photos
2 of 2
3220
3225
Like - Derek Parker likes this
Hole in One...
Me, Today, 9:41 AM
Nice Shot...
Derek Parker, Today, 10:05 AM
3
3205
105
Family Photos
2 of 2
Like - Derek Parker likes this
Nice Shot...
Derek Parker, Today, 10:05 AM
3
3210
Family Photos
2 of 2
You and Derek Parker like this
Hole in One...
Me, Today, 9:41 AM
Nice Shot...
Derek Parker, Today, 10:05 AM
4
3215
375

Figure 32

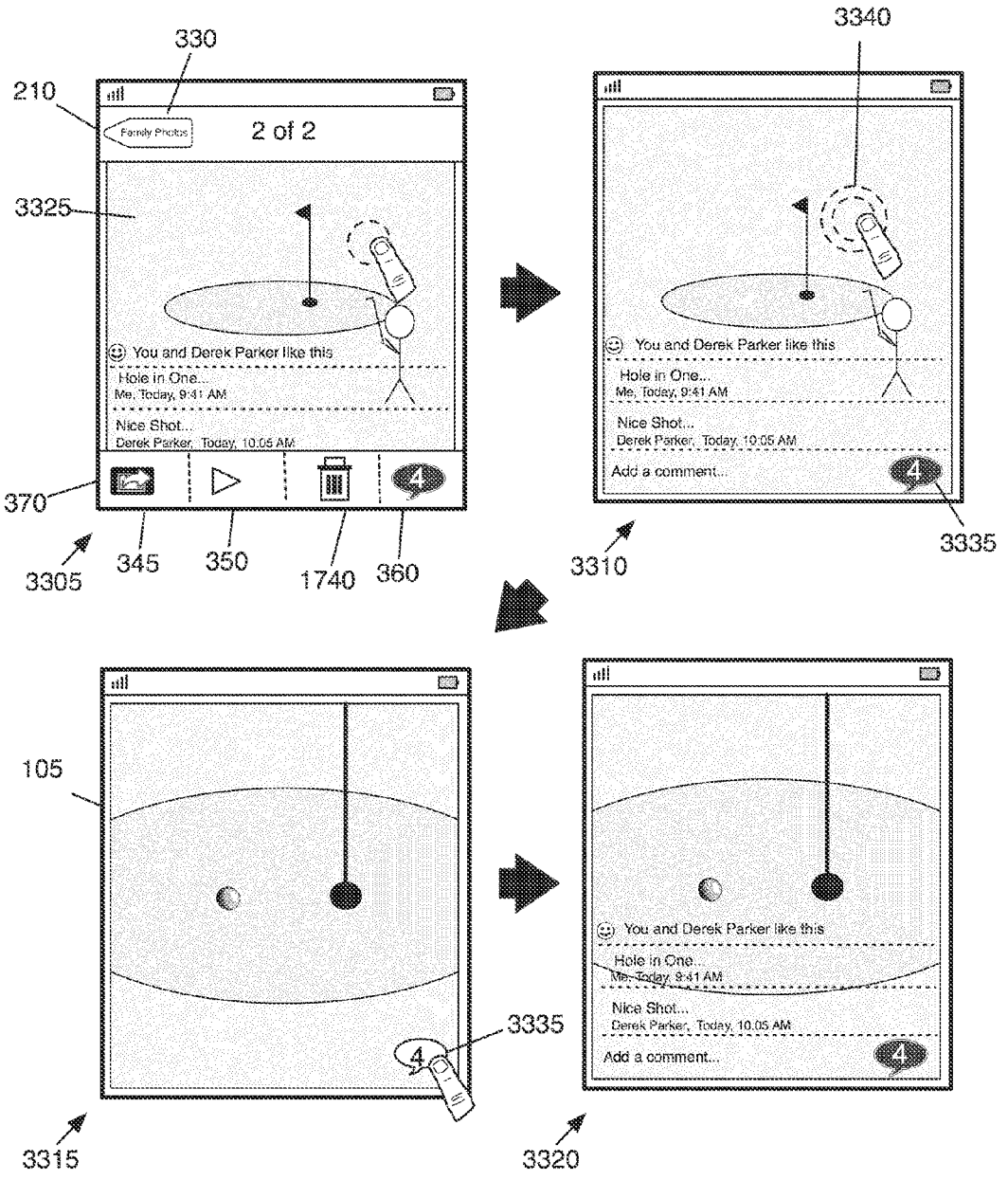

330
210
Family Photos
2 of 2
3325
You and Derek Parker like this
Hole in One...
Me, Today, 9:41 AM
Nice Shot...
Derek Parker, Today, 10:05 AM
370
3305
345
350
1740
360
3340
You and Derek Parker like this
Hole in One...
Me, Today, 9:41 AM
Nice Shot...
Derek Parker, Today, 10:05 AM
Add a comment...
3335
3310
105
3335
3315
You and Derek Parker like this
Hole in One...
Me, Today, 9:41 AM
Nice Shot...
Derek Parker, Today, 10:05 AM
Add a comment...
3320

Figure 33

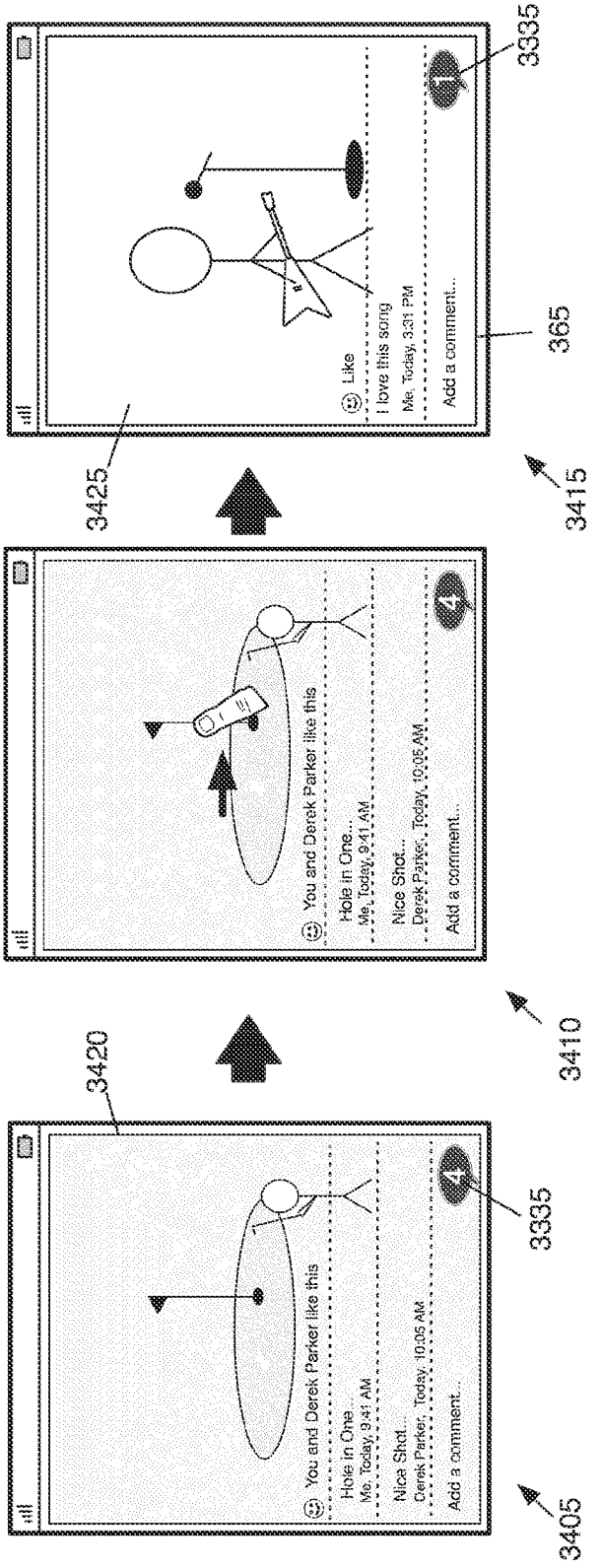

3425
3335
365
Like
I love this song
Me, Today, 3:31 PM
Add a comment...
3415
You and Derek Parker like this
Hole in One...
Me, Today, 9:41 AM
Nice Shot...
Derek Parker, Today, 10:05 AM
Add a comment...
3410
3420
3335
You and Derek Parker like this
Hole in One...
Me, Today, 9:41 AM
Nice Shot...
Derek Parker, Today, 10:05 AM
Add a comment...
3405

Figure 34

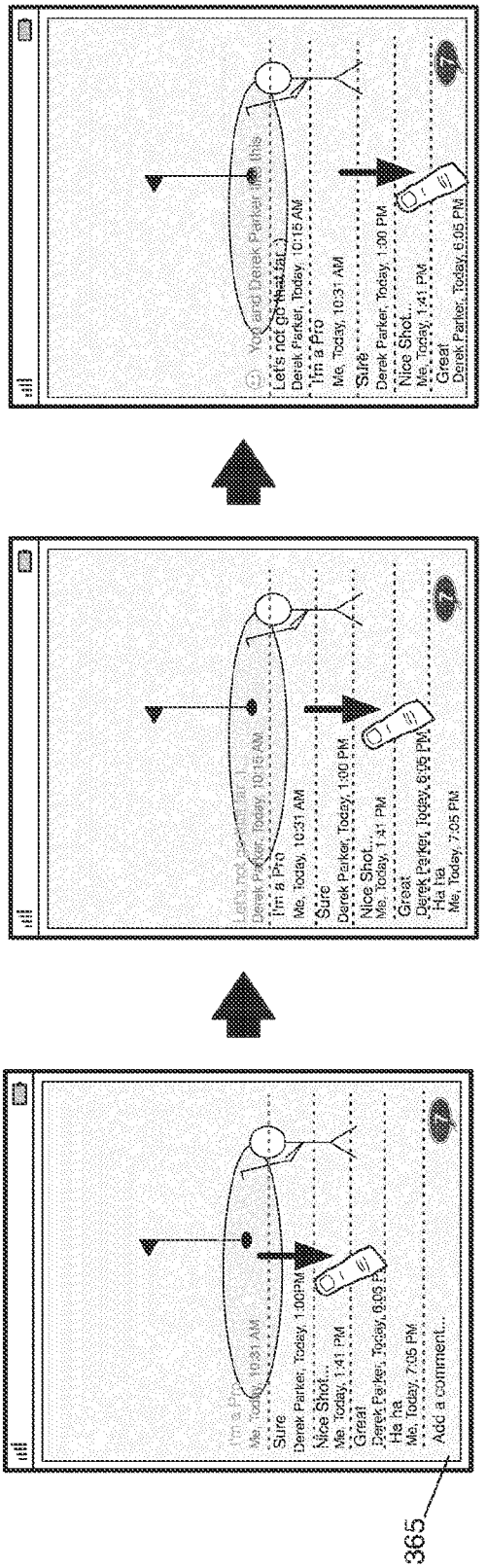

3515
3510
3505
365
Sure
Derek Parker, Today, 1:00 PM
Nice Shot...
Me, Today, 1:41 PM
Great
Derek Parker, Today, 6:05 PM
Ha Ha
Me, Today, 7:05 PM
Add a comment...

Figure 35

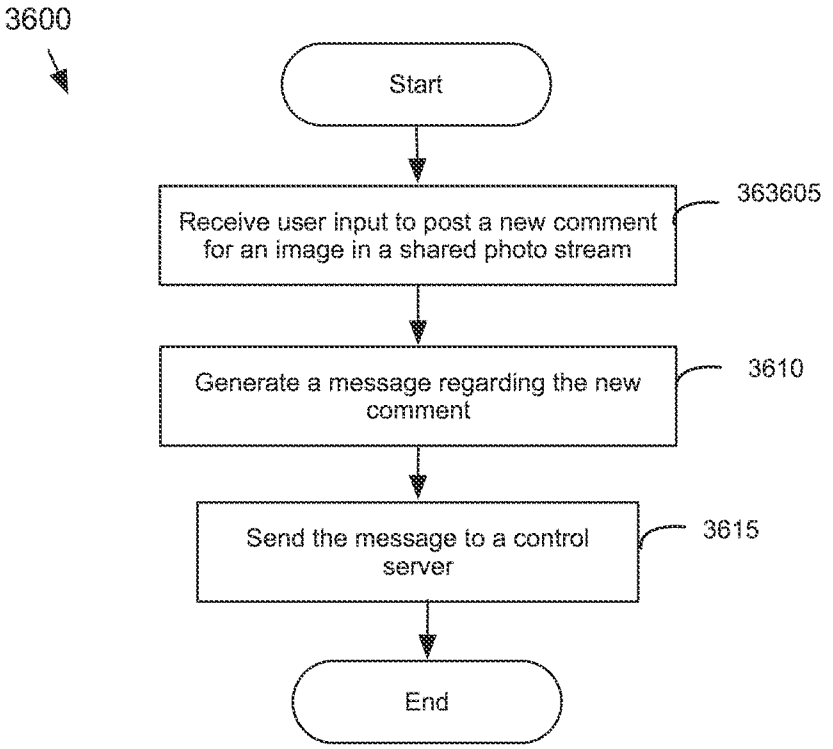

3600
Start
Receive user input to post a new comment for an image in a shared photo stream
363605
Generate a message regarding the new comment
3610
Send the message to a control server
3615
End

Figure 36

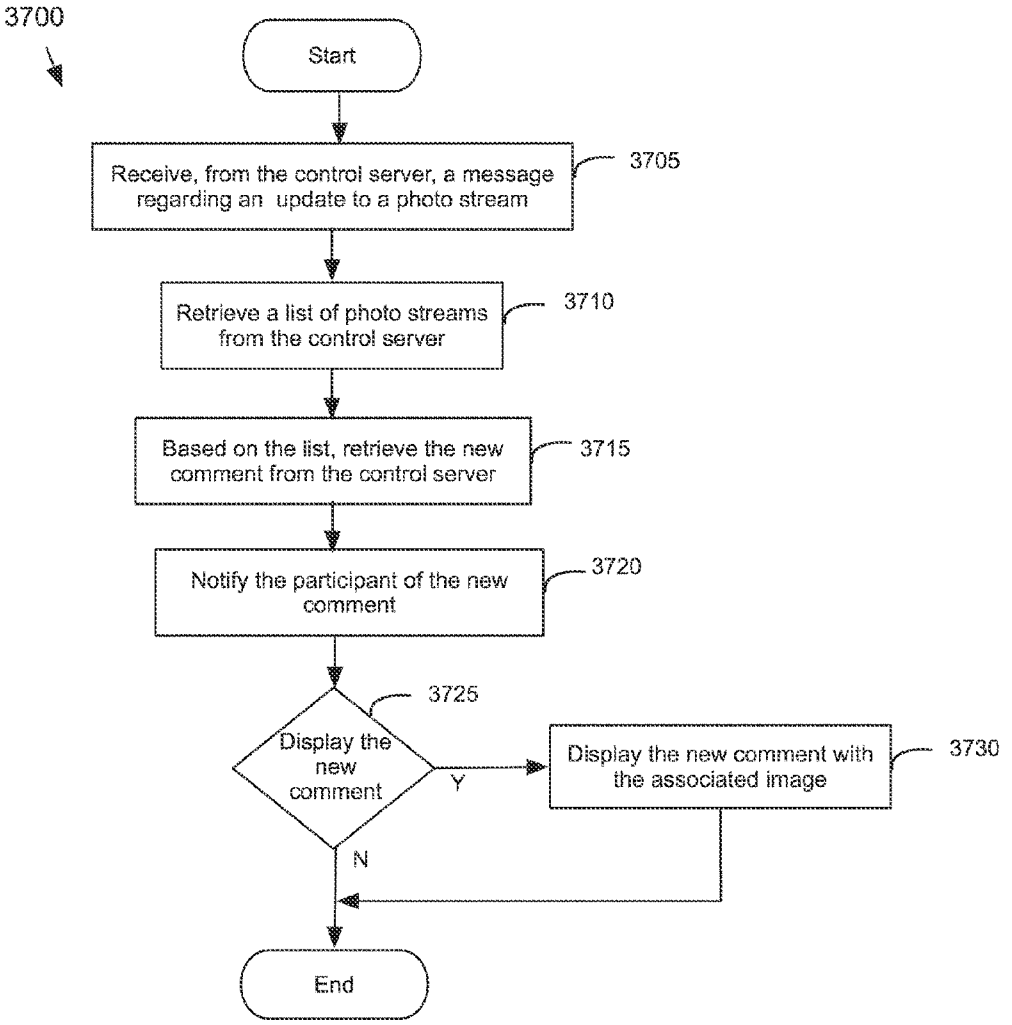

3700
Start
Receive, from the control server, a message regarding an update to a photo stream
3705
Retrieve a list of photo streams from the control server
3710
Based on the list, retrieve the new comment from the control server
3715
Notify the participant of the new comment
3720
3725
Display the new comment
Y
Display the new comment with the associated image
3730
N
End

Figure 37

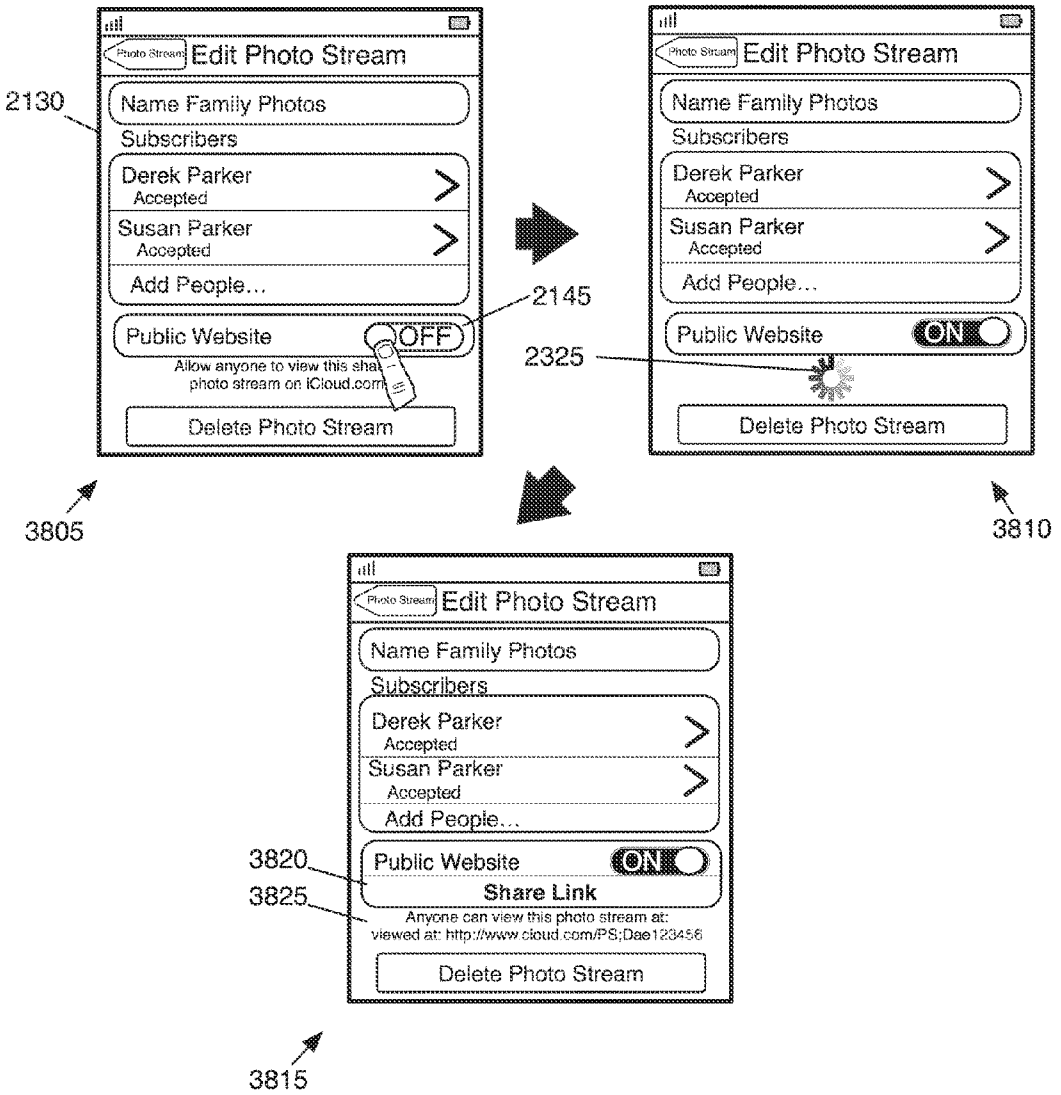


Photo Stream
Edit Photo Stream
Name Family Photos
Subscribers
Derek Parker
Accepted
Susan Parker
Accepted
Add People...
Public Website
OFF
ON
Delete Photo Stream
2130
2145
2325
3805
3810
Share Link
Anyone can view this photo stream at:
viewed at: http://www.cloud.com/PS;Dae123456
3820
3825
3815

Figure 38

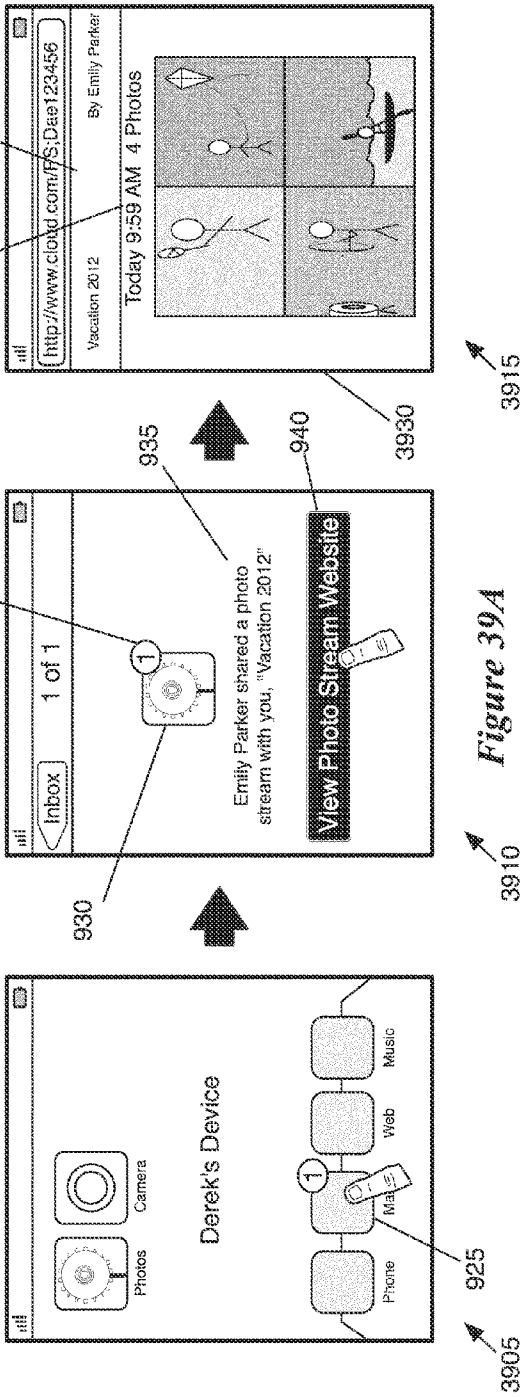


Figure 39A

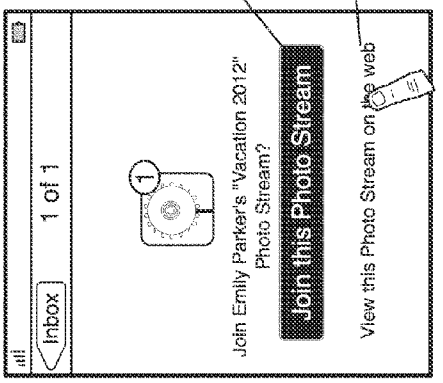


Figure 39B

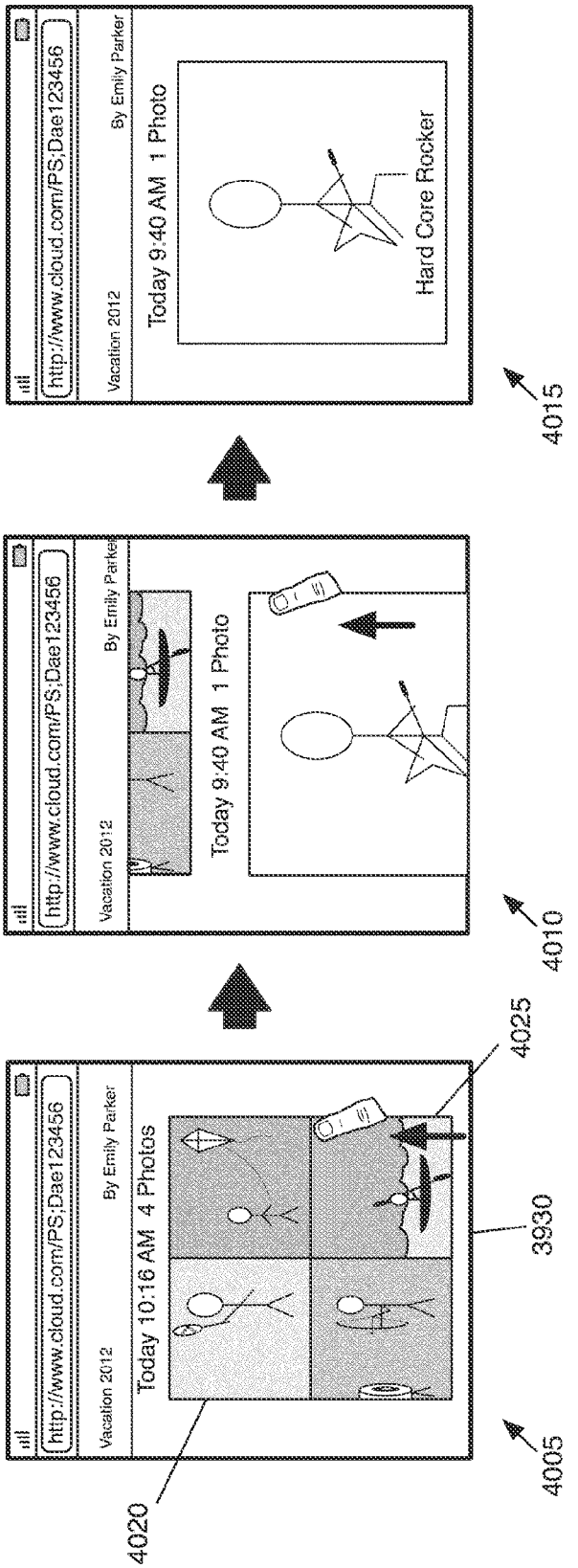

http://www.cloud.com/PS;Dae123456
Vacation 2012
By Emily Parker
Today 10:16 AM 4 Photos
Today 9:40 AM 1 Photo
Hard Core Rocker
4005
4010
4015
4020
4025
3930

Figure 40

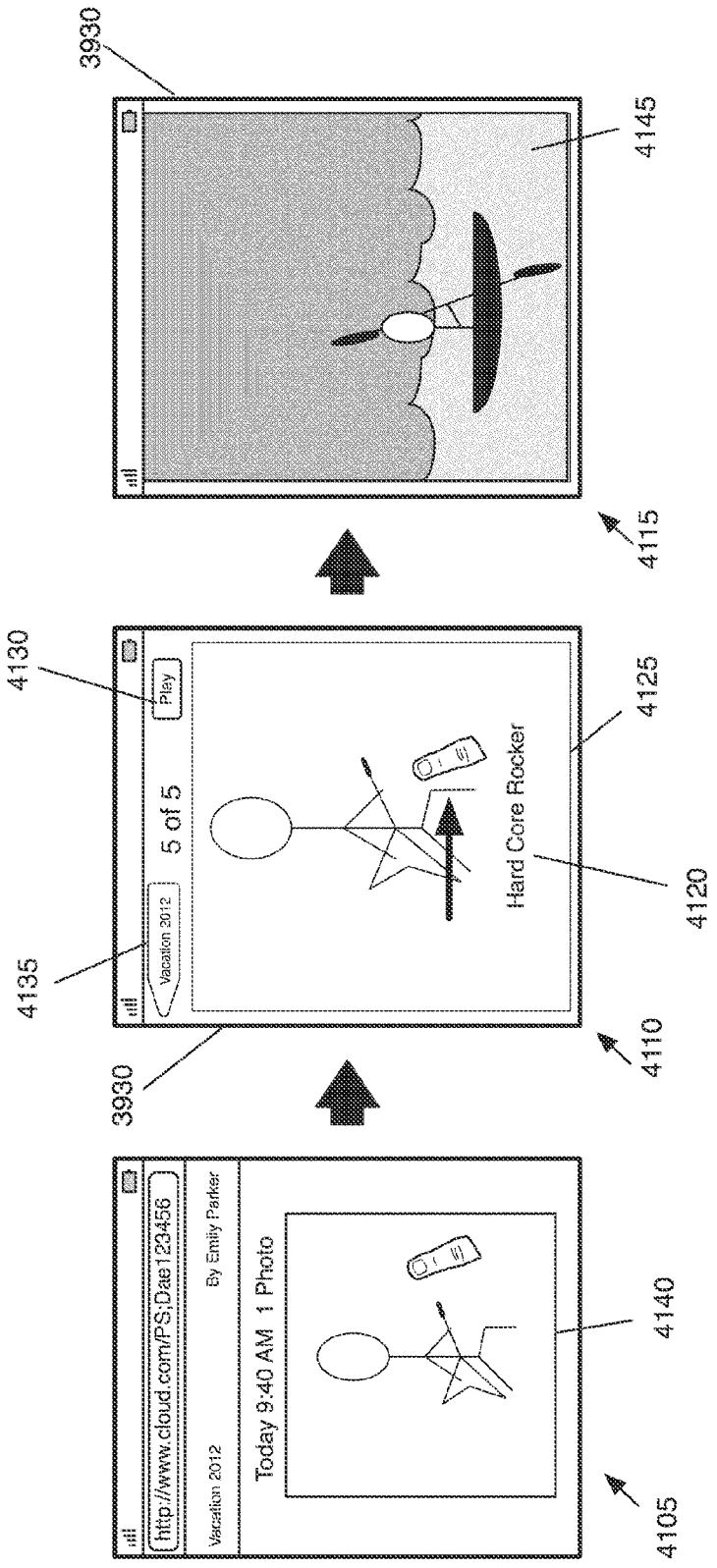

3930
4145
4115
4130
Play
5 of 5
4125
Vacation 2012
Hard Core Rocker
4135
4120
3930
4110
http://www.cloud.com/PS:Dae123456
Vacation 2012
By Emily Parker
Today 9:40 AM 1 Photo
4140
4105

Figure 41

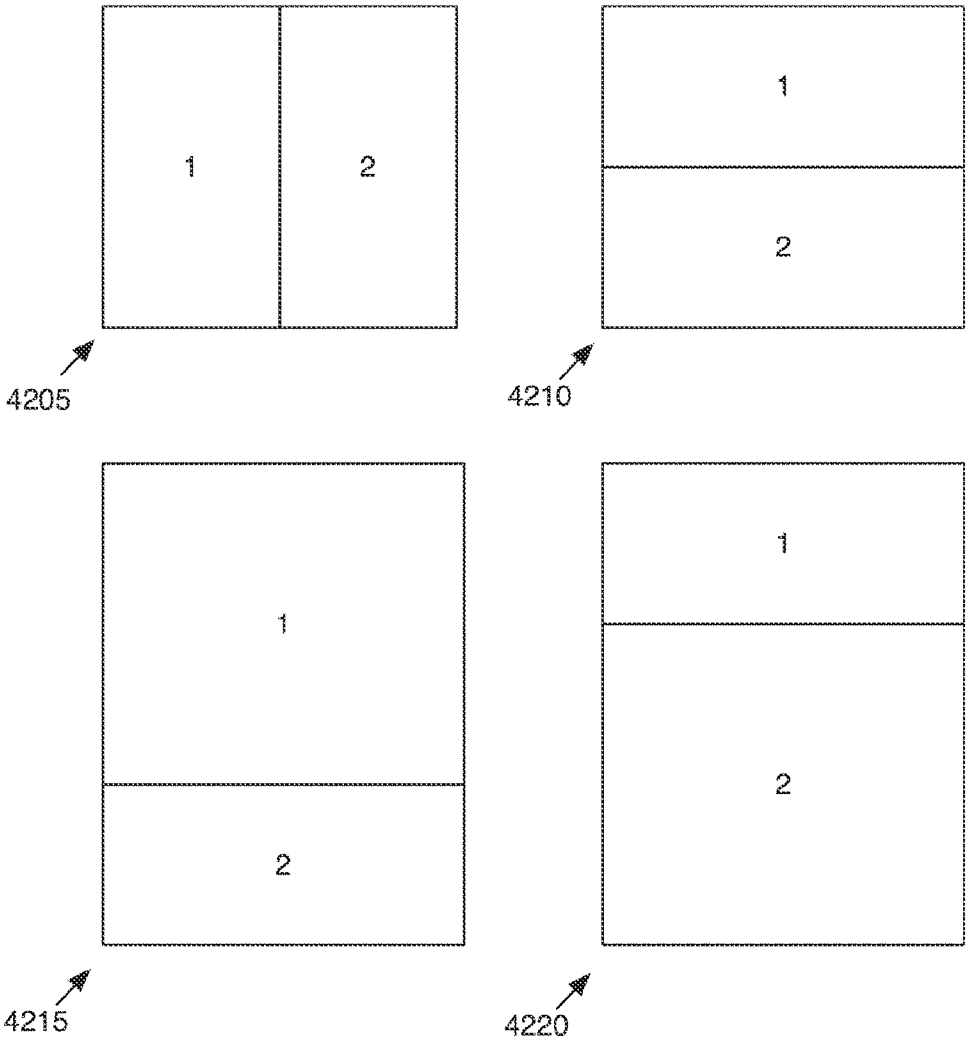


Figure 42

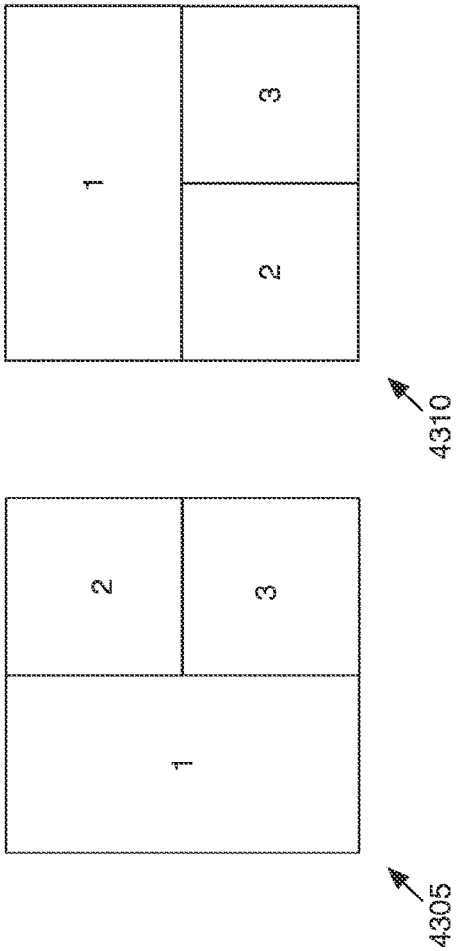
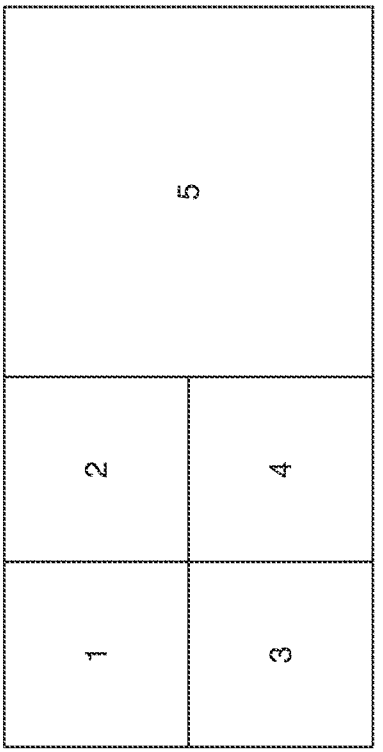
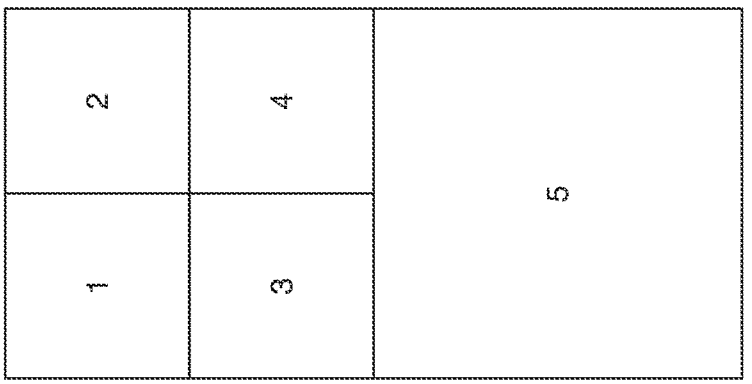


Figure 43



4410



4405

Figure 44

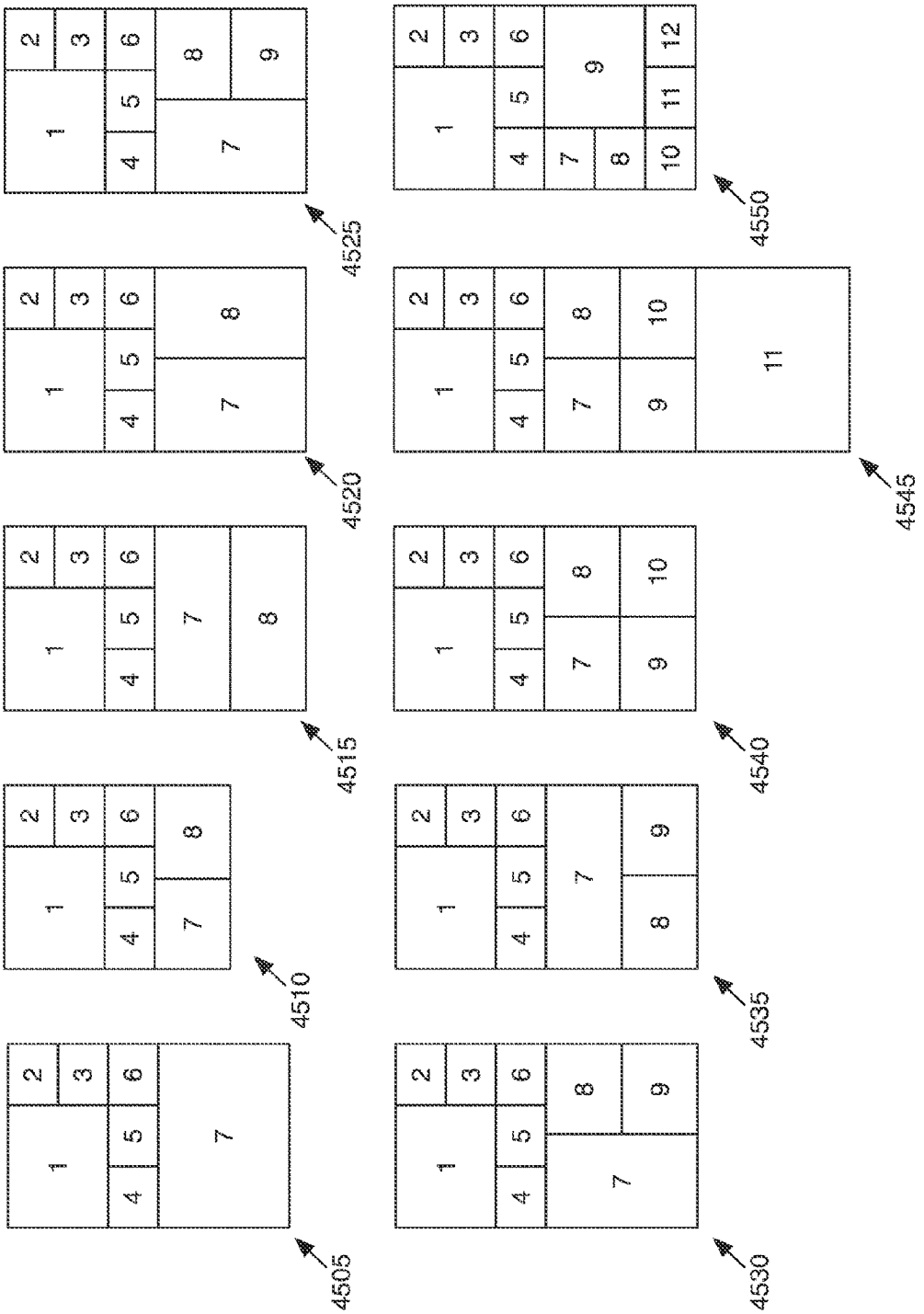


Figure 45

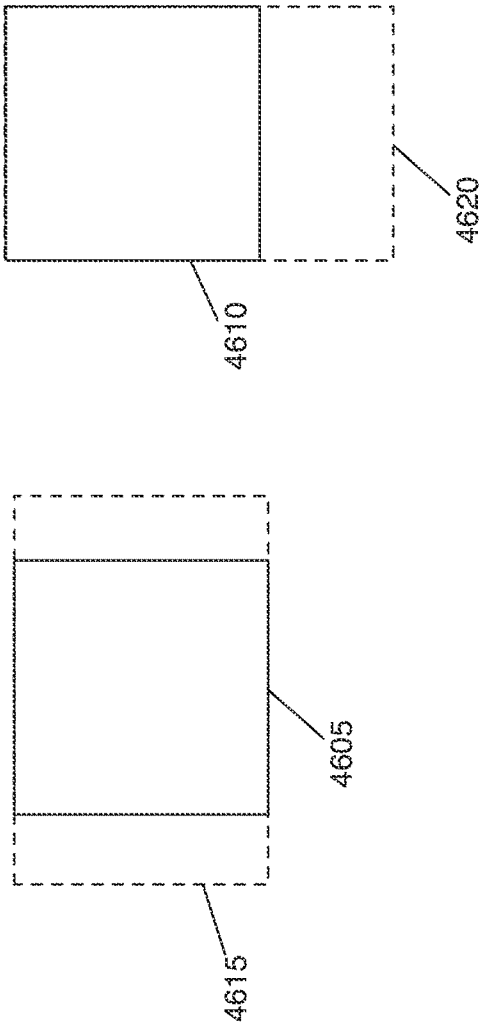


Figure 46

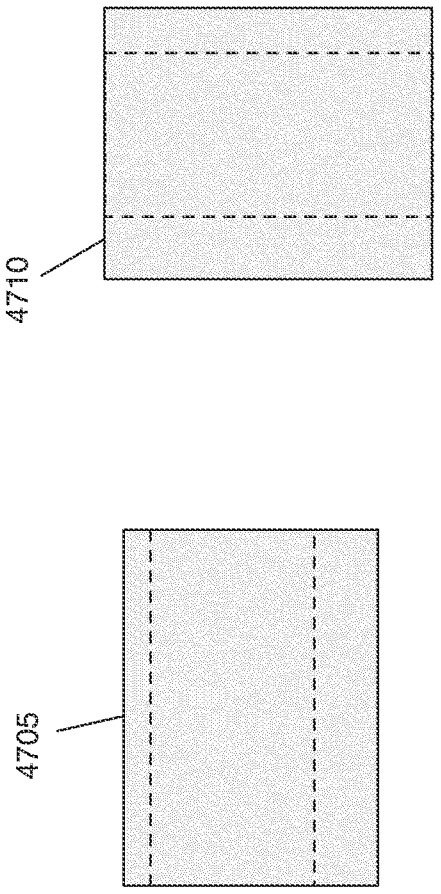


Figure 47

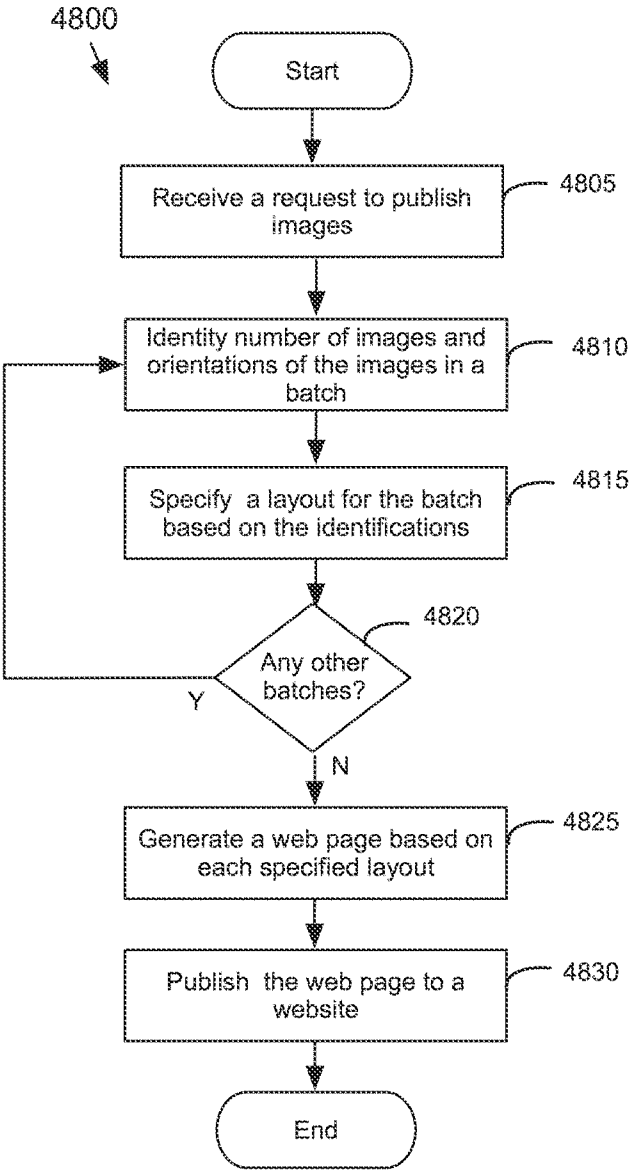

4800
Start
Receive a request to publish images
4805
Identity number of images and orientations of the images in a batch
4810
Specify a layout for the batch based on the identifications
4815
Any other batches?
4820
Y
N
Generate a web page based on each specified layout
4825
Publish the web page to a website
4830
End

Figure 48

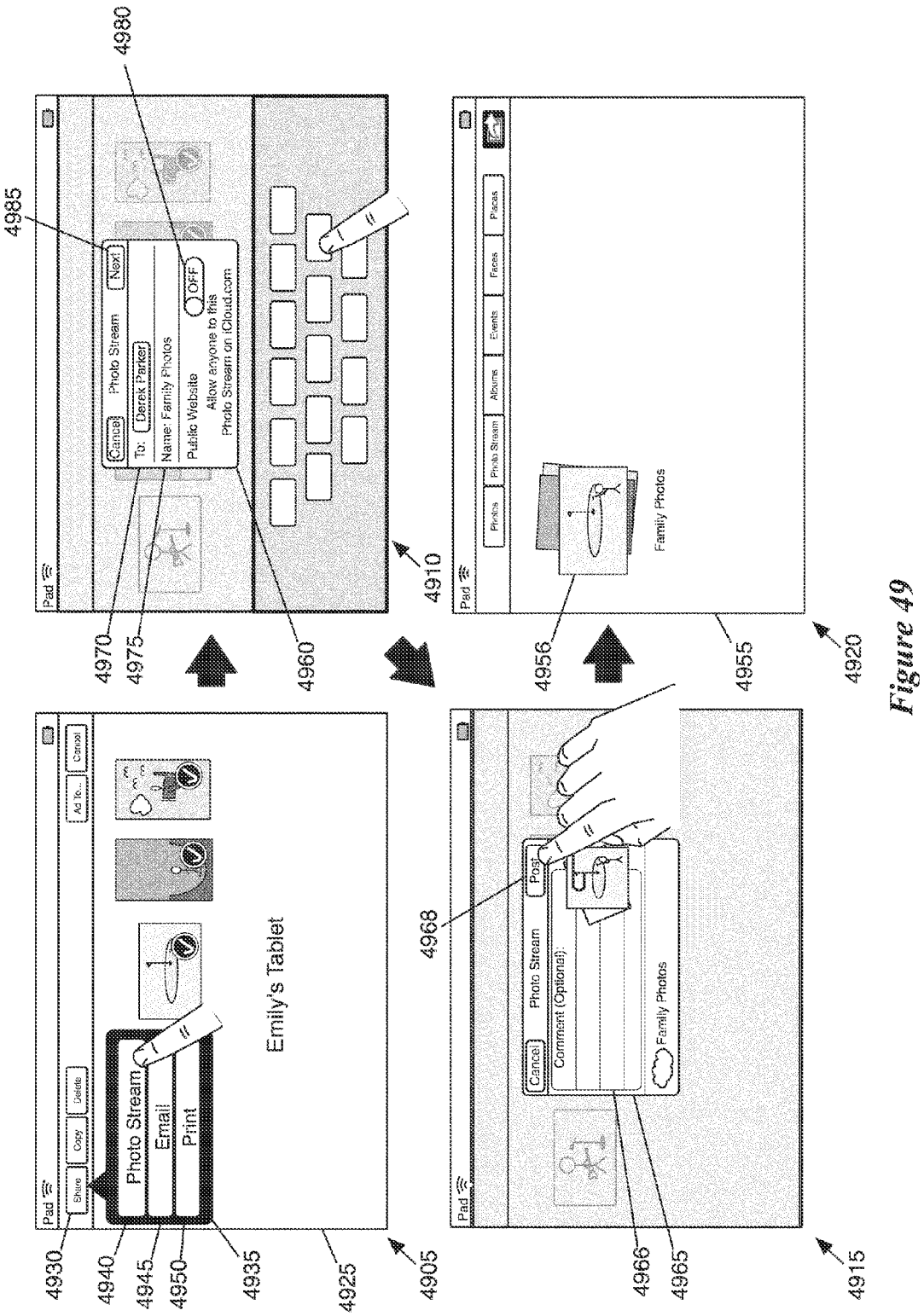

4980
4985
4970
4975
4960
4910
4956
4955
4920
4968
4966
4965
4915
4930
4940
4945
4950
4935
4925
4905
Emily's Tablet
Photo Stream
Email
Print
Family Photos

Figure 49

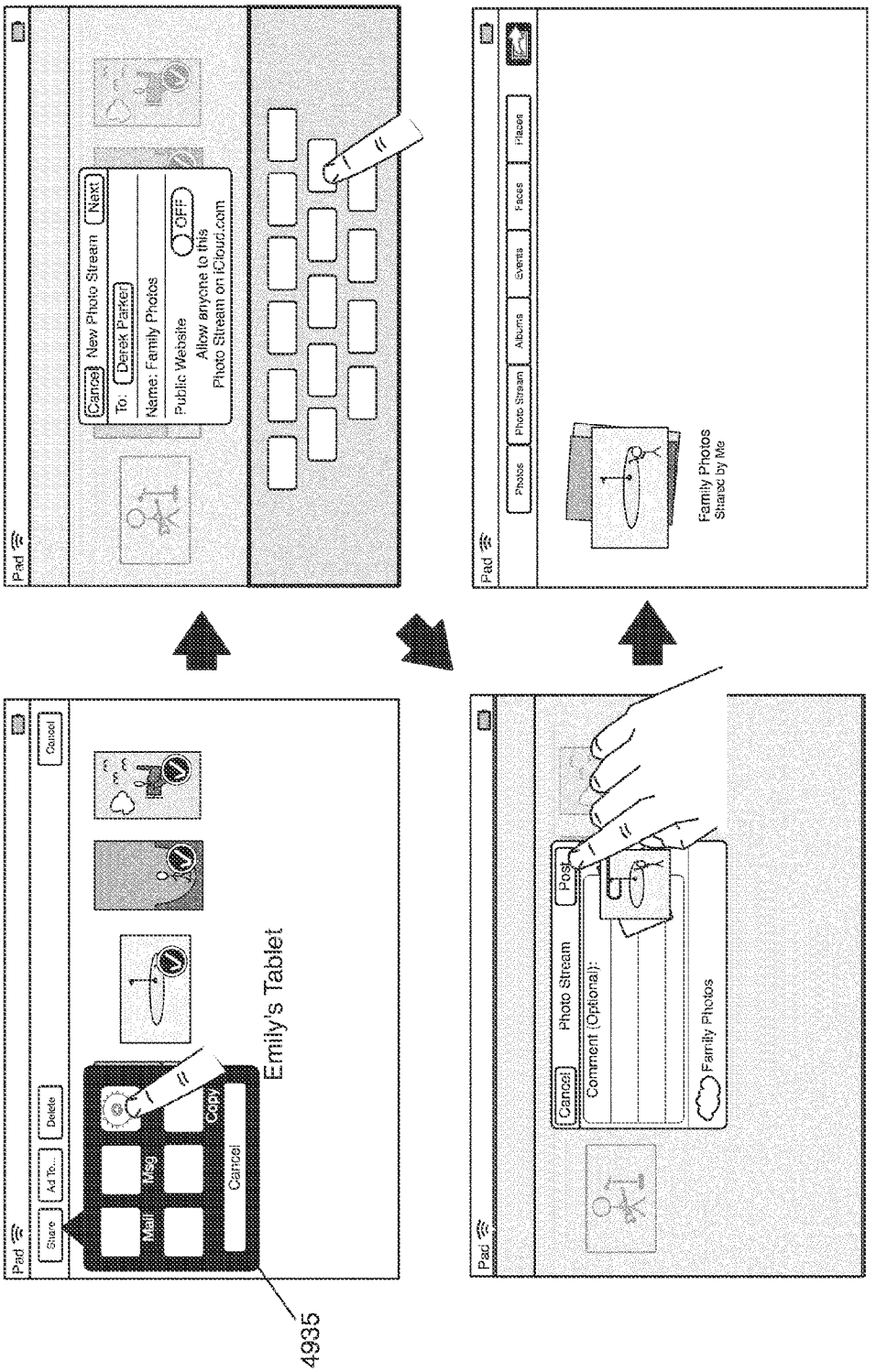

Pad
Share
Add To...
Delete
Cancel
Mail
Msg
Copy
Cancel
Emily's Tablet
4935
Pad
Cancel
New Photo Stream
Next
To: Derek Parker
Name: Family Photos
Public Website
OFF
Allow anyone to this Photo Stream on iCloud.com
Pad
Photos
Photo Stream
Albums
Events
Faces
Places
Family Photos
Shared by Me
Pad
Cancel
Photo Stream
Post
Comment (Optional):
Family Photos

Figure 50

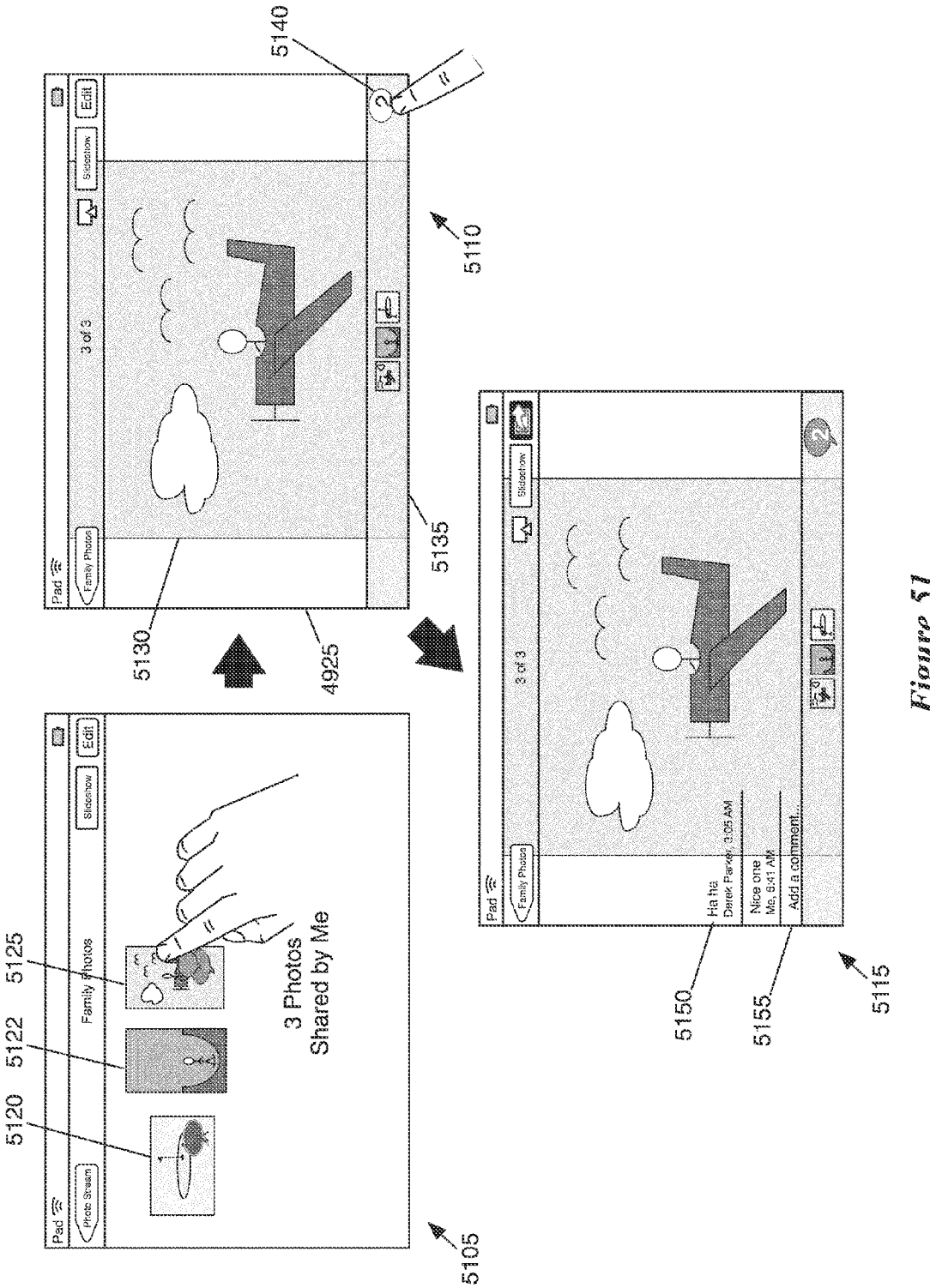

5140
5110
5135
5130
4925
5105
5125
5122
5120
3 Photos
Shared by Me
5115
5150
5155
Ha ha
Derek Parker, 3:05 AM
Nice one
Me, 9:41 AM
Add a comment...

Figure 51

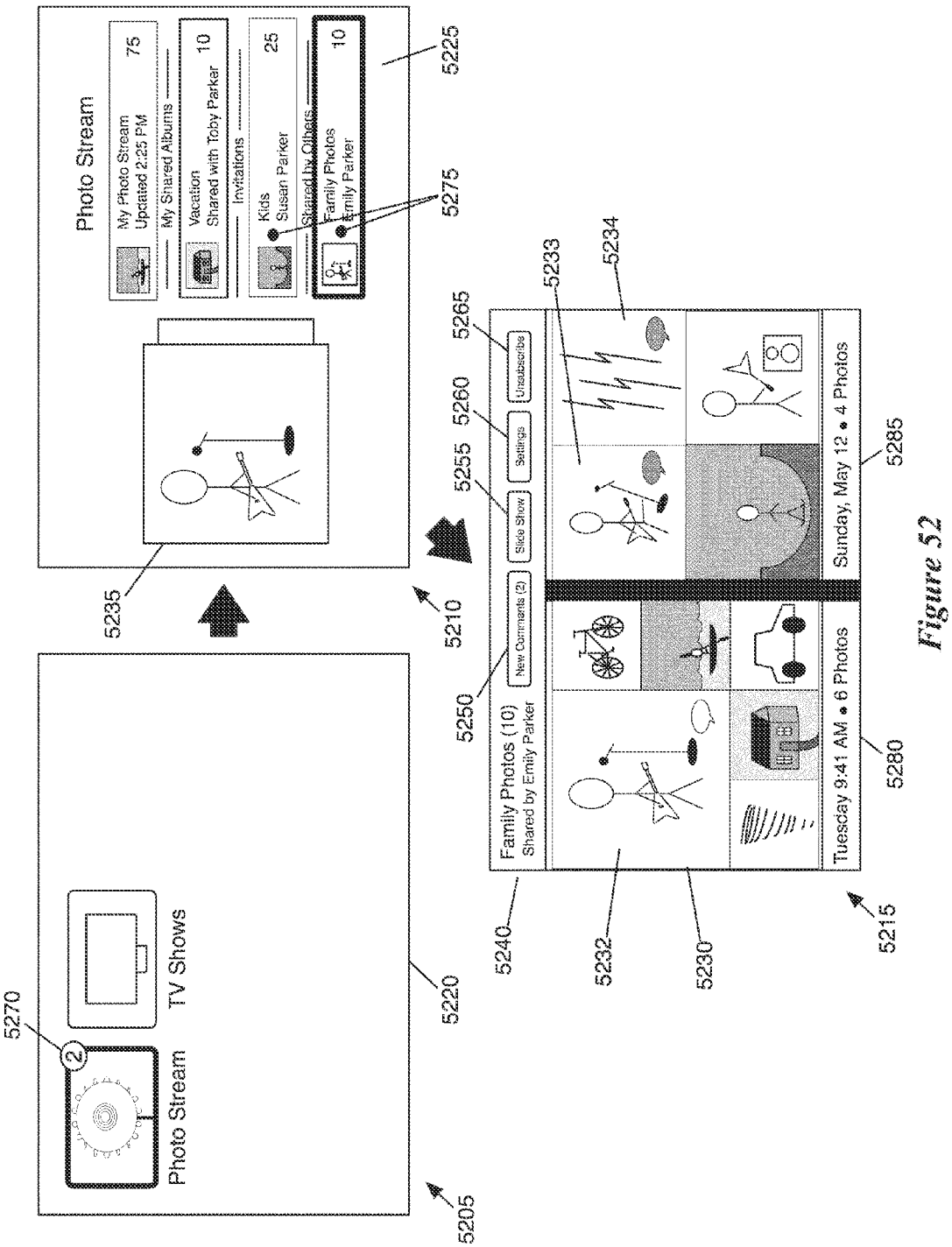


Photo Stream
My Photo Stream
Updated 2:25 PM
75
My Shared Albums
Vacation
Shared with Toby Parker
10
Invitations
Kids
Susan Parker
25
Shared by Others
Family Photos
Emily Parker
10
5225
5275
5235
5210
5265
5260
5255
5250
Unsubscribe
Settings
Slide Show
New Comments (2)
Family Photos (10)
Shared by Emily Parker
5233
5234
Sunday, May 12 • 4 Photos
5285
Tuesday 9:41 AM • 6 Photos
5280
5240
5232
5230
5215
5270
2
TV Shows
Photo Stream
5220
5205

Figure 52

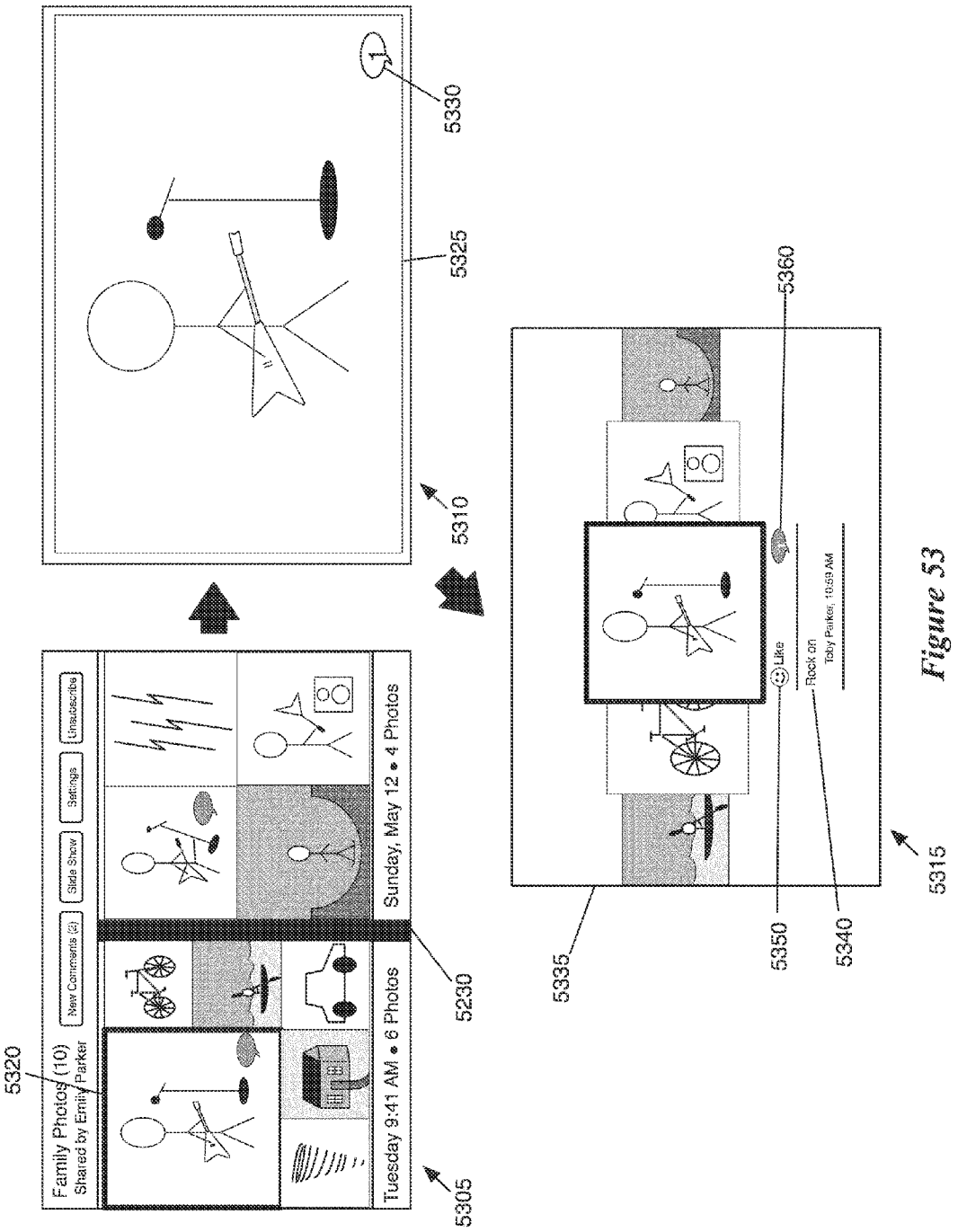

5320
Family Photos (10)
Shared by Emily Parker
New Comments (2)
Slide Show
Settings
Unsubscribe
Tuesday 9:41 AM • 6 Photos
Sunday, May 12 • 4 Photos
5305
5230
5310
5330
5325
5360
Like
Rock on
Toby Parker, 10:59 AM
5335
5350
5340
5315

Figure 53

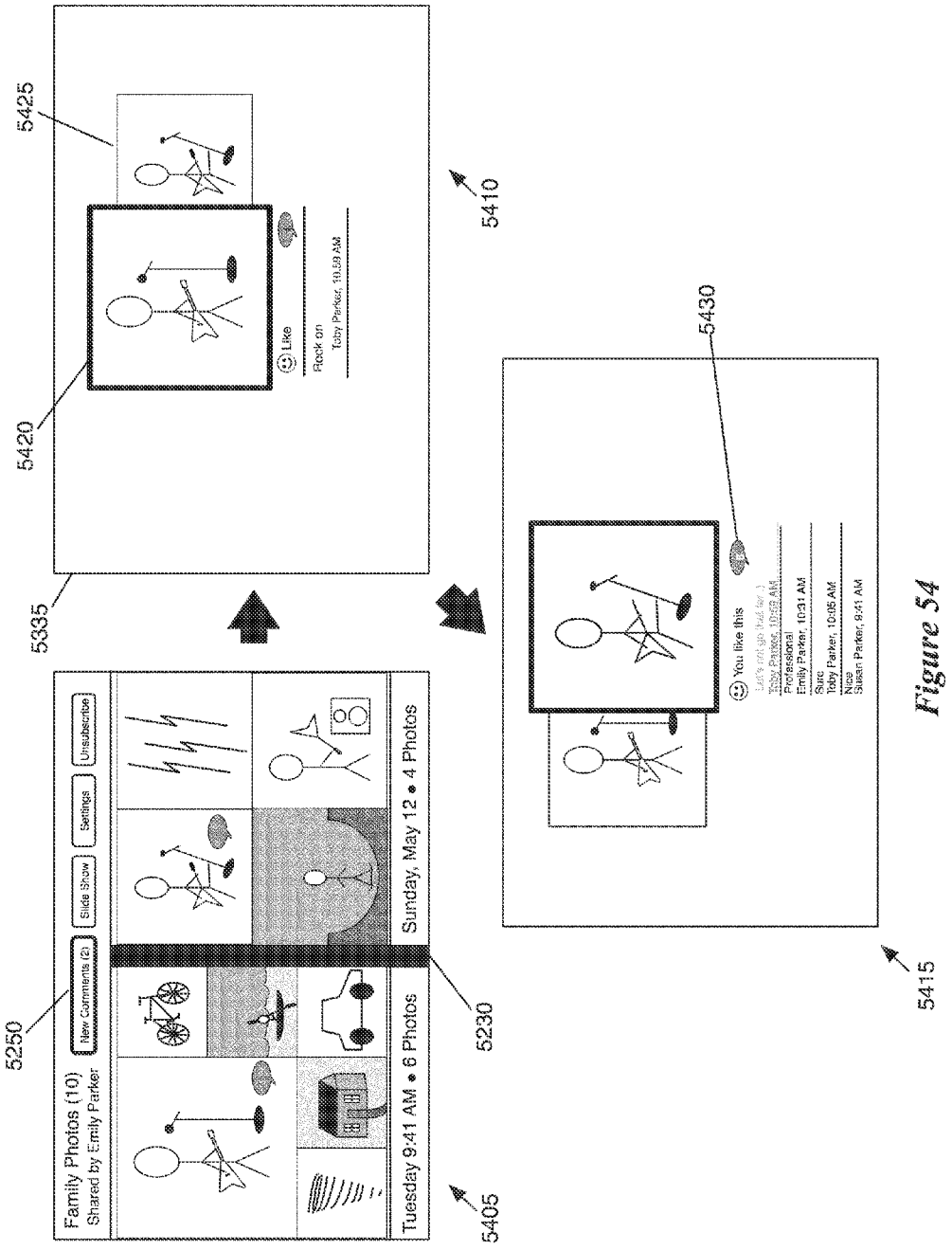

5425
5420
5335
5410
Like
Rock on
Toby Parker, 10:59 AM
5430
You like this
Professional
Emily Parker, 10:01 AM
Sure
Toby Parker, 10:05 AM
Nice
Susan Parker, 9:41 AM
5415
5250
Family Photos (10)
Shared by Emily Parker
New Comments (2)
Slide Show
Settings
Unsubscribe
Tuesday 9:41 AM • 6 Photos
Sunday, May 12 • 4 Photos
5230
5405

Figure 54

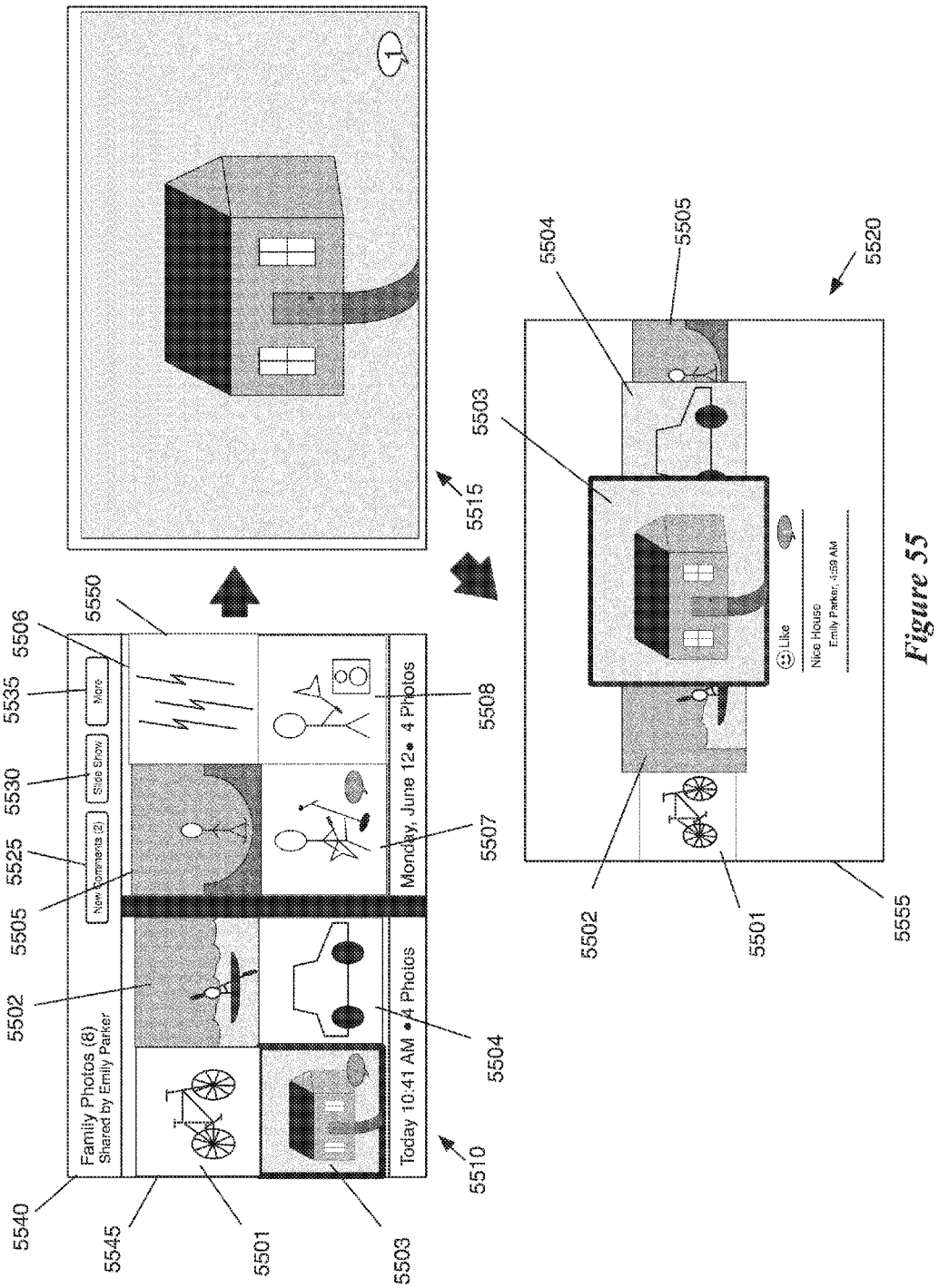

5550
5506
5535
More
5530
Slide Show
5525
New Comments (2)
5505
5502
Family Photos (6)
Shared by Emily Parker
5540
5545
5501
5503
Today 10:41 AM • 4 Photos
5504
5510
Monday, June 12 • 4 Photos
5508
5507
5515
5504
5505
5520
5503
Like
Nice House
Emily Parker, 4:59 AM
5502
5501
5555

Figure 55

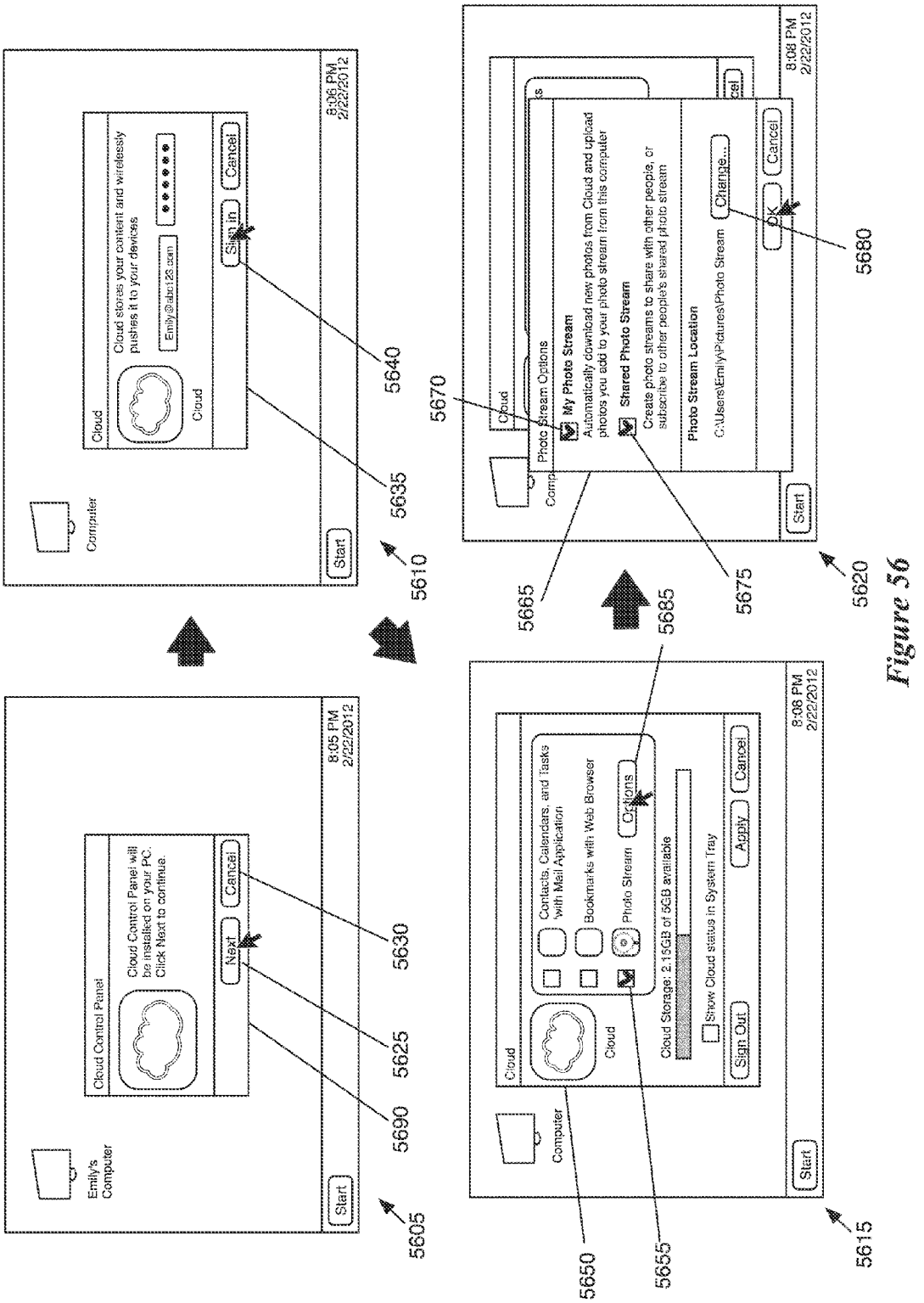

Emily's Computer
Cloud Control Panel
Cloud Control Panel will be installed on your PC. Click Next to continue.
Next
Cancel
Start
8:05 PM 2/22/2012
5605
5690
5625
5630
Computer
Cloud
Cloud stores your content and wirelessly pushes it to your devices
Emily@abc123.com
Sign In
Cancel
Start
8:06 PM 2/22/2012
5610
5635
5640
Computer
Cloud
Contacts, Calendars, and Tasks with Mail Application
Bookmarks with Web Browser
Photo Stream
Options...
Cloud Storage: 2.15GB of 5GB available
Show Cloud status in System Tray
Sign Out
Apply
Cancel
Start
8:06 PM 2/22/2012
5615
5650
5655
Cloud
Photo Stream Options
My Photo Stream
Automatically download new photos from Cloud and upload photos you add to your photo stream from this computer
Shared Photo Stream
Create photo streams to share with other people, or subscribe to other people's shared photo stream
Photo Stream Location
C:\Users\Emily\Pictures\Photo Stream
Change...
OK
Cancel
Start
8:08 PM 2/22/2012
5620
5665
5670
5675
5680
5685

Figure 56

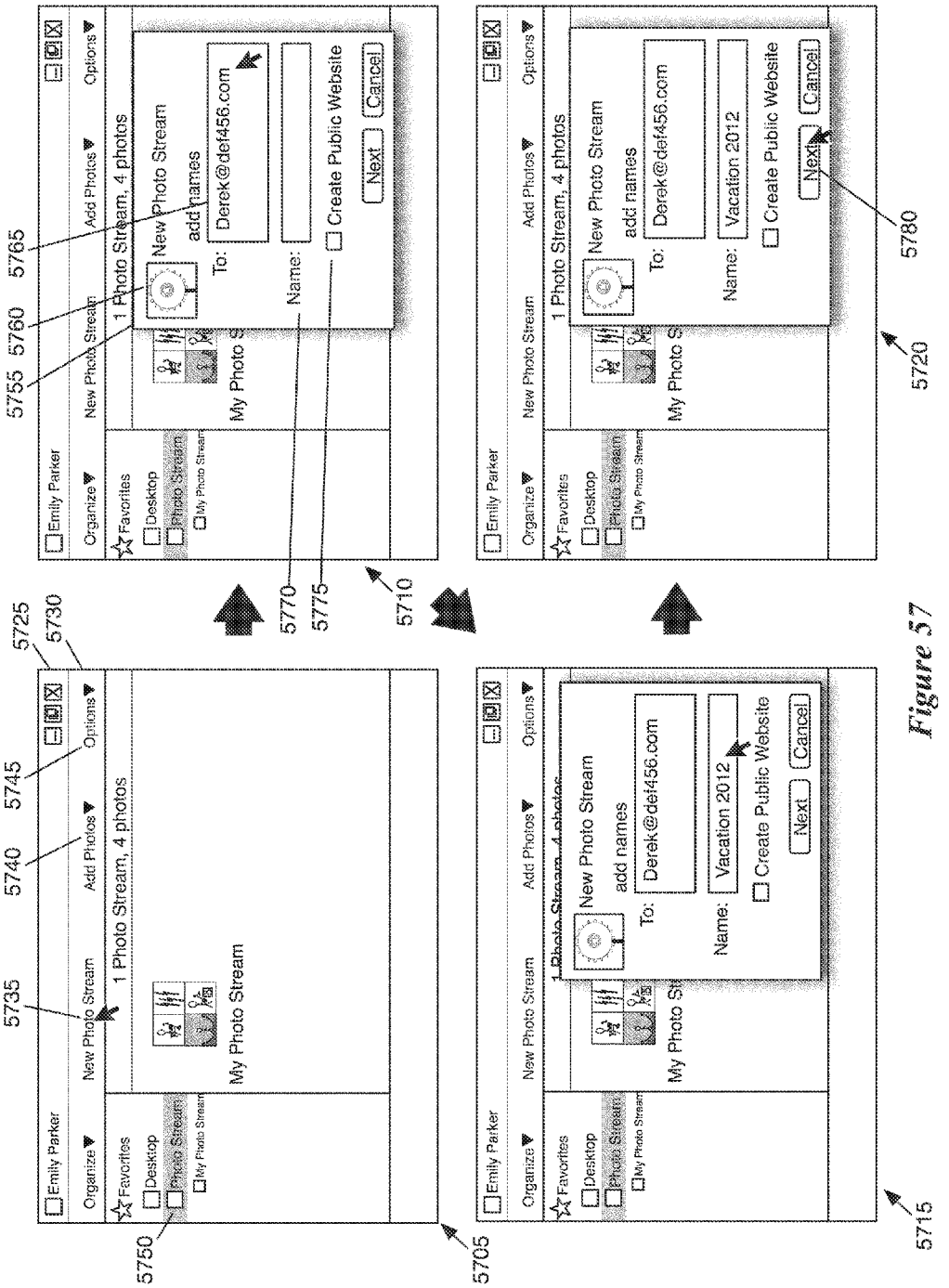

5705
5710
5715
5720
5725
5730
5735
5740
5745
5750
5755
5760
5765
5770
5775
5780
Emily Parker
Organize
New Photo Stream
Add Photos
Options
Favorites
Desktop
Photo Stream
My Photo Stream
1 Photo Stream, 4 photos
New Photo Stream
add names
To:
Derek@def456.com
Name:
Vacation 2012
Create Public Website
Next
Cancel

Figure 57

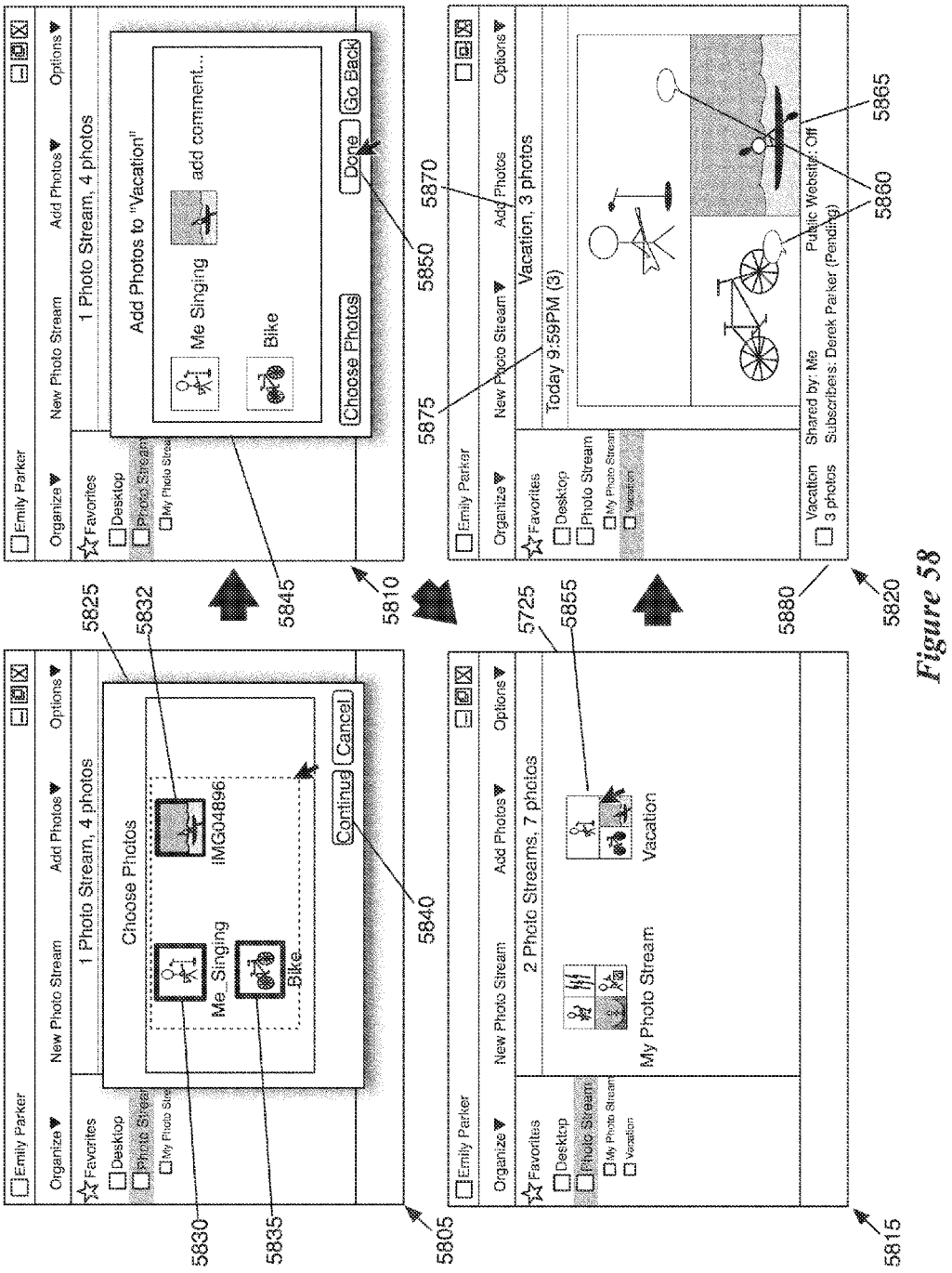

Emily Parker
Organize
New Photo Stream
Add Photos
Options
Favorites
Desktop
Photo Stream
My Photo Stream
Vacation
1 Photo Stream, 4 photos
2 Photo Streams, 7 photos
Choose Photos
Add Photos to "Vacation"
Me_Singing
IMG04896
Bike
add comment...
Continue
Cancel
Choose Photos
Done
Go Back
Today 9:59PM (3)
Vacation, 3 photos
Shared by: Me
Subscribers: Derek Parker (Pending)
Public Website: Off
5805
5810
5815
5820
5825
5830
5832
5835
5840
5845
5850
5855
5860
5865
5870
5875
5880
5725

Figure 58

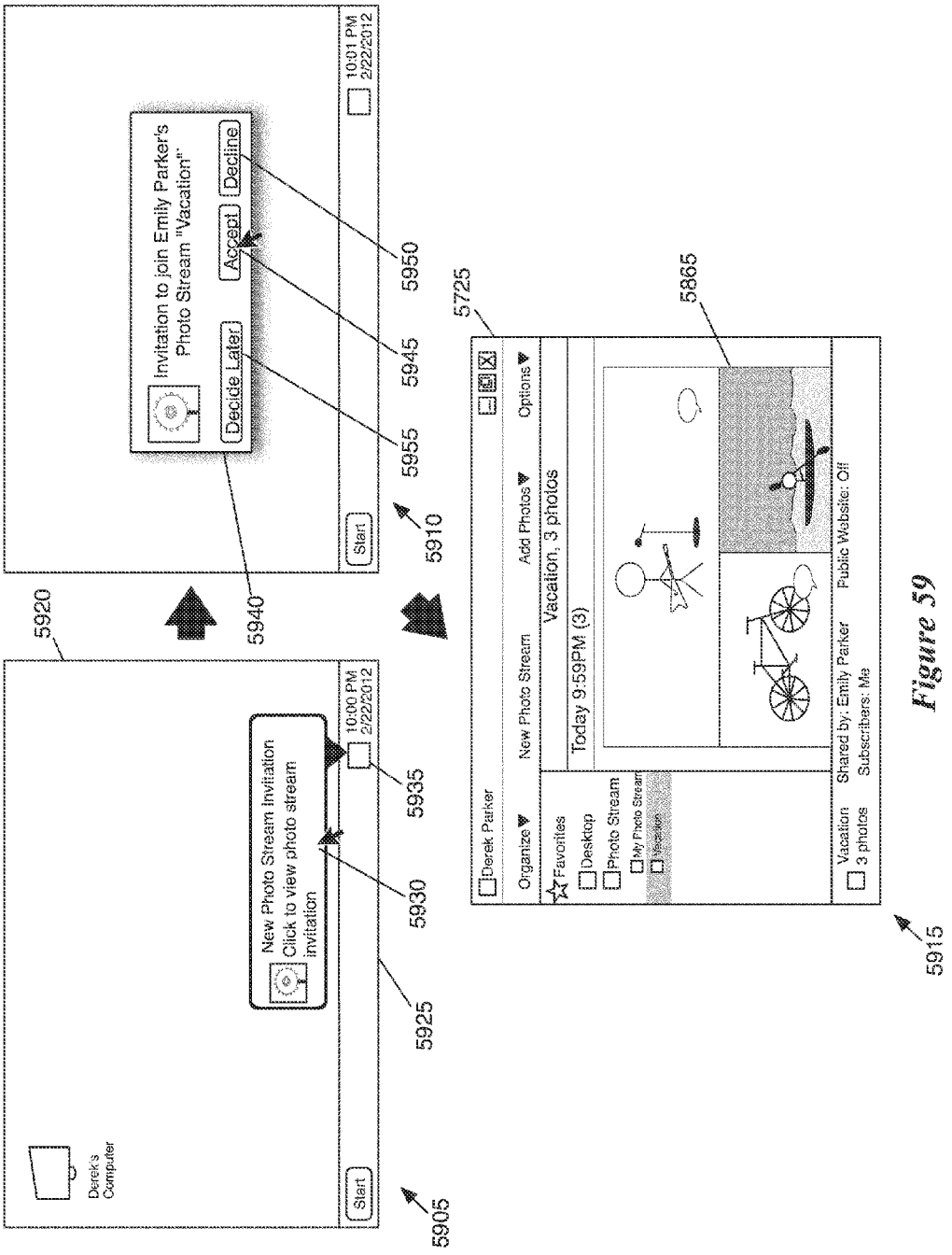

Derek's Computer
Start
10:00 PM
2/22/2012
New Photo Stream Invitation
Click to view photo stream invitation
5905
5910
5915
5920
5925
5930
5935
5940
5945
5950
5955
5725
5865
Invitation to join Emily Parker's Photo Stream "Vacation"
Decide Later
Accept
Decline
10:01 PM
2/22/2012
Derek Parker
Organize
New Photo Stream
Add Photos
Options
Favorites
Desktop
Photo Stream
My Photo Stream
Vacation
Vacation, 3 photos
Today 9:59PM (3)
Vacation
3 photos
Shared by: Emily Parker
Subscribers: Me
Public Website: Off

Figure 59

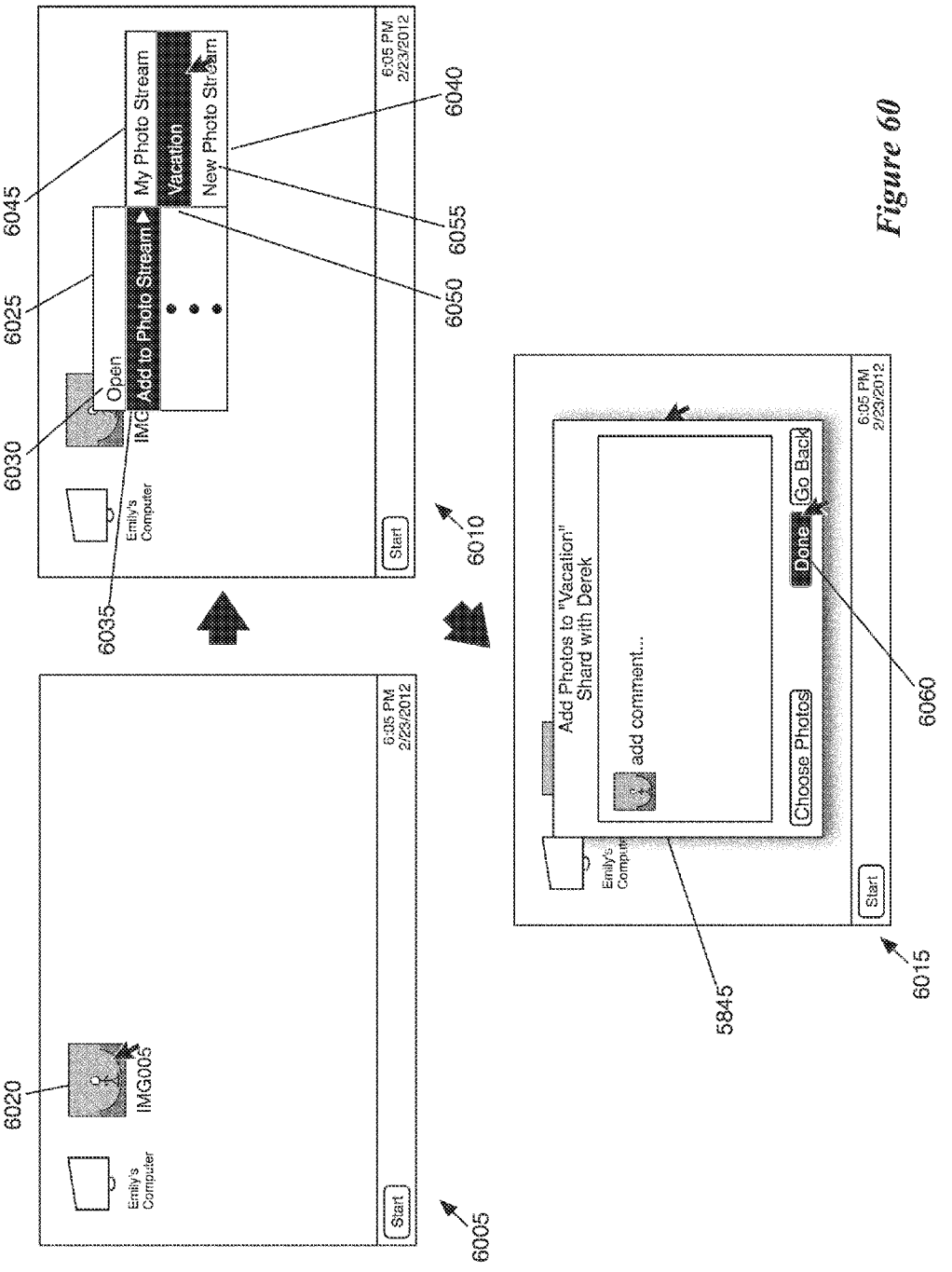

6045
6025
6030
6035
6040
6055
6050
6010
6020
IMG005
Emily's Computer
Start
6:05 PM
2/23/2012
6005
Open
Add to Photo Stream
My Photo Stream
Vacation
New Photo Stream
Add Photos to "Vacation"
Shard with Derek
add comment...
Choose Photos
Done
Go Back
6060
5845
6015

Figure 60

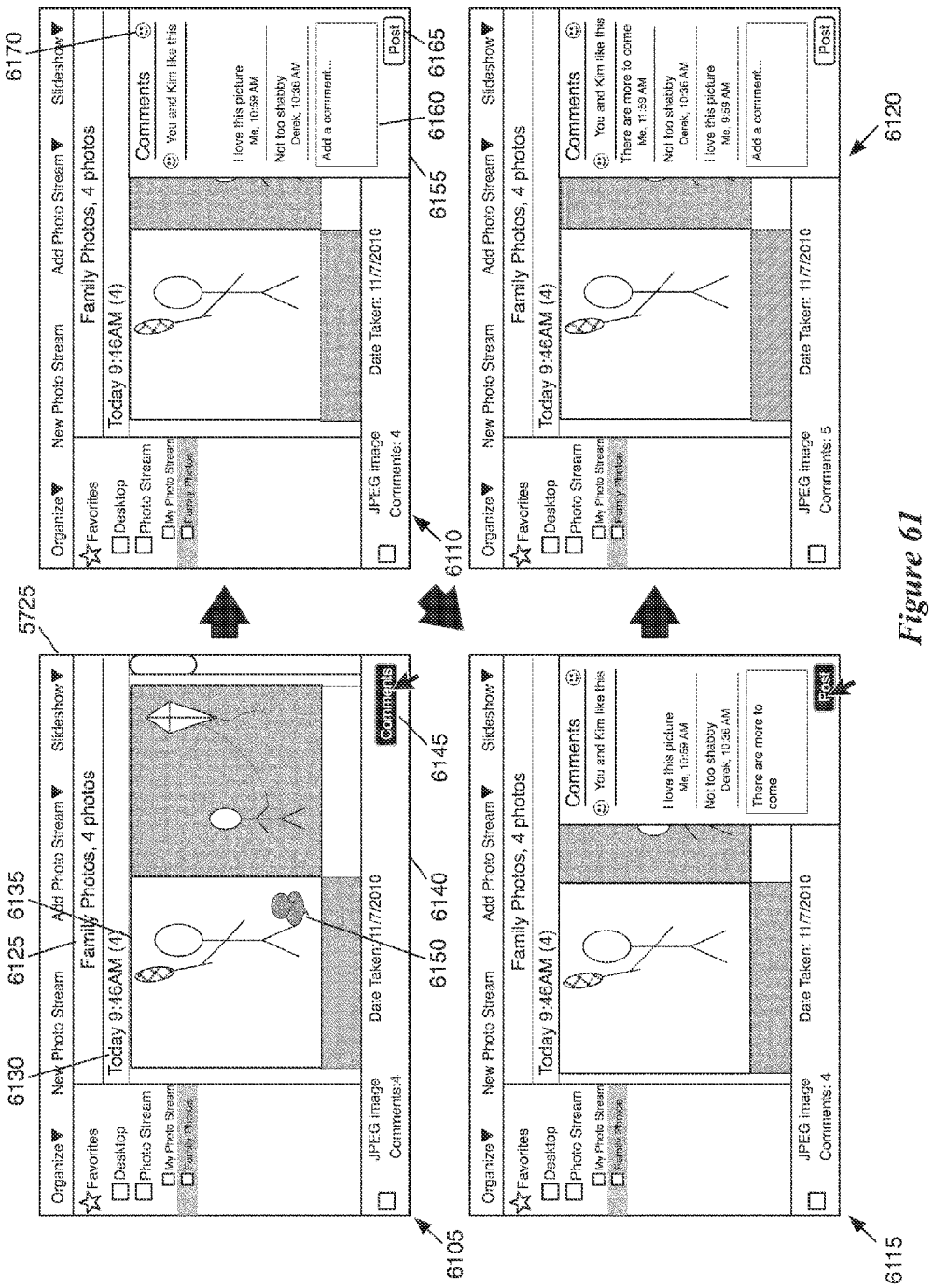

Organize
New Photo Stream
Add Photo Stream
Slideshow
Favorites
Desktop
Photo Stream
My Photo Stream
Family Photos
Family Photos, 4 photos
Today 9:46AM (4)
JPEG image
Comments:4
Date Taken: 11/7/2010
Comments
You and Kim like this
I love this picture
Me, 10:59 AM
Not too shabby
Derek, 10:36 AM
There are more to come
Me, 11:59 AM
Me, 9:59 AM
Add a comment...
Post
Comments: 4
Comments: 5
5725
6105
6110
6115
6120
6125
6130
6135
6140
6145
6150
6155
6160
6165
6170

Figure 61

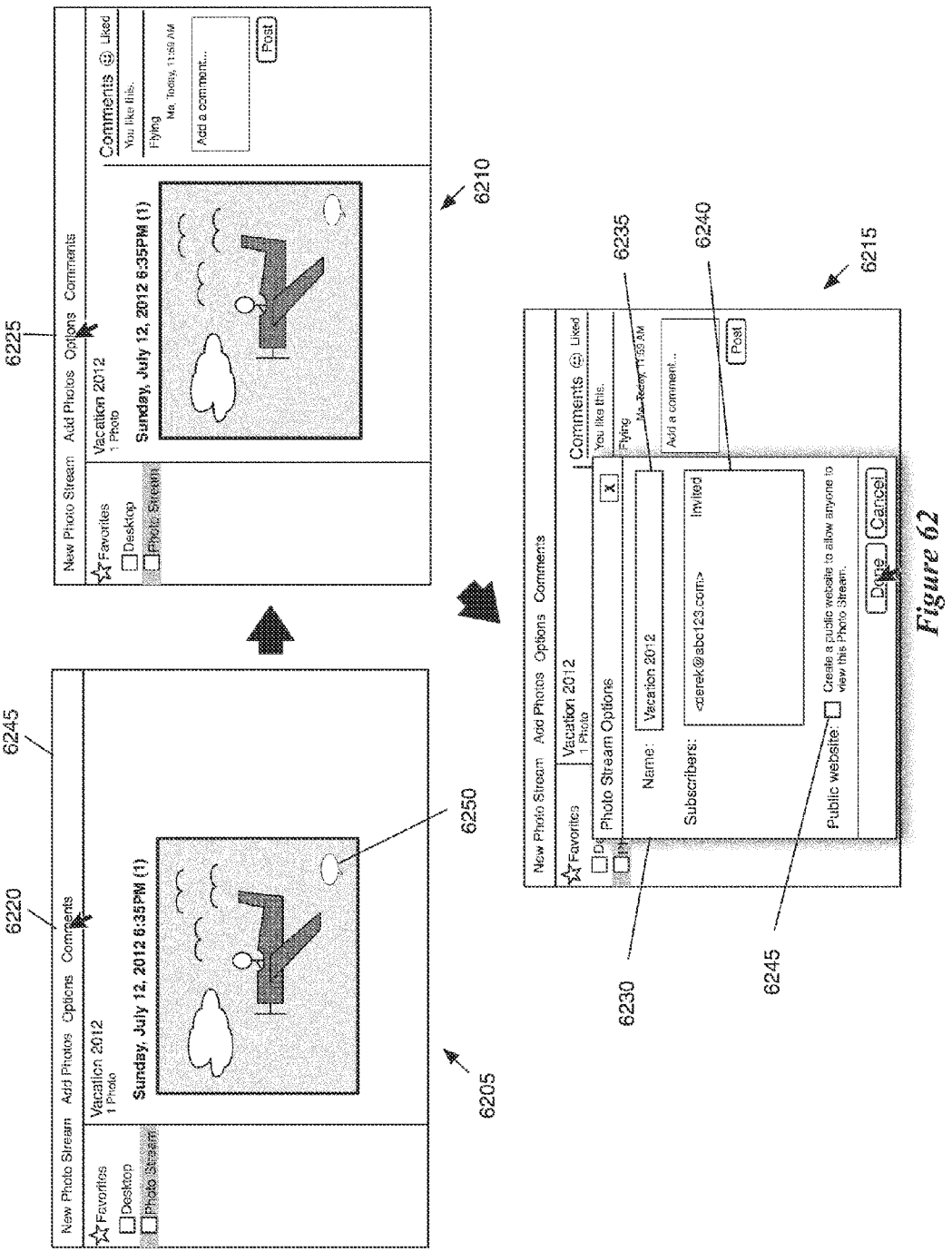

6205
6210
6215
6220
6225
6230
6235
6240
6245
6250
New Photo Stream
Add Photos
Options
Comments
Favorites
Desktop
Photo Stream
Vacation 2012
1 Photo
Sunday, July 12, 2012 6:35PM (1)
Liked
You like this.
Flying
Me Today, 11:56 AM
Add a comment...
Post
Photo Stream Options
Name:
Vacation 2012
Subscribers:
<derek@abc123.com>
Invited
Public website:
Create a public website to allow anyone to view this Photo Stream.
Done
Cancel

Figure 62

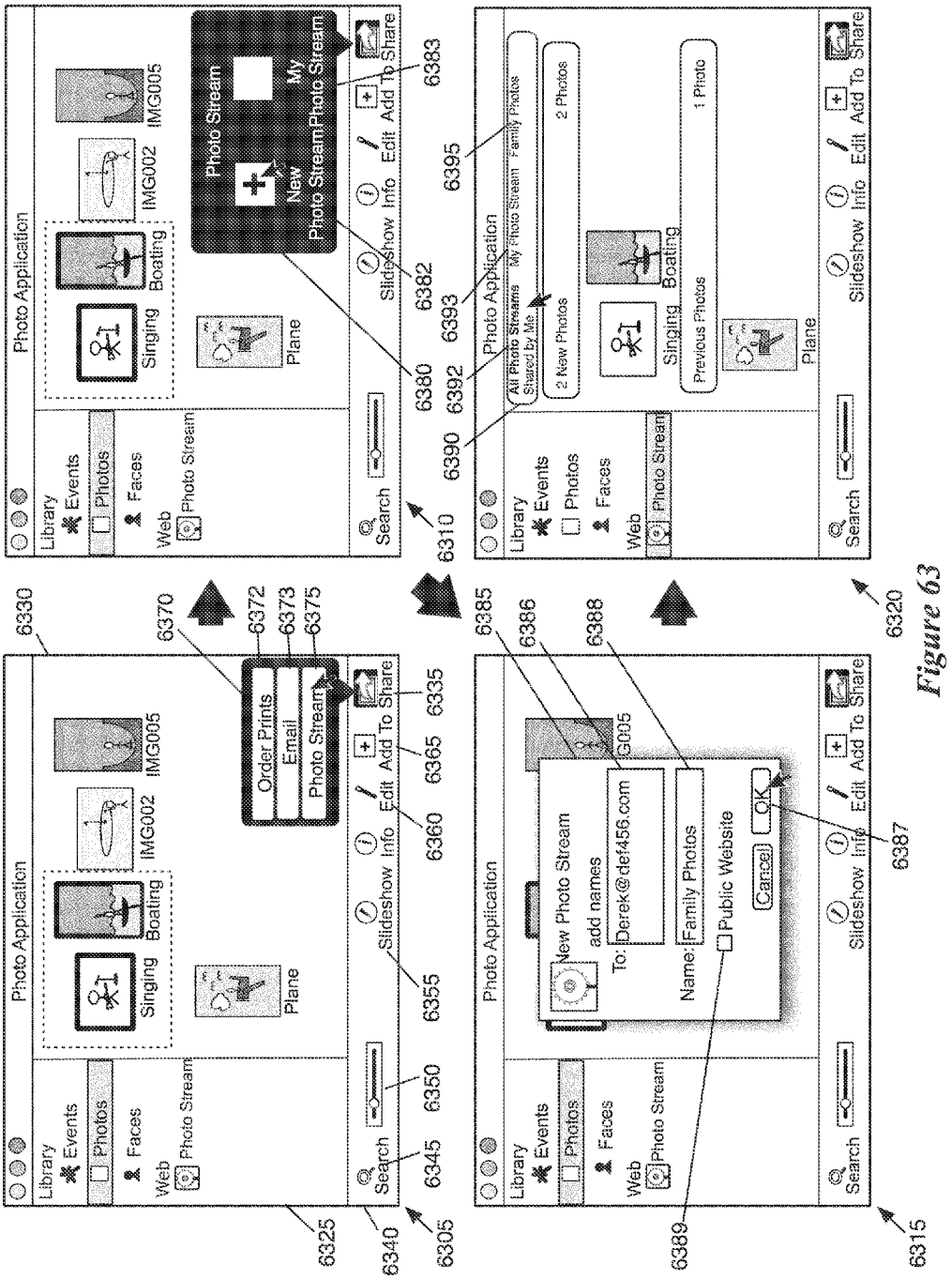


Photo Application
Library
Events
Photos
Faces
Web
Photo Stream
Singing
Boating
IMG002
IMG005
Plane
Search
Slideshow
Info
Edit
Add To
Share
Order Prints
Email
Photo Stream
New Photo Stream
add names
To: Derek@def456.com
Name: Family Photos
Public Website
Cancel
OK
My Photo Stream
All Photo Streams
Shared by Me
2 New Photos
Previous Photos
1 Photo
6305
6310
6315
6320
6325
6330
6335
6340
6345
6350
6355
6360
6365
6370
6372
6373
6375
6380
6382
6383
6385
6386
6387
6388
6389
6390
6392
6393
6395

Figure 63

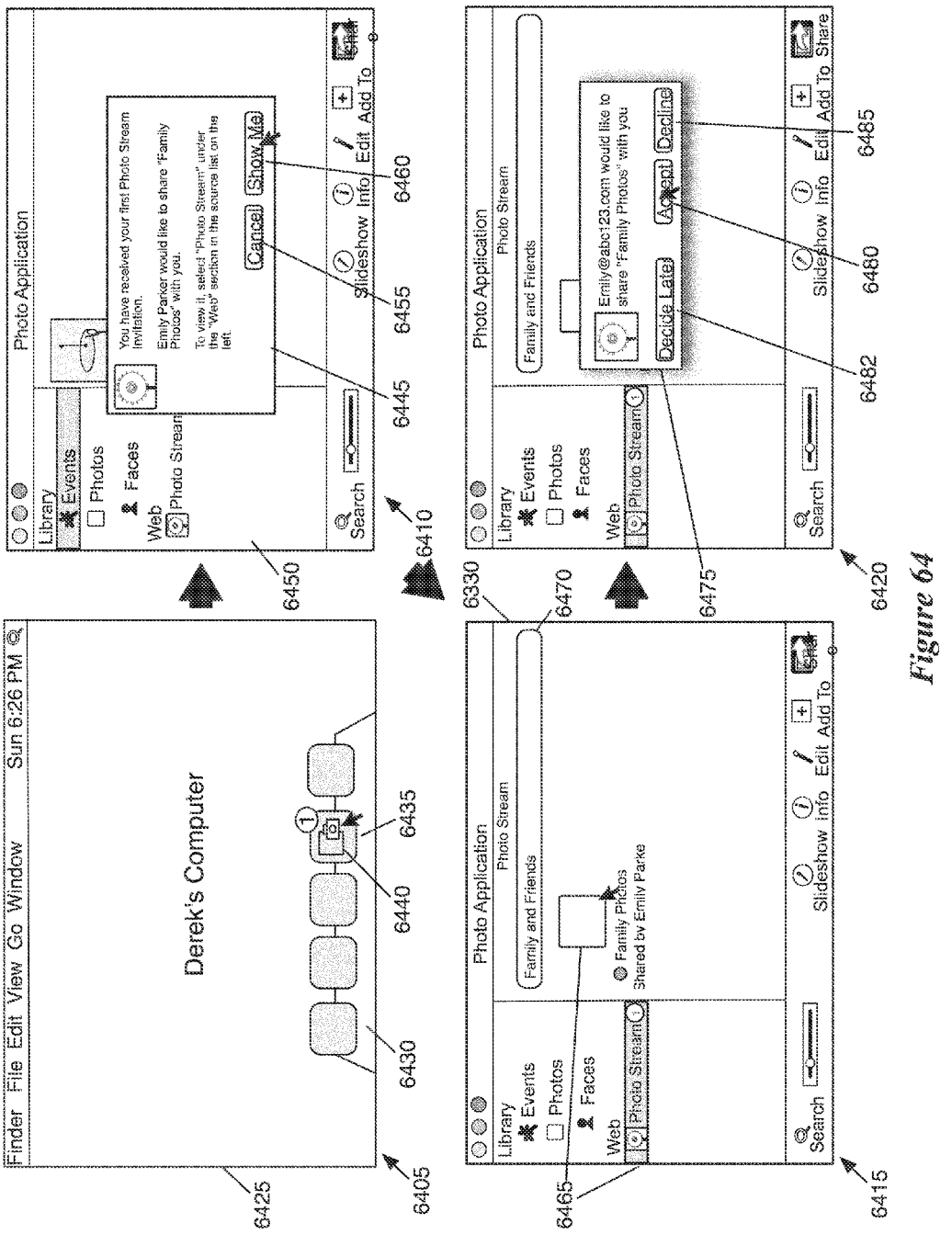

Finder File Edit View Go Window Sun 6:26 PM
Derek's Computer
6425
6405
6430
6440
6435
6450
Photo Application
Library
Events
Photos
Faces
Web
Photo Stream
You have received your first Photo Stream invitation.
Emily Parker would like to share "Family Photos" with you.
To view it, select "Photo Stream" under the "Web" section in the source list on the left.
Cancel
Show Me
6460
6455
6445
Search
Slideshow
Info
Edit
Add To
6410
6330
6470
Photo Stream
Family and Friends
Family Photos
Shared by Emily Parker
6465
6415
Emily@abc123.com would like to share "Family Photos" with you
Decline Later
Accept
Decline
6482
6480
6485
6475
6420

Figure 64

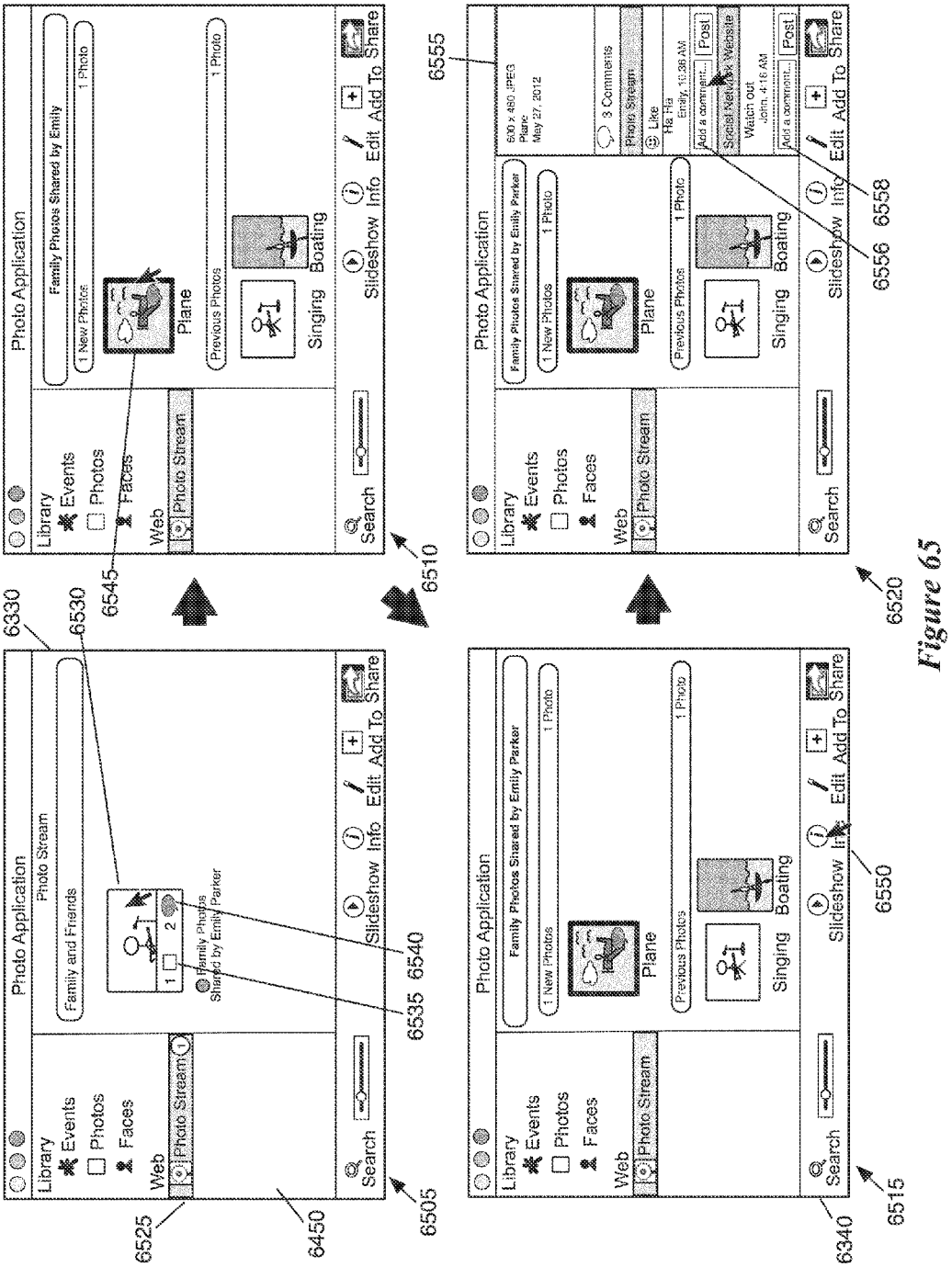


Photo Application
Library
Events
Photos
Faces
Web
Photo Stream
Family and Friends
Family Photos Shared by Emily Parker
1 New Photos
1 Photo
Previous Photos
Plane
Singing
Boating
Search
Slideshow
Info
Edit
Add To
Share
6330
6530
6545
6510
6555
6556
6558
6520
6525
6450
6505
6535
6540
6550
6340
6515

Figure 65

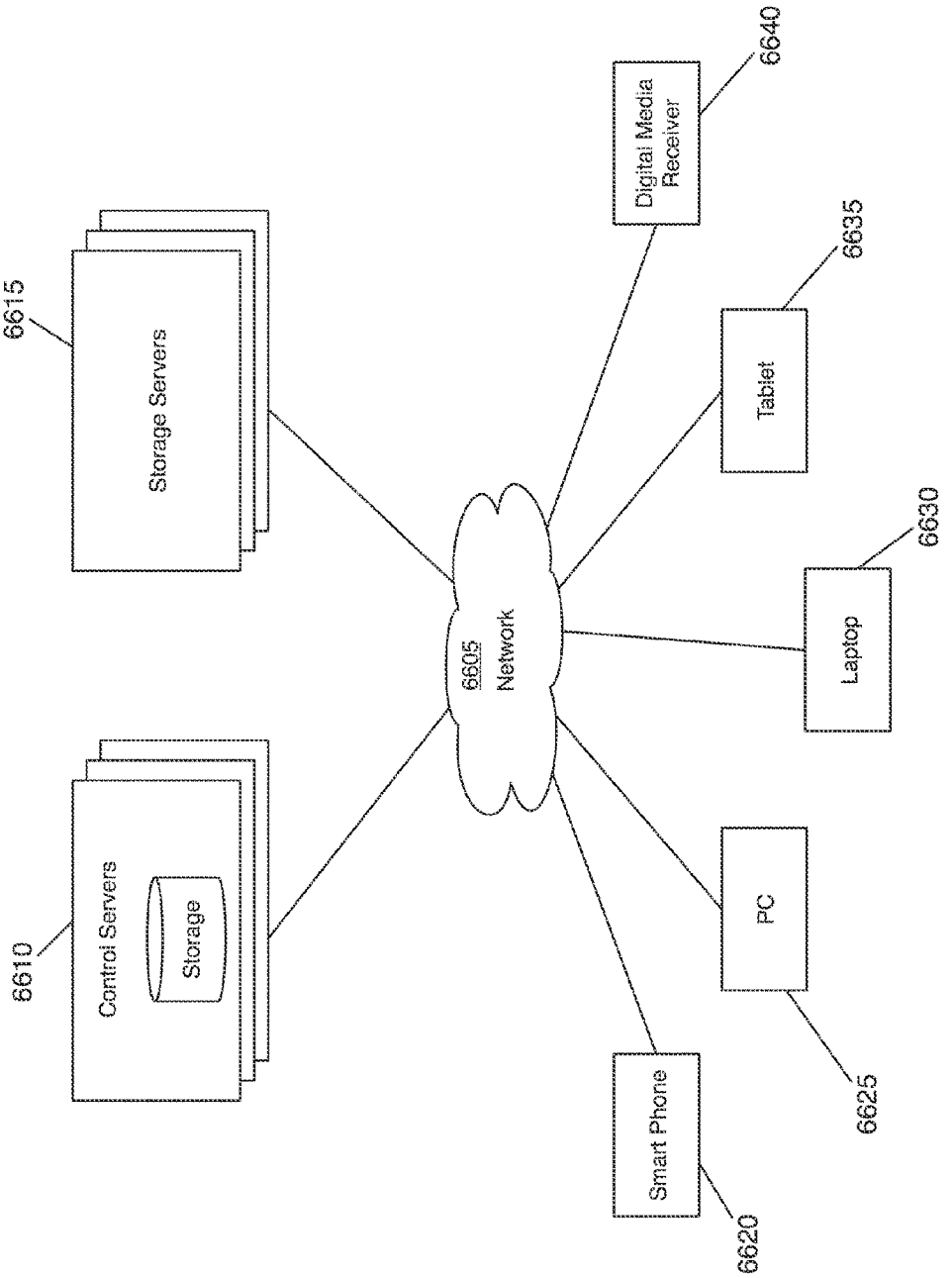

6615
Storage Servers
6610
Control Servers
Storage
6605
Network
6640
Digital Media Receiver
6635
Tablet
6630
Laptop
PC
6625
Smart Phone
6620

Figure 66

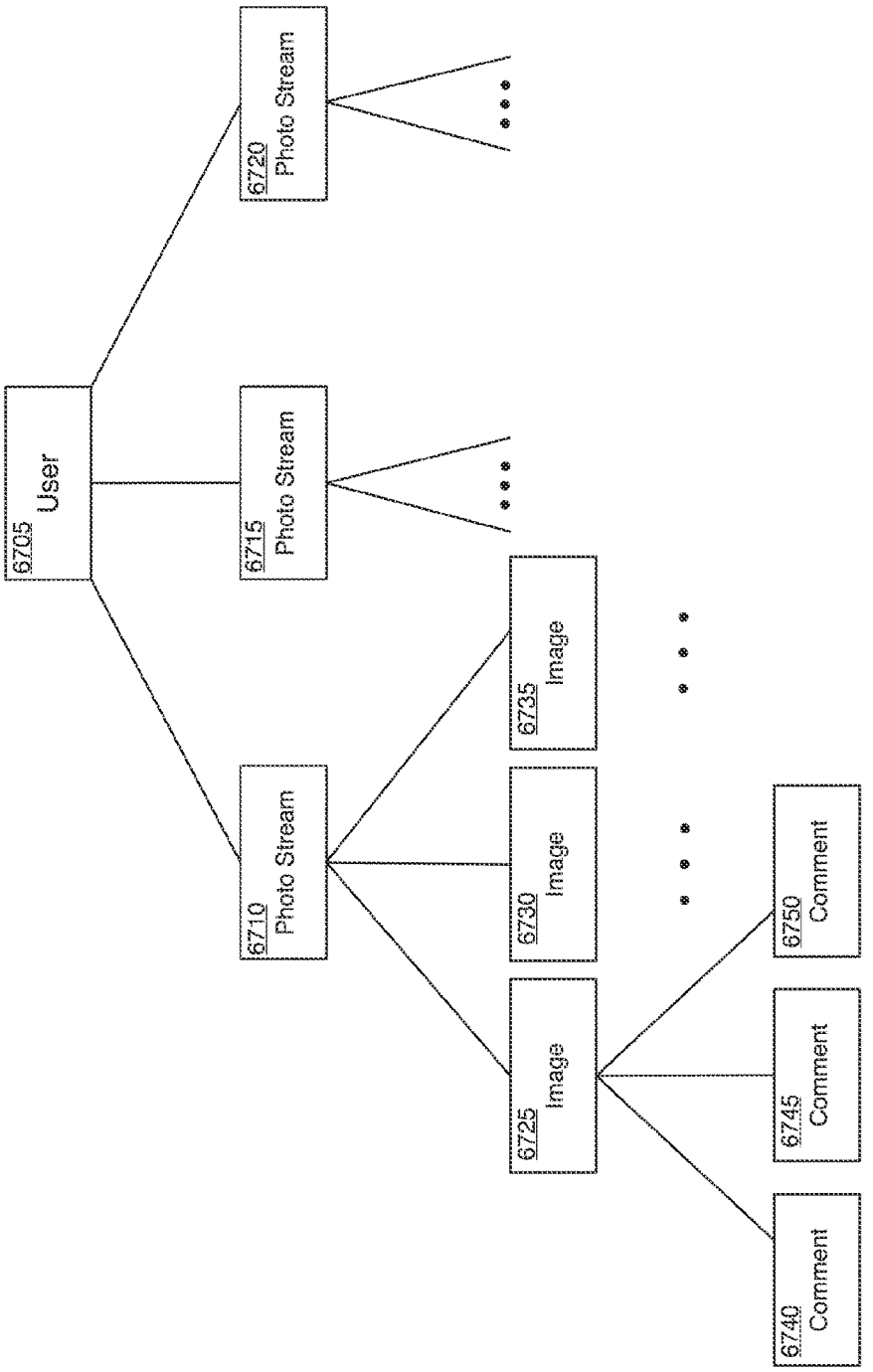

6705 User
6710 Photo Stream
6715 Photo Stream
6720 Photo Stream
6725 Image
6730 Image
6735 Image
6740 Comment
6745 Comment
6750 Comment

Figure 67

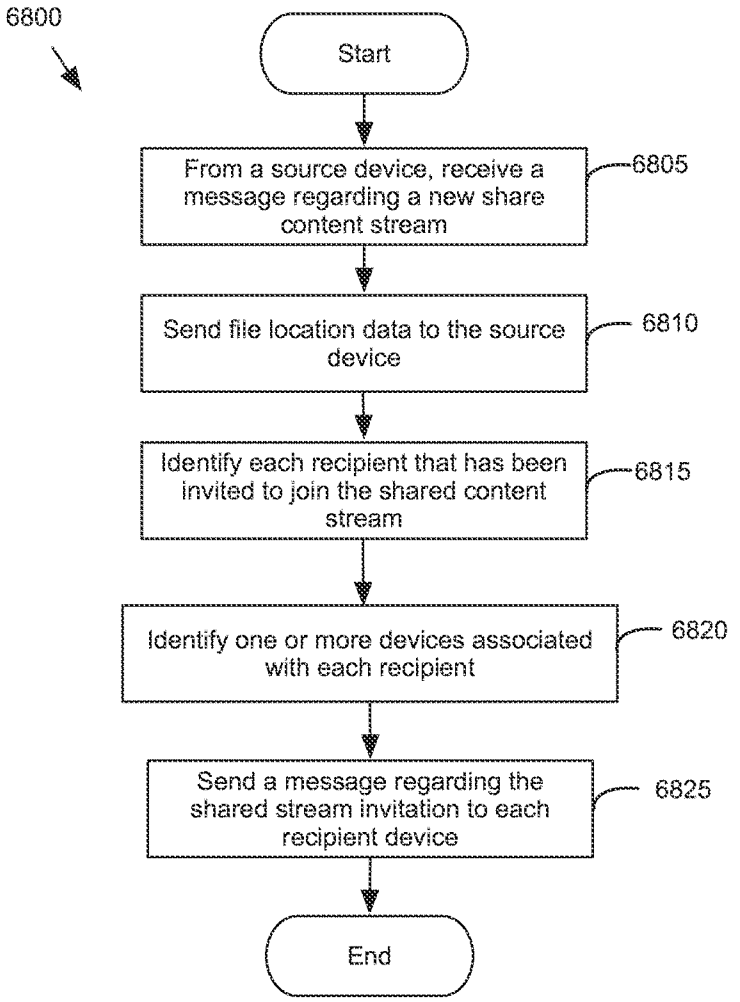

6800
Start
From a source device, receive a message regarding a new share content stream
6805
Send file location data to the source device
6810
Identify each recipient that has been invited to join the shared content stream
6815
Identify one or more devices associated with each recipient
6820
Send a message regarding the shared stream invitation to each recipient device
6825
End

Figure 68

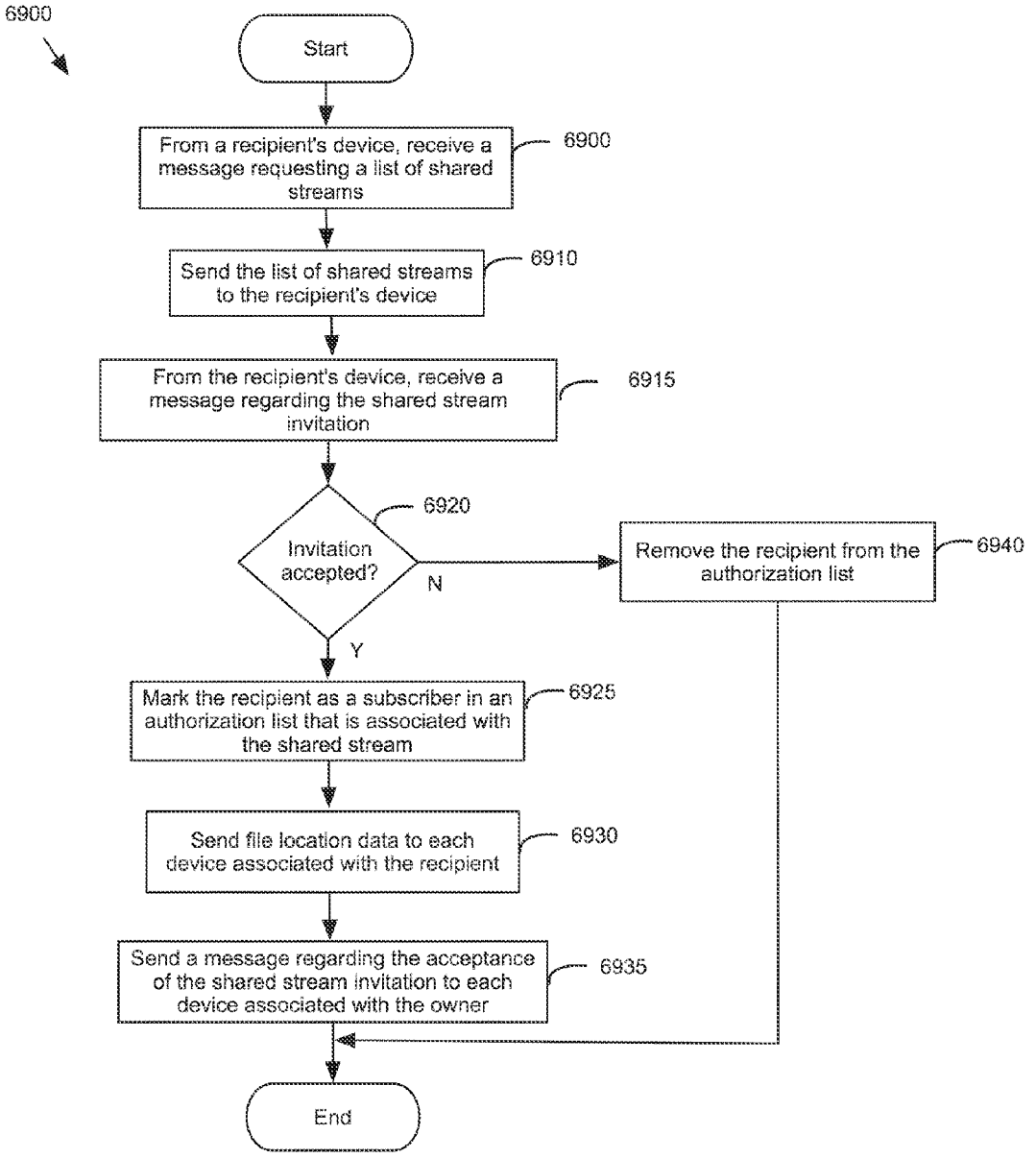

6900
Start
From a recipient's device, receive a message requesting a list of shared streams
6900
Send the list of shared streams to the recipient's device
6910
From the recipient's device, receive a message regarding the shared stream invitation
6915
Invitation accepted?
6920
N
Remove the recipient from the authorization list
6940
Y
Mark the recipient as a subscriber in an authorization list that is associated with the shared stream
6925
Send file location data to each device associated with the recipient
6930
Send a message regarding the acceptance of the shared stream invitation to each device associated with the owner
6935
End

Figure 69

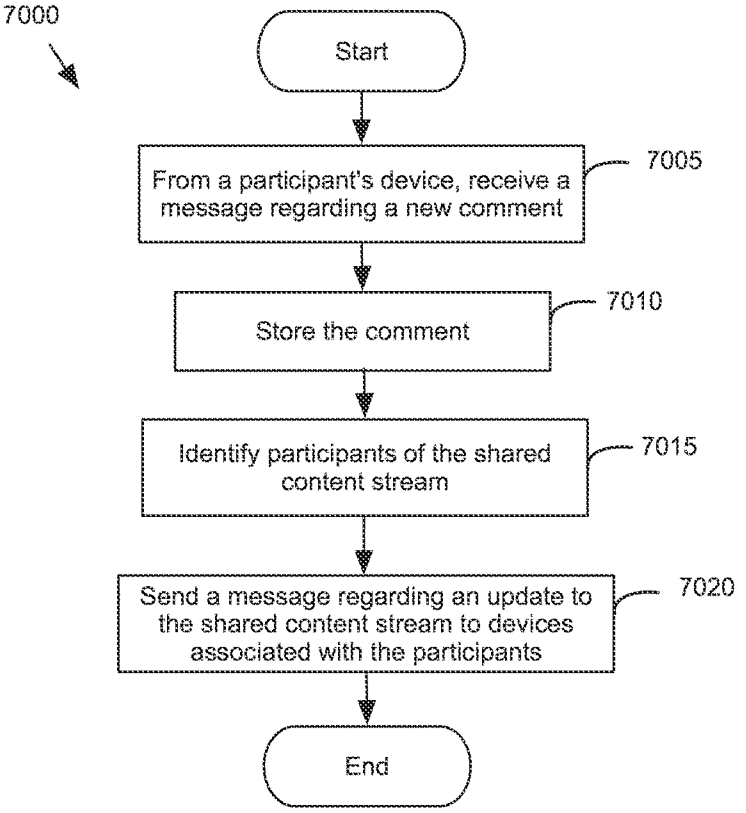

7000
Start
From a participant's device, receive a message regarding a new comment
7005
Store the comment
7010
Identify participants of the shared content stream
7015
Send a message regarding an update to the shared content stream to devices associated with the participants
7020
End

Figure 70

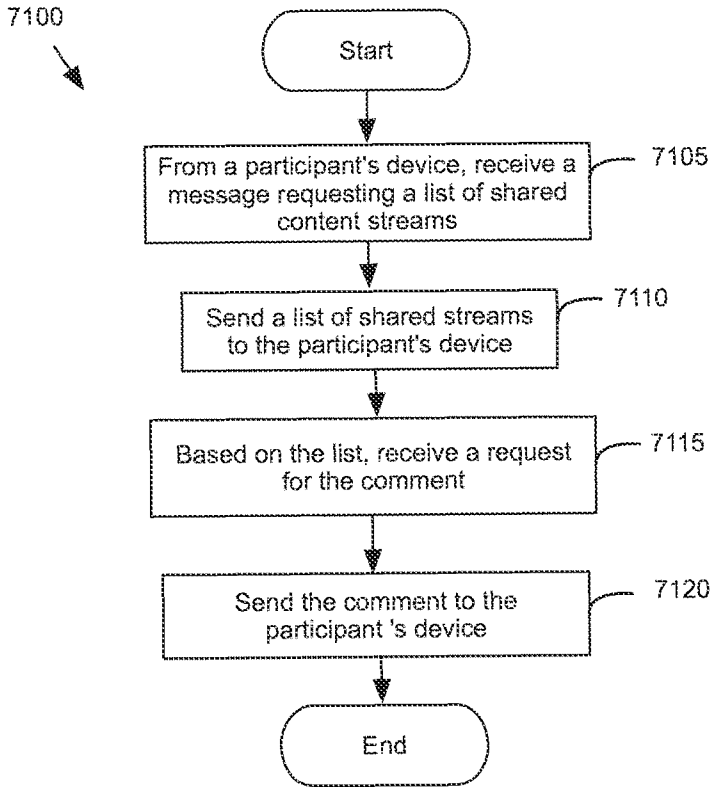

7100
Start
From a participant's device, receive a message requesting a list of shared content streams
7105
Send a list of shared streams to the participant's device
7110
Based on the list, receive a request for the comment
7115
Send the comment to the participant 's device
7120
End

Figure 71

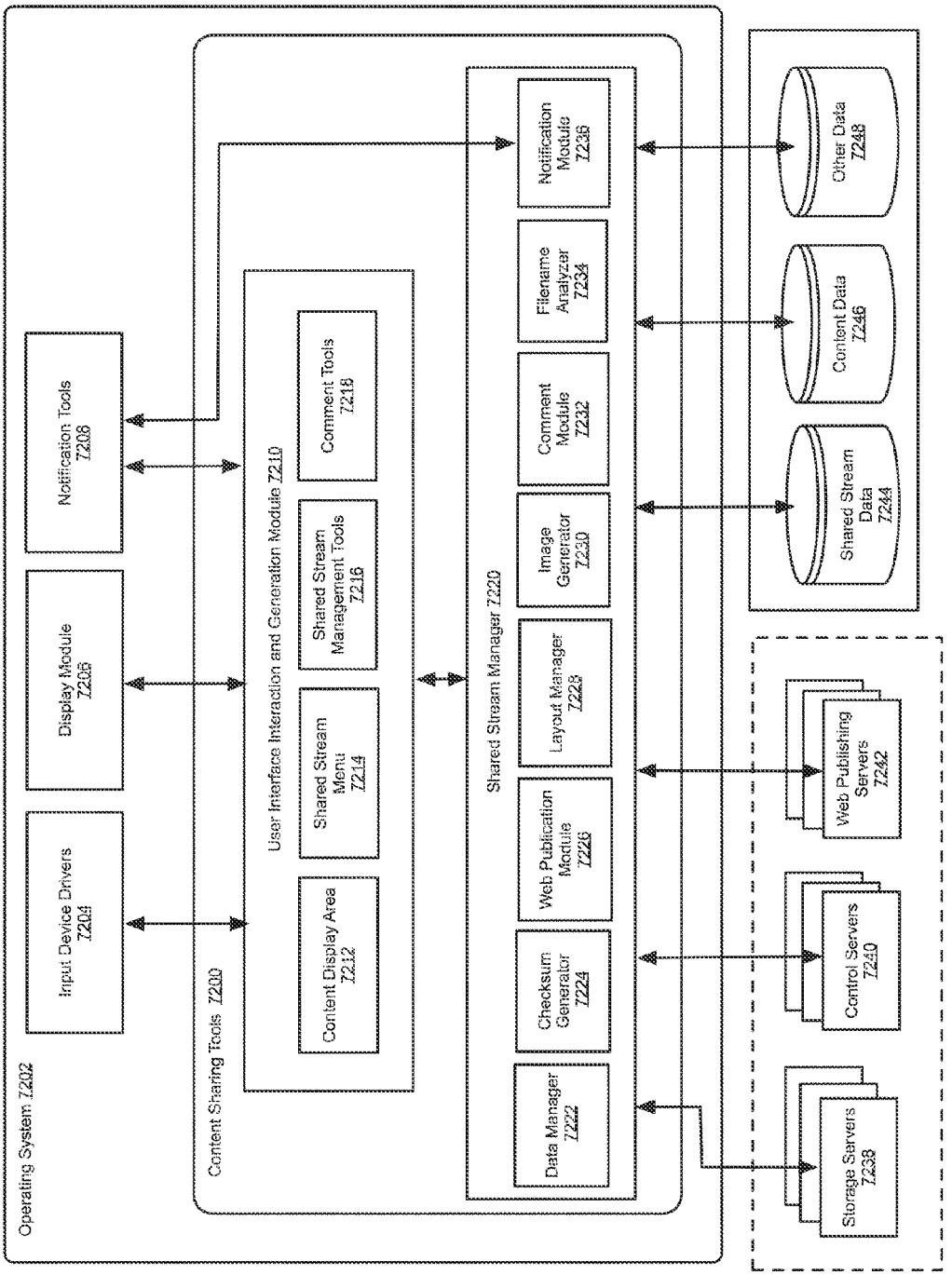

Operating System 7202
Input Device Drivers 7204
Display Module 7206
Notification Tools 7208
Content Sharing Tools 7200
User Interface Interaction and Generation Module 7210
Content Display Area 7212
Shared Stream Menu 7214
Shared Stream Management Tools 7216
Comment Tools 7218
Shared Stream Manager 7220
Data Manager 7222
Checksum Generator 7224
Web Publication Module 7226
Layout Manager 7228
Image Generator 7230
Comment Module 7232
Filename Analyzer 7234
Notification Module 7236
Storage Servers 7238
Control Servers 7240
Web Publishing Servers 7242
Shared Stream Data 7244
Content Data 7246
Other Data 7248

Figure 72

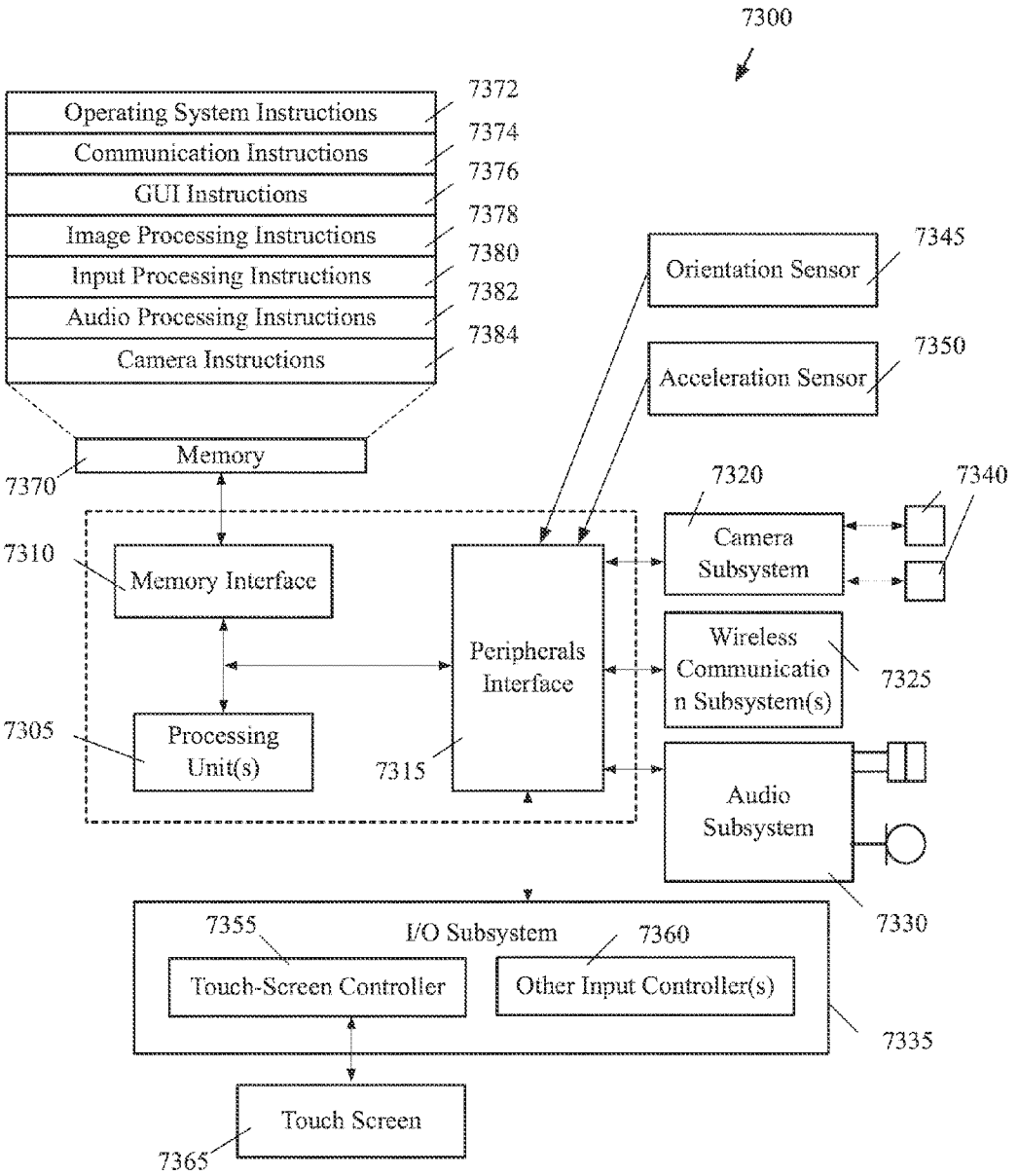

7300
Operating System Instructions
7372
Communication Instructions
7374
GUI Instructions
7376
Image Processing Instructions
7378
Input Processing Instructions
7380
Audio Processing Instructions
7382
Camera Instructions
7384
Memory
7370
Orientation Sensor
7345
Acceleration Sensor
7350
7320
7340
Camera Subsystem
7310
Memory Interface
Peripherals Interface
Wireless Communicatio n Subsystem(s)
7325
7305
Processing Unit(s)
7315
Audio Subsystem
7330
7355
I/O Subsystem
7360
Touch-Screen Controller
Other Input Controller(s)
7335
Touch Screen
7365

Figure 73

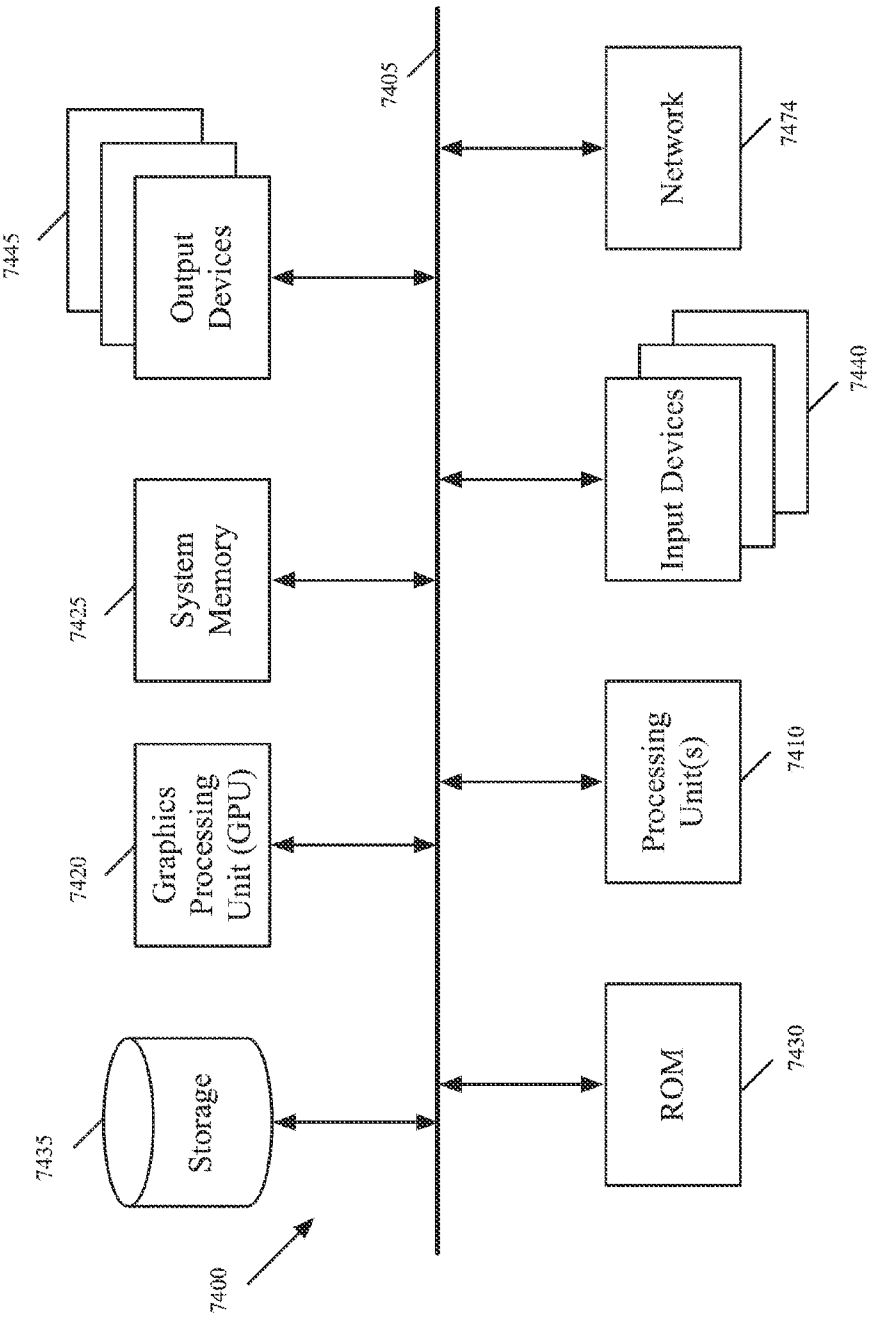

7400
7405
7410
Processing Unit(s)
7420
Graphics Processing Unit (GPU)
7425
System Memory
7430
ROM
7435
Storage
7440
Input Devices
7445
Output Devices
7474
Network

Figure 74

SHARING IMAGES AND COMMENTS ACROSS DIFFERENT DEVICES

CLAIM OF BENEFIT TO PRIOR APPLICATIONS

This application claims the benefit of U.S. Provisional Application 61/657,806, filed Jun. 10, 2012, U.S. Provisional Application 61/657,883, filed Jun. 10, 2012, and U.S. Provisional Application 61/699,815, filed Sep. 11, 2012. U.S. Provisional Applications 61/657,806, 61/657,883, and 61/699,815 are incorporated herein by reference.

BACKGROUND

Today, many different websites exists for sharing images. Typically, a person uses a web browser to navigate to a website. The person then logs on to the website and starts posting photos. In some cases, the person can also leave comments regarding those photos. The photos and comments may be viewed by everyone or by a group of people (e.g., friends, family, colleagues) that is associated with the person.

There are a number of shortcomings with such image and comment sharing operations described above. As a first example, the person may take a photo with a smart phone having a camera. To share that photo, the person then has to navigate to the website and log onto the website before he or she can even start uploading the photo. This can entail opening a web browser and inputting the website's URL address into web browser. If a desktop or laptop computer is being used, the person may also have to plug in the smart phone to the computer and then import the photo into the computer. Accordingly, there can be many different steps that must be performed just to share that one photo.

As another example, the website might not provide any easy options to select certain people that can or cannot view a group of photos. For example, when a person shares photos, they can be seen by either everyone or all people (e.g., friends, family, colleagues) that are associated with that person. Similarly, any comments that are left regarding the photos can be viewed by either everyone or the associated people. As such, there may be no easy way to specify a personal or mini social network that excludes one group of people (e.g., friends) while including another group of people (e.g., family).

BRIEF SUMMARY

Some embodiments described herein provide tools that allow a person to share content (e.g., images, video clips) on one device with multiple other people using different devices. Examples of such devices include a desktop computer, laptop, tablet, smart phone, digital media receiver, smart television ("TV"), etc. The content may also be shared across the person's own devices. To facilitate the sharing operations, the content sharing tools allow the person to (1) create a shared stream that represents a set of shared content, and (2) invite one or more recipients (e.g., friends, family) to subscribe to the shared stream. When a recipient subscribes to the shared stream, the set of shared content is streamed across to one or more of the recipient's devices.

In conjunction with the content sharing features, the content sharing tools (hereinafter image sharing tools) allow different participants to share comments regarding the stream's content. In some embodiments, the comments are pushed in real time to all devices (e.g., across different platforms) of the different participants associated with the shared stream. By pushing content and comments to a specified group of people, the content sharing tools create a social network (e.g., a mini social network, a personal social network). In this network, a participant can take a photo with his or her smart phone, add it to a shared stream album, and receive, at a moment's notice, comments from only those other participants that are associated with the shared stream album.

The image sharing tools of some embodiments provide a variety of different tools to modify a shared photo stream album. The user can use these tools to add or delete image from the shared photo stream album. When an image is added to the shared photo stream album, the image is distributed across the user's own devices and the devices of other participants that have subscribed to the shared photo stream album. Conversely, when an image is deleted from the user's device, the image may be deleted from the user's own devices and the participants' devices.

In some embodiments, the image sharing tools allow a user to manage a shared photo stream album. Example of such management features include resending a photo stream invitation, inviting additional subscribers, removing existing subscribers, and deleting the shared photo stream album. The image sharing tools of some embodiments only allow an owner (i.e., the person that created the shared photo stream album) to perform one or more of these management operations. However, the image sharing tools may allow the owner to specify access privileges. That is, the owner can specify whether a subscriber can add images to or remove images from the shared photo stream album, add or remove subscribers, make comments, etc. In some embodiments, the image sharing tools provide a control that when selected unsubscribes a subscriber from a shared photo stream album.

The image sharing tools of some embodiments allow content and comments to be shared across different platforms (e.g., from different vendors). That is, a person using one type of computing device (e.g., a tablet, smart phone) can share images and comments with a different person using another type of computing device (e.g., personal computer, laptop). In some embodiments, the image sharing tools are integrated into an operating system ("OS"). Alternatively, the image sharing tools may be provided as part of an image application (e.g., a photo viewing application, an image organizing and editing application).

In the cross-platform system, each client may communicate with a control server. In some embodiments, the control server facilitates the sharing by managing control data associated with different shared photo streams. Examples of such control data include user data (e.g., a list of devices associated with a user) and photo stream data (e.g., a list of photo stream associated with the user, a list of individuals that can access a particular photo stream).

When a new shared stream album is created, the control server of some embodiments sends file location data to the owner's device. The owner's device then uploads images in the shared photo stream album to a storage server. This storage server may be a third-party storage server. The control sever may also send a message to each recipient that has been invited to participate in the shared stream album. When a recipient accepts the invitation, the images may be downloaded from the storage sever to one or more of the recipient's devices.

In some embodiments, the image sharing tools allow images in a shared photo stream album to be published as a webpage to a website. In publishing the images, the layout of the webpage is selected based on the number of images and the orientation of the images. When different batches of images are added at different time, one particular layout is selected for each batch. The images in a batch may be pre-

sented in a particular order (e.g., starting with the oldest image and ending with the newest image, or vice versa). Also, the different batches may be presented in a particular order (e.g., starting with the oldest batch and ending with the newest batch, or vice versa). In some embodiments, the webpage is generated by a web-publishing server. Alternatively, a client device may generate the web page and upload it to the web-publishing server.

Several more detailed embodiments of the invention are provided below. Many of these examples refer to controls (e.g., selectable items) that are part of the image sharing tools. The image sharing tools in some embodiments are part of a standalone application that executes on top of the operating system of a device, while in other embodiments they are part of the operating system. Also, in many of the examples below (such as those illustrated in FIGS. **1-6**, **8-13**, **15-18**, **21-35**, **38-41**, and **49-51**) the device on which the application executes has a touch screen through which a user can interact with the image editing application. However, one of ordinary skill in the art will realize that cursor controllers or other input devices can be used to interact with the controls and applications shown in these examples for other embodiments that execute on devices with cursors and cursor controllers or other input mechanisms (e.g., voice control, remote control).

The preceding Summary is intended to serve as a brief introduction to some embodiments as described herein. It is not meant to be an introduction or overview of all subject matter disclosed in this document. The Detailed Description that follows and the Drawings that are referred to in the Detailed Description will further describe the embodiments described in the Summary as well as other embodiments. Accordingly, to understand all the embodiments described by this document, a full review of the Summary, Detailed Description and the Drawings is needed. Moreover, the claimed subject matters are not to be limited by the illustrative details in the Summary, Detailed Description and the Drawings, but rather are to be defined by the appended claims, because the claimed subject matters can be embodied in other specific forms without departing from the spirit of the subject matters.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features as described here are set forth in the appended claims. However, for purposes of explanation, several embodiments are set forth in the following figures.

FIG. **1** illustrates an example graphical user interface ("GUI") of an application for sharing images.

FIG. **2** provides an illustrative example of a recipient becoming a subscriber by accepting a photo stream invitation.

FIG. **3** provides an illustrative example of sharing a comment regarding an image in the photo stream.

FIG. **4** provides an illustrative example of selecting several images for a photo stream.

FIG. **5** provides an illustrative example of specifying a name and subscriber for a photo stream.

FIG. **6** provides an illustrative example of inputting a comment for an image in the new photo stream.

FIG. **7** conceptually illustrates a process that some embodiments use to create a new photo stream.

FIG. **8**A provides an illustrative example of how a recipient is notified of the photo stream invitation.

FIG. **8**B illustrates an example of the owner receiving notification of the acceptance of the invitation.

FIG. **9** provides an illustrative example of an email that is received at the recipient's device.

FIG. **10** provides an illustrative example of a first recipient forwarding the photo stream to a second recipient.

FIG. **11**A provides an illustrative example of the second recipient accepting the photo stream invitation.

FIG. **11**B provides an illustrative example of a notification that is pushed onto the owner's device upon the second recipient accepting the invitation.

FIG. **12** provides an illustrative example of a subscriber selecting and viewing the photo stream after accepting the invitation.

FIG. **13** provides an illustrative example of a recipient declining a photo stream invitation.

FIG. **14** conceptually illustrates a process that some embodiments use to accept or decline a photo stream invitation.

FIG. **15** provides an illustrative example of adding an image to an existing photo stream.

FIG. **16** provides an illustrative example of several notifications that are received at the subscriber's device.

FIG. **17** provides an illustrative example of deleting an image from a photo stream.

FIG. **18** provides an illustrative example of the photo stream on the subscriber's device after deleting the image.

FIG. **19** conceptually illustrates a process that some embodiments perform to add or delete images from a photo stream.

FIG. **20** conceptually illustrates a process that some embodiments perform when a participant adds images to or deletes images from a photo stream.

FIG. **21** provides an illustrative example of resending a photo stream invitation to a recipient that has not accepted or declined the invitation.

FIG. **22** provides an illustrative example of adding a subscriber for the photo stream.

FIG. **23** provides an illustrative example of removing a subscriber.

FIG. **24** provides an illustrative example of deleting a photo stream.

FIG. **25** provides an illustrative example of unsubscribing from a photo stream by a subscriber.

FIG. **26** provides an illustrative example of preventing the user of a device from receiving a photo stream invitation.

FIG. **27** provides an illustrative example of turning off the shared photo stream features.

FIG. **28** provides an illustrative example of blocking photo stream alerts.

FIG. **29** provides an illustrative example of adding a comment regarding an image in a photo stream.

FIG. **30** provides an illustrative example of how the comment appears on a subscriber's device.

FIG. **31** provides an illustrative example of how the comment appears on the user's device.

FIG. **32** provides an illustrative example of marking an image.

FIG. **33** provides an illustrative example of how the image application of some embodiments displays an image with comments.

FIG. **34** provides an illustrative example of scrolling through different images with comments.

FIG. **35** provides an illustrative example of scrolling through the comments associated with one image.

FIG. **36** conceptually illustrates a process that some embodiments use to post a comment.

FIG. **37** conceptually illustrates a process that some embodiments use to provide one or more notifications regarding a new comment.

FIG. **38** provides an illustrative example of publishing a photo stream to a website.

FIG. **39**A provides an illustrative example accessing the webpage with the subscriber's device.

FIG. **39**B provides an example message that is received at a recipient's device.

FIG. **40** provides an illustrative example of how the webpage is updated when a new image is added to the photo stream.

FIG. **41** provides an example of scrolling through images in the photo stream.

FIG. **42** provides an illustrative example of a webpage layout for a photo stream that includes two images.

FIG. **43** provides an illustrative example of a webpage layout for a photo stream that includes three or four images.

FIG. **44** provides an illustrative example of a webpage layout for a photo stream that includes five or six images.

FIG. **45** illustrates webpage layouts for a photo stream that includes more than six images.

FIG. **46** provides several examples of how images are framed in a webpage layout.

FIG. **47** provides an illustrative example of how portrait and landscape images are presented in a batch layout.

FIG. **48** conceptually illustrates a process that some embodiments use to publish images in a photo stream to a website.

FIG. **49** provides an illustrative example of the image sharing tools on a tablet.

FIG. **50** provides another example of the image sharing tools on a tablet.

FIG. **51** provides an illustrative example of how comments are presented on the tablet.

FIG. **52** provides an illustrative example of opening a shared photo stream with a digital media receiver.

FIG. **53** provides an illustrative example of navigating images in the photo stream.

FIG. **54** provides an illustrative example of filtering a display to only display images with one or more new comments.

FIG. **55** illustrates an example of another image application for a digital media receiver or smart TV.

FIG. **56** provides an illustrative example of installing and configuring the image sharing tools.

FIG. **57** illustrates an example of specifying a subscriber and a name for the photo stream.

FIG. **58** illustrates selecting images for the photo stream and inputting comments for several of the images.

FIG. **59** provides an illustrative example of accepting a photo stream invitation with a subscriber's device.

FIG. **60** provides an example of adding an image to a photo stream.

FIG. **61** provides an illustrative example of leaving a comment using a PC.

FIG. **62** provides an illustrative example of an alternate embodiment of the integrated image sharing tools.

FIG. **63** provides an illustrative example of the image sharing tools that are integrated into an image organizing and editing application.

FIG. **64** provides an illustrative example of accepting a photo stream invitation with a subscriber's device.

FIG. **65** provides an illustrative example of how the image sharing tools of some embodiments present comments on the photo application.

FIG. **66** conceptually illustrates an example system architecture in which the clients communicate with the different servers to share images and comments.

FIG. **67** conceptually illustrates an example of how a user's photo streams are represented at the server side.

FIG. **68** conceptually illustrates an example process that some embodiments perform to notify recipients of a new-shared stream invitation.

FIG. **69** conceptually illustrates an example process that some embodiments perform when it receives a response from a recipient device.

FIG. **70** conceptually illustrates an example process that some embodiments perform to notify participants of a new comment.

FIG. **71** conceptually illustrates an example process that some embodiments perform to deliver a new comment.

FIG. **72** conceptually illustrates the software architecture of content sharing tools of some embodiments

FIG. **73** is an example of an architecture of such a mobile computing device.

FIG. **74** conceptually illustrates another example of an electronic system with which some embodiments of the invention are implemented.

DETAILED DESCRIPTION

In the following detailed description of the invention, numerous details, examples, and embodiments of the invention are set forth and described. However, it will be clear and apparent to one skilled in the art that the invention is not limited to the embodiments set forth and that the invention may be practiced without some of the specific details and examples discussed.

Some embodiments described herein provide tools that allow a person to share images on one device with multiple other people using different devices. Examples of such devices include a desktop computer, laptop, tablet, smart phone, digital media receiver, smart television ("TV"), etc. The images may also be shared across the person's own devices. To facilitate the sharing operations, these tools allow the person to (1) create a photo stream that represents a set of shared images and (2) invite one or more recipients to subscribe to the photo stream. When a recipient subscribes to the photo stream, the set of images is streamed across to one or more of the recipient's devices.

In conjunction with the image sharing features, the image sharing tools allow different participants to share comments regarding the photo stream's images. In some embodiments, the comments are pushed in real time to all devices (e.g., across different platforms) of the different participants associated with the shared stream. By pushing content and comments to a specified group of people, the content sharing tools create a social network (e.g., a mini social network, a personal social network). In this network, a participant can take a photo with his or her smart phone, add it to a shared photo stream, and receive, at a moment's notice, comments from only those other participants that are associated with the shared photo stream.

In some embodiments, the image sharing tools are integrated into an operating system ("OS"). Alternatively, the image sharing tools may be provided as part of an image application (e.g., a photo viewing application, an image organizing and editing application). For some embodiments, FIG. **1** illustrates a graphical user interface ("GUI") **100** of an application with such image and comment sharing features. Specifically, this figure illustrates in five operational stages **170-190** how a user can use the GUI **100** to create a shared photo stream.

In several examples described below, a first user creates a photo stream and sends an invitation to a second different user to subscribe to the photo stream. To simplify the description, the first user may be referred to as an owner, and the second

user may be referred to as a recipient or subscriber depending on whether the second user has subscribed to the photo stream.

As shown in FIG. **1**, the GUI **100** includes (1) an image display area **105**, (2) a photo stream options display area **125** (hereinafter an options sheet), and (3) a photo stream comment display area **150** (hereinafter a comment sheet). The image display area **105** is an area within the GUI **100** through which the user can view images. The image display area **105** displays thumbnail representations of images. Thumbnails are reduced-size representations of full-size images. At any time, the user can select any one of the thumbnail images to display the corresponding image at a higher resolution. This higher resolution image is typically not the full size image (which is often of a higher resolution than resolution of the display device). In some embodiments, the thumbnail image represents only a portion of an image. That is, the thumbnails in the image display area **105** are all squares, irrespective of the aspect ratio of the full-size images. In order to determine the portion of a rectangular image to use for a thumbnail, the application of some embodiments identifies the smaller dimension of the image and uses the center portion of the image in the longer dimension.

As shown in the first stage **170**, the image display area **105** displays images from a collection, namely a camera roll. This is indicated by a top bar **110** that displays "Camera Roll" as the heading for the image display area **105**. The camera roll collection includes one or more images taken with the device (e.g., a smart phone, tablet) on which the image application executes. Accordingly, the thumbnail images **102**, **104**, and **106** represent those images taken with the device.

In the example illustrated in the FIG. **1**, the GUI **100** includes a bottom bar **115** that displays several selectable controls **112**, **114**, and **116**. Specifically, the user can view images in another collection (e.g., album) by selecting the "Albums" tab **112**. When selected, the application of some embodiments lists different collections, such as the camera roll collection. Different from the "Albums" tab, the user can select the "Photo Stream" tab **114** to display a list of different photo streams. The "Places" tab **116** can be selected to display a map showing mapped locations of geotagged images (e.g., images associated with Global Positioning System (GPS) metadata). In some embodiments, the application includes a separate "Camera Roll" tab for displaying images in the camera roll collection. The application may also include a "Photos" tab for displaying all images (e.g., a library of images) taken with the device and/or imported into the device.

The photo stream options sheet **125** is used to specify different options for a shared photo stream. This sheet **125** includes a subscriber field **130** and a name field **135**. The subscriber field **130** is an area in the sheet that the user can input one or more recipients for the photo stream. That is, the owner can input contact information into this field to invite the recipients to join the photo stream.

In the example illustrated in FIG. **1**, the contact information that can be inputted in the subscriber field **130** is an email address or a name associated with an email address. However, other types of contact information (e.g., a phone number) may be provided to invite a recipient to join the shared photo stream. In some embodiments, the application includes an auto-complete feature. For instance, one or more suggested names from a contacts directory or an address book may be displayed as the owner inputs text into the field **130**. The owner can then select a suggested name to automatically fill in the field **130**.

The name field **135** allows the user to specify a name or title for the photo stream. For example, the owner can use this field to input a name or title that summarizes the photo stream's images. The name specified with the name field **135** may be displayed in a number of different places. The name may appear in the photo stream invitation (e.g., email message). The name may also appear as the heading for the shared photo stream.

The comment sheet **150** can be used to add a comment. The comment sheet **150** includes a comment field **155** for inputting the comment. In some embodiments, the comment is associated with a first image in the photo stream (e.g., the first selected image **102** in the image display area **105**). This comment may be displayed with the first image (e.g., as a caption over a lower portion of the first image) on each device of participants associated with the photo stream. As shown in FIG. **1**, the comment field is an optional field because the owner does not have to input a comment in order to create the photo stream.

Having described the elements of the GUI **100**, the operations of creating a photo stream will now be described by reference to the state of the GUI during the five stages **170**-**190** that are illustrated in FIG. **1**. In the first stage **170**, the image display area **105** displays thumbnail representations **102**-**106** of images from the camera roll collection. As mentioned above, the camera roll collection includes one or more images taken with the device (e.g., a smart phone or tablet equipped with a camera).

The second stage **175** illustrates the GUI **100** after the user has selected several images for the shared photo stream. Specifically, the user has selected (e.g., by performing a gesture such as tapping the user's finger on) the first thumbnail image **102** representing a first image for the photo stream, and a second thumbnail image **104** representing a second image. To choose images, the user might have first selected an edit button **118** (e.g., an image selection button, an action button) prior to selecting the thumbnail images **102** and **104**. Otherwise, the image display area **105** may display a full-screen representation of the selected image.

When the application is in an image selection state, the selection of a thumbnail image causes it to display a marking near or at least partially over the selected thumbnail image. This marking provides the user with a visual indication of the selection of the thumbnail image. In the example illustrated in FIG. **1**, the marking is a check mark **122** that is displayed over each of the selected thumbnail images **102** and **104**. However, the application may display a different marking to provide the same visual indication.

To share the selected images, the user selects (e.g., by performing a gesture such as tapping the user's finger on) a share button **160**. The selection of the share button **160** causes a pop-up menu **145** to appear, as shown in the third stage **180**. The pop-up menu **145** may appear by sliding up from the bottom of the screen and disappear by sliding down towards the bottom of the screen.

As shown in the third stage **180**, the pop-up menu **145** includes several selectable items. The selectable items are arranged as a 2×2 grid of buttons. Each button is associated with an icon and a description. The selectable items include a photo stream button **165**, a message button **124**, a mail button **126**, and a copy button **172**. The photo stream button **165** is for creating a new photo stream or adding the selected images to an existing photo stream, the message button **124** is for creating a text message (e.g., SMS, iMessage) with the selected images, the mail button **126** is for generating an email with the selected images, and the copy button **172** is for copying the selected images. The pop-up menu **145** also includes a cancel button **128** for canceling and returning to the

previous view. In some embodiments, the pop-up menu **145** includes a print button (not shown) for printing the selected images.

In the example illustrated in the third stage **180**, the selectable items are icon based. In some embodiments, the application presents each item with text and an icon, only with the text and without the icon, or only with the icon and without the text. The application of some embodiments presents different selectable items based on the number of images that are selected from the image display area. For instance, if only one image is selected, the pop-up menu **145** may include an option to use the selected image as a desktop wallpaper.

In the third stage **180**, the user selects the photo stream button **165**. The fourth stage **185** illustrates the GUI **100** after the user has selected the photo stream button **165**. As shown, the selection resulted in the display of the photo stream options sheet **125** for creating a new photo stream. When a photo stream has been previously created, the application provides an option to add the selected images to an existing photo stream or create a new photo stream, in some embodiments. Here, the photo stream option sheet **125** is overlaid by the top bar **110** that includes a heading. The heading reads "Photo Stream". In some embodiments, the heading reminds the user that he or she is creating a new photo stream by specifically stating "New Photo Stream".

As shown in the fourth stage **185**, the user has typed in an email address into the subscriber field **130** using an on-screen or virtual keyboard **140**. The user has also typed in a name for the photo stream in the name field **135**. Once the fields **130** and **135** are populated, the user can select a next button **134** that is shown on the top bar **110**. Optionally, the user can select a cancel button **132** to return to a previous view (e.g., the view illustrated in the second stage **175**). In some embodiments, the next button **134** is disabled when there are one or more blank fields. For example, the next button **134** may be disabled when the subscriber field and/or the name field are blank. The application of some embodiments modifies the appearance of the button **134** (e.g., changes its color) to indicate that it is selectable or disabled.

The fifth stage **190** illustrates the application after the selection of the next button **134**. The selection results in the display of the comment sheet **150**. In some embodiments, the application presents the comment sheet **150** with animation. For example, the application may present it by flipping over the photo stream options sheet **125**, similar to a two-sided card being flipped over.

As shown in the fifth stage **190**, the comment sheet **150** includes a heading that states that it is associated with the photo stream. The name of the photo stream is also shown on the comment sheet. Specifically, the name of the photo stream is displayed below the comment field **155** with an icon (e.g., a photo stream icon). The comment field **155** remains empty, as the user has not inputted any comment for an image (e.g., the first image) in the photo stream. In some embodiments, the comment sheet **150** displays one or more thumbnail images of images in the photo stream. In the example illustrated in the fifth stage **190**, thumbnail images of the selected images are shown as being attached (e.g., paper clipped) to the comment sheet **150**. However, different embodiments may differently present previews of the photo stream's images. For example, the application may present the images as a grid of thumbnails on one or more rows.

In the fifth stage **190**, the user selects a post button **136** to create the new photo stream. Optionally the user can select a cancel button **138** to return to a previous display area, namely the options sheet **125** that is illustrated in the fourth stage **185**. In some embodiments, the selection of the cancel button **138** causes the application to return to the image display area **105** that is illustrated in the second stage **175**.

When the post button is selected, the application of some embodiments generates a message regarding the new photo stream and sends the notification to a control or push server. Based on the message, the control server may respond with file location data (e.g., with one or more Uniform Resource Locators ("URLs")) to send the images to a storage server (e.g., a third-party storage server). The application may also generate images to send to the storage server. For example, the application may generate one or more lower resolution images from a stored image (e.g., raw image) and send those images to the storage server.

In some embodiments, the control server identifies each device associated with the recipient (e.g., based on the recipient's email address) and sends one or more messages or notifications regarding the photo stream invitation. Once the recipient accepts the invitation, the images are downloaded from the storage server onto each associated device. To more quickly display the images, the images may be downloaded to a recipient's device prior to the recipient accepting the invitation, and may be deleted from the device if the recipient rejects the invitation.

FIG. **2** provides an illustrative example of a recipient becoming a subscriber by accepting the photo stream invitation. Specifically, this figure illustrates in three operational stages **225-235** how the recipient can accept the photo stream invitation to display the shared images on the recipient's device. In this example, the recipient's device is executing the same image application as the owner's device. As such, the GUI **200** is the same one described above by reference to FIG. **1**.

In the first stage **225**, the application is displaying a photo stream display area **220** (hereinafter a photo stream menu). To display the menu **220**, the recipient might have first selected (e.g., by performing a gesture such as tapping the recipient's finger on) the "Photo Stream" tab **114**. As shown, the menu **220** displays the photo stream created by the owner. The photo stream is listed with (1) an icon associated with the image sharing tools, (2) the name of the photo stream, and (3) a number that identifies the number of images in the photo stream. In addition, the menu **220** identifies the owner as it states that the photo stream is shared by "Emily Parker". In the illustrated example, the name of the owner is listed using a smaller font than the name of the photo stream.

In some embodiments, the image sharing tools provide one or more visual indications that there is a new photo stream invitation and/or an update to an existing photo stream. This is shown in the photo stream menu **220** as the new photo stream is listed with a marking **245**. Here, the marking **245** is a colored dot (e.g., blue dot) but other types of markings (e.g., textual markings) can be used to convey the same message. For instance, the "Photo Stream" tab **114** shows an icon **285** that is badged with a number **280**. This number indicates that there is one new photo stream invitation. In some embodiments, the application removes the badge **280** from the icon upon displaying the photo stream menu. On the other hand, the marking **245** may be shown on the menu until the recipient either accepts or declines the photo stream invitation.

As will be described in detail below, the image sharing tools of some embodiments provide different visual indications at multiple different levels to notify a user of a new photo stream invitation and/or an update to an existing photo stream. For example, the image sharing tools may badge the application's icon at the operating system ("OS") desktop level, mark different photo streams with a marking at the application menu level, and/or flag images (e.g., as new

images) at the photo stream image level. In conjunction with, or instead of one or more of these visual indications, the image sharing tools of some embodiments alerts the user by causing the recipient's device to play a sound and/or vibrate.

In the first stage **225**, the recipient selects (e.g., by performing a gesture such as tapping the recipient's finger on) the photo stream from the photo stream menu **220**. The selection causes the application to display a pop-up menu **215**, as illustrated in the second stage **230**. In some embodiments, the pop-up menu **215** is superimposed over a portion of the photo stream menu **220** by sliding up from the bottom of the screen. The pop-up menu **215** includes a heading. The heading states that the owner would like to share the photo stream with the recipient. The owner is identified by the owner's name and email address, and the photo stream is identified by its associated name. The pop-up menu **215** includes (1) an accept button **250** for accepting the photo stream invitation, (2) a decline button **255** for declining the invitation, and (3) a cancel button **260** for closing the pop-up menu without accepting or declining the invitation (e.g., keeping the invitation pending and deciding at a later time).

As shown in the second stage **230**, the recipient selects the accept button **250** from the pop-up menu **215**. This results in the display of an image display area **105**, as illustrated in the third stage **235**. The image display area **105** is the same as the one described above by reference to FIG. **1**. The image display area **105** displays thumbnail representations **202** and **204** of the images in the photo stream. The user can select any one of the thumbnail representations **202** or **204** to display a full screen representation of the corresponding image.

In the example illustrated in FIG. **2**, the image display area **105** is overlaid by the top bar **210**, which includes the name of photo stream. The top bar **210** also includes a back button **265** for returning to the photo stream menu **220** and an edit button **270** for selecting images in the photo stream. In the example illustrated in the third stage **235**, the image display area also displays text below the two thumbnails **202** and **204**. The text states the name of the owner and the number of images shared by the owner.

In some embodiments, the application displays a marking that identifies the number of new image that are in the photo stream. This is shown in the third stage **235** as a flag **275** is displayed over the thumbnail **202** of the first new image. The flag is marked with text that states that there are two new images in the photo stream. The application of some embodiments displays such a marking for each new batch of images. For example, when the owner adds a new batch of images to the photo stream, the application may display a similar flag on a first thumbnail image that corresponds to the first image in the new batch.

The image application of some embodiments displays images in a batch in a particular order (e.g., starting with the oldest image and ending with the newest image, or vice versa). The application of some embodiments displays different batches in a particular order (e.g., starting with the oldest batch to the newest batch, or vice versa). By displaying different batches in chronological or reverse chronological order, the images may not necessarily be ordered in a display area (e.g., the image display **105**). For example, this can occur when there are multiple batches and when an image in a first batch is newer (e.g., has a timestamp that is later) than another image in one of the subsequent batches. Many different examples of batching or grouping images will be described below.

In the example described above, the recipient's device is in an invited state through the first two stages **225** and **230**. In this state, the photo stream's images may not be pushed to the recipient's device or any other devices associated with the recipient. However, the images may be pushed to all of the recipient's devices upon the recipient accepting the invitation. In some embodiments, a notification is sent to one or more of the owner's devices upon the recipient accepting the invitation. This notification may state that the recipient has subscribed to the photo stream

As mentioned above, the image sharing tools create a social network by allowing users to share not only images but also comments regarding those images. FIG. **3** provides an illustrative example of sharing a comment regarding an image in the photo stream. Four operational stages **305-320** of the application are illustrated in this figure. These stages are continuations of the stages that are illustrated in FIG. **2**.

In the first stage **305**, the image display area **105** displays thumbnail representations **202** and **204** of the images associated with the photo stream. The subscriber selects the first thumbnail image **202**. The selection causes the image display area **105** to display a full screen representation **325** of the corresponding image. The full screen representation is overlaid by the top and bottom bars **210** and **370**. The top bar **210** includes a back button **330** to return to the thumbnail view. The top bar **210** also states that the displayed image **325** is a first of two images in the photo stream.

Different from the top bar **210**, the bottom bar **370** includes (1) a share button **345** for sharing the selected image, (2) a play button **350** for playing a slide show of the images in the photo stream, and (3) a comment button **360** for leaving a comment regarding the displayed image. The bottom bar may also include a stream button (not shown) for streaming the images in the photo stream to one or more other devices (e.g., a desktop computer, a laptop). In the example illustrated in FIG. **3**, each item in the bottom bar **370** is displayed with a corresponding icon. For example, the comment button **360** is displayed with a chat bubble icon **375**. The chat bubble icon **375** includes a plus sign (i.e., "+") that provides a visual indication that a comment can be added for the displayed image **325**.

As shown in the second stage **310**, the user selects the comment button **360**. The selection causes the virtual or on-screen overlay keyboard **140** to appear, as illustrated in the third stage **315**. The selection also causes the top bar **110** to display a heading that states "New Comment". Here, the user types in a comment regarding the image **325**. Alternatively, the user can select the cancel button **380** to return to the full screen representation.

The fourth stage **320** illustrates the image application after inputting the comment. As shown, the comment is displayed over the image **325**. The comment is also associated with comment metadata. The metadata is displayed below the comment, and identifies the person who left the comment and the time and date that the comment was left. In the example illustrated in the fourth stage **320**, the person who left the comment is identified as "Me". This is because the subscriber left the comment with the subscriber's device. The comment is also displayed with an add comment field **365** that can be selected to add another comment.

In some embodiments, the comments are shared in real time across multiple different devices (e.g., across different platforms of different vendors). For instance, when a new comment has been received, the application of some embodiments generates a message regarding the new comment and sends the message to the control server. The message may include the comment and a key that uniquely identifies the image that is associated with the comment. Based on the message, the control server may store the comment, identify participants associated with the photo stream, and send a

message regarding an update to a photo stream to each device associated with the identified participants. In some embodiments, the participant's device then downloads the comment and displays it with the associated image.

Many more photo stream examples are described below. Section I describes another more detailed example of creating a new photo stream. This section also describes another example of accepting a photo stream invitation. Section II then describes adding and removing images from a photo stream. Section III describes several examples of managing a photo stream (e.g., resending an invitation, adding or removing a subscriber, unsubscribing, etc.). Section IV then describes additional examples of exchanging comments. Section V describes publishing a photo stream to a public website. These previous sections are then followed by examples of the image sharing tools that are implemented on different devices and/or platforms. Specially, Section VI describes example of the image sharing tools that operate on a tablet. The tablet examples are followed by Section VII that describes an example digital media receiver. Section VIII then describes how the image sharing tools of some embodiments are integrated in an operating system (e.g., of a personal computer ("PC")). Section IX then describes several more examples of the image sharing tools that are integrated into one or more image editing and organizing application. Section X then describes an example system architecture used to facilitate the image and comment sharing operations. Section XI then describes example processes that are performed on the server-side. Section XII then describes a software architecture of content sharing tools of some embodiments. Finally, Section XIII then describes several example electronic systems that implement some embodiments described herein.

I. Example Operations

As mentioned above, the image sharing tools allow an owner to create a shared photo stream album that includes images, and invite any number of recipients to join the shared photo stream album and view those images. When a recipient accepts the invitation, the images are downloaded onto one or more of the recipient's devices. Several more example operations of creating a photo stream album and sharing the photo stream album will now be described by reference to FIGS. **1-14**.

A. Creating the Photo Stream

An example of creating a photo stream has been described above. A more detailed example of creating a photo stream will now be described by reference to a sequence of operations that is illustrated in FIG. **4-6**. FIG. **4** provides an illustrative example of selecting several images for a photo stream. Six operational stages **405-430** of the owner's device **400** are illustrated in this figure. The figure includes the image display area **105** that is described above by reference to FIG. **1**.

The first stage **405** illustrates the device **400** displaying a graphical user interface ("GUI") of its operating system ("OS"). The GUI includes selectable icons for opening different applications. Several of the icons are displayed along a menu bar (e.g., a dock). The icons include ones for opening a phone application, email application, web browser, and music player. An image application icon **435** (e.g., Photos application icon) and a camera application icon **440** are overlaid on the OS's desktop or main display area. To open the image application, the owner selects (e.g., by tapping the owner's finger on) the image application icon **435**.

The second stage **410** illustrates the device after the owner has selected the icon **435**. As shown, the application displays a list **445** of different collections. The owner might have first selected the albums tab **112** to display this list. Here, the owner selects the camera roll collection **460** from the list. As shown in the third stage **415**, the selection causes the image display area **105** displays thumbnail representations of images in the camera roll collection. Here, the camera roll collection includes the images taken with the device (e.g., a smart phone or tablet equipped with a camera).

The third and fourth stages **415** and **420** illustrate selections of several images for the new photo stream. Specifically, the owner selects (e.g., by performing a gesture such as tapping the owner's finger on) a first thumbnail image **450** to select a first image for the photo stream, and selects a second thumbnail image **455** to select a second image for the photo stream. The owner might have selected the edit button **118** prior to selecting the first thumbnail image **450**. Otherwise, the image display area **105** may display a full screen representation of the selected image.

When the application is in an image selection state, the selection of a thumbnail image causes it to display a marking near or at least partially over the selected thumbnail image. This marking provides the user with a visual indication of the selection of the thumbnail image. In the example illustrated in FIG. **4**, the marking is a check mark **122** that is displayed over each of the selected thumbnail images **450** and **455**. However, the application may display a different marking to provide the same visual indication.

In the fifth stage **425**, the owner selects (e.g., by tapping the owner's finger on) the share button **160**. The selection causes the pop-up menu **145** to appear, as illustrated in the sixth stage **430**. The menu **145** includes the photo stream button **165** for creating a new photo stream or adding the selected images to an existing photo stream. To create a new photo stream, the owner then selects the photo stream button.

FIG. **5** provides an illustrative example of specifying a name and subscriber for a photo stream. Five operational stages **505-525** of the image application are shown in this figure. The operations are continuations of the ones illustrated in FIG. **4**. The first stage **505** illustrates the image application after the owner has selected the photo stream button **165** from the pop-up menu **145**. The selection resulted in the display of the photo stream options sheet **125**. The photo stream options sheet includes a subscriber field **130** for inputting one or more subscribers, and a name field for inputting a name for the photo stream. To input an email address of the subscriber, the owner then selects (e.g., by tapping the owner's finger on) the subscriber field **130**.

The second stage **510** illustrates inputting a name of a subscriber into the subscriber field **130**. In particular, the owner begins to input (e.g., type in) an email address in the subscriber field **130** using the on-screen or virtual keyboard **140**. Based on the input, the application provides a list of suggested names **535** from the address book. Here, the autocomplete feature displays a name of a person. The name is shown with the associated email address. The owner then selects the name from the list **535** to automatically fill in the subscriber field **130**.

In the third stage **515**, the owner selects (e.g., by tapping the owner's finger on) the name field **135** for inputting a name (e.g., title) of the new photo stream. As shown in the fourth stage **520**, the owner types in a name for the photo stream in the name field **135**. In the fifth stage **525**, the owner then selects the next button **134** to continue defining the photo stream.

FIG. **6** provides an illustrative example of inputting a comment for an image in the new photo stream. Five operational stages **605-625** of the image application are shown in this figure. These operations are continuations of the ones illus-

trated in FIG. **5**. The first stage **605** illustrates the comment sheet **150** that is shown after the selection of the next button **134**. The comment field **155** remains empty, as the owner has not inputted any comment for an image (e.g., the first image) in the photo stream. To input a comment, the owner selects the comment field **155**.

As shown in the second stage **610**, the selection of the comment field **155** causes an on-screen keyboard **140** to appear. The owner then types in a comment (e.g., "Summer Vacation") into the comment field **155**. As mentioned above, the image sharing tools of some embodiments associate the comment to the first image in the photo stream. In some embodiments, the image sharing tools provide separate fields to input comment for different images. The image sharing tools of some embodiments automatically populates comment fields. For example, the comment fields may be populated using the image filenames. In auto-populating the comment fields, the image sharing tools may analyze the image files names to differentiate machine-generated names and user-specified names. Several example of such analysis will be described in detail below by reference to FIG. **58**.

Returning to FIG. **6**, the third stage illustrates the owner selecting (e.g., by tapping the user's finger on) the post button **136** to post or share the photo stream. The fourth stage **620** illustrates the image application displaying the photo stream menu **220**. Here, the user selects the new photo stream (e.g., "Family Photos") from the menu **220**. The selection causes thumbnail representation of the images in the new photo stream to be displayed in the image display area **105**, as illustrated in the fifth stage **625**.

When a new photo stream is defined, the application of some embodiments generates a message regarding the new photo stream and sends the notification to a control or push server. Based on the message, the control server may respond with file location data (e.g., with one or more URLs) to send the images to a storage server (e.g., a third-party storage server). The application may also generate images to send to the storage server. For example, the application may generate one or more lower resolution images from a stored image (e.g., raw image) and send those images to the storage server.

In some embodiments, the control server identifies each device associated with the recipient (e.g., based on the recipient's email address) and sends one or more messages or notifications regarding the photo stream invitation. Once the recipient accepts the invitation, the images are downloaded from the storage server onto each associated device. To more quickly display the images, the images may be downloaded to a recipient's device prior to the recipient accepting the invitation, and may be deleted from the device if the recipient rejects the invitation.

Having described several example GUI operations, a process for creating the new photo stream will now be described. FIG. **7** conceptually illustrates an example process **700** that some embodiments use to create a new photo stream. The process **700**, in some embodiments, is performed by the image application.

The process **700** begins when it identifies (at **705**) images for the photo stream. In the example described above, the owner selects the images through an image display area. After identifying the images, the process identifies (at **710**) the name of the photo stream. Next, the process **700** identifies (at **715**) each recipient of the photo stream invitation. Examples of specifying a name of the photo stream and a recipient of the photo stream invitation are described above by reference to FIG. **5**.

The process **700** then determines (at **720**) whether any comment has been left regarding an image (e.g., a first selected image) in the photo stream. If a comment was made, the process **700** identifies (at **725**) the comment and associates it with the image. The process **700** then generates (at **730**) a message regarding the new photo stream based on the identifications. After generating the message, the process sends (at **735**) the message to a control server. In some embodiments, the control server facilitates the sharing of content by managing control data associated with a shared photo stream. Examples of such control data include user data (e.g., a list of devices associated with a user) and photo stream data (e.g., a list of photo stream associated with the user, a list of individuals that can access a particular photo stream, file location data).

A shown in FIG. **7**, the process **700** receives (at **740**) file location data from the control server. In some embodiments, the file location data comprises one or more URLs to upload images to a storage server (e.g., a third-party storage server). After receiving the file location data, the process **700** sends (at **745**) the images to a storage server using the file location data. The process **700** then ends.

In some embodiments, the process **700** generates one or more copies of each original image (e.g., RAW image) prior to sending them to the storage server. That is, the process may take an image and generate different versions (e.g., at different resolutions) of that same image. Depending on the type of client (e.g., digital media receiver, tablet, smart TV, etc.), one of several different versions of the same image may be downloaded onto a client.

In some embodiments, the images are sent to the storage server when there is a particular type of network connection. For example, the images may not be sent to the storage server when the device is connected to the Internet through a cellular (e.g., a 3G, 4G) connection. That is, the device may send the image data to the storage server when there is a different type of connection such as a Wi-Fi connection. One reason for this is a smart phone or a tablet operates in a high-power state when transferring data using the cellular network. On the hand, the smart phone or tablet may operate in a low-power state when connected to the Internet through a wired connection or Wi-Fi connection. As such, power consumption (e.g., battery consumption) is minimized.

In some embodiments, the process **700** generates and sends an email message to each recipient. The email message may include a link that when selected causes cause the recipient to be added as a subscriber to the shared photo stream. Several examples of such an email will be described below by reference to FIG. **9**.

Some embodiments perform variations on the process **700**. The specific operations may not be performed in one continuous series of operations, and different specific operations may be performed in different embodiments. For instance, the process **700** might not identify any comment associated with an image. Also, the process **700** may generate multiple messages (e.g., one regarding a new shared photo stream album and another regarding a comment that was left for an image in the new shared photo stream) to send to the control server. Furthermore, the process **700** could be implemented using several sub-processes, or as part of a larger macro process.

B. Push Notifications

The previous examples illustrated creating a photo stream and sending a photo stream invitation. FIG. **8**A provides an illustrative example of how a recipient is notified of the photo stream invitation. This figure is followed by FIG. **8**B which illustrates an example of the owner receiving notification of the acceptance of the invitation. Three operational stages **805-815** are illustrated in FIG. **8**A.

The first stage **805** illustrates the recipient receiving notification through his or her device (e.g., "Derek's Device"). This first stage **805** occurs after the owner (e.g., "Emily") has created the photo stream and sent the photo stream invitation. As shown, a banner **820** is displayed on the recipient's device. Specifically, the banner is superimposed along the top edge of the operating system's desktop. In some embodiments, the banner rotates into view as a simulated 3D effect. The banner may float on top of the display area for a predetermined period of time and then disappear (e.g., rotate out of view, fade away).

The banner **820** includes a message and an icon **825**. The message states that there is a new shared photo stream. In addition, the message states that the photo stream's owner would like to share the photo stream with the recipient. The owner is identified by the owner's name (e.g., "Emily Parker"), while the photo stream is identified by its name (e.g., "Family Photos"). The icon **825** is the one associated with the image application.

In conjunction with the icon, or instead of it, the application of some embodiments displays a thumbnail representation of an image in the shared photo stream. For example, the banner **820** may include a thumbnail representation of the first image in the shared photo stream. The application of some embodiments alerts the recipient through one or more other means. For instance, the application may cause a device to vibrate or play a sound. When the device is in a locked mode, a pop-up window or dialog box with the message may appear in a lock screen.

In the first stage **805**, the application displays a badge at the operating system ("OS") level to alert the recipient of an update to a photo stream. At this level, the application may display one or more other markings. One such type of notification is a badge that appears at least partially over the application's icon. This is shown in the first stage **805** as a badge **830** is displayed on the icon **840** of the image application. The badge **830** includes a number (e.g., "1"). In the example illustrated in the first stage **805**, the number does not represent the number of new images in the photo stream. Instead, it indicates there is an update to a photo stream (e.g., there is a new photo stream invitation, a batch of images has been added to an existing photo stream, a new comment has been received regarding an image the existing photo stream, etc.).

The first stage **805** illustrates the selection of the application icon **840** (e.g., through a touch operation such as tapping the recipient's finger on the icon). As shown in the second stage **810**, the selection causes the image application to be opened. The application displays the photo stream menu **220**. The user might have first selected the photo stream tab **114** to display this menu. In the second stage **810**, the menu **220** lists the new photo stream (i.e., "Family Photos") **845**. Here, the recipient selects the photo stream **845** from the menu **220**. The selection causes the application to display the pop-up menu **215**, as shown in the third stage **815**. The recipient then accepts the photo stream invitation by selecting the accept button **250** from the pop-up menu **215**.

In the example illustrated in the second stage **810**, the recipient selects the photo stream from the photo stream menu **220** to display the pop-up menu **215**. In some embodiments, the selection of the banner **825** (shown in the first stage **805**) opens the image application. In conjunction with launching the application, the selection of the banner **825** may cause the application to navigate to the photo stream menu **220** and/or displays an invitation sheet (e.g., the pop-up menu **215**).

The previous example illustrated an example notification that is displayed on the recipient's device. When a subscriber accepts an invitation, the owner may also be notified of the acceptance of the invitation. FIG. **8**B provides an illustrative example of a notification that is pushed onto the owner's device (e.g., through the image application).

As shown in FIG. **8**B, a banner **835** is displayed on the owner's device. The banner **835** is superimposed along the top edge of the OS's desktop. The banner **835** includes a message that states that the recipient has subscribed to the photo stream. The subscriber is identified by the subscriber's name (e.g., "Derek Parker"), while the photo stream is identified by its name (e.g., "Family Photos"). The owner's device might have received the subscriber's name and/or the photo stream's name from a message from the control server. In this example, a badge is not displayed over the image application's icon. This is because the photo stream has not been updated. For instance, the subscriber has not added any comments regarding the images in the photo stream.

In some embodiments, the application alerts the recipient through one or more other means. For example, the application may cause a device to vibrate or play a sound to alert the user. When the device is in a locked mode, a pop-up window or dialog box with the message may appear in the lock screen.

As mentioned above, the application of some embodiments alerts the recipient through one or more other means. For instance, the application may cause a device to vibrate or play a sound. When the device is in a locked mode, a pop-up window or dialog box with the message may appear in a lock screen. In some embodiments, the notifications are fully customizable in that the user can disable them (e.g., from the application settings menu). For example, the user can turn on or off notification for certain updates (e.g., new comments, new photo streams, new images, etc.). The user can also specify whether to (1) display push notifications, (2) to display the notification as a banner or as an alert (e.g., the message in a bubble), (3) whether to view the notifications in the lock screen, (4) to play sound, and/or (5) badge the application's icon. These customization features are described below by reference to FIG. **28**.

C. Email Notifications

In the example shown in FIG. **8**A, the application displays a banner to notify the recipient of the photo stream invitation. In conjunction with the banner notification, or instead of it, an email message may be sent to the recipient upon creation of a new shared photo stream. In some embodiments, the image application generates the email message that contains a selectable link which when selected opens the image application. The selection of the link may also cause the application to navigate to the photo stream menu and/or may cause the recipient to be added as a subscriber to the photo stream. In some embodiments, the email message is always sent to each recipient that is invited to join the shared photo stream.

FIG. **9** provides an illustrative example of an email that is received at the recipient's device. Four operational stages **905-920** of the recipient's device are illustrated in this figure. The first stage **905** illustrates the selection of an icon **925** of an email application. In the second stage **910**, the email application displays the email sent from the owner's device. The email includes (1) a message **935**, (2) a link **940**, and (3) a thumbnail image **930**. The message **935** indicates that the owner shared a photo stream with the recipient. Specifically, it asks the recipient to join the owner's shared photo stream. The owner is identified by the owner's name and email address, and the photo stream is identified by its associated name.

The thumbnail image **930** shows the icon of the image application. The icon includes a marking or badge **945**. The marking indicates that there is a new photo stream or an

update to an existing photo stream. The link **940** is a selectable item for opening the image application. In some embodiments, the email includes a message that states that recipient has to create an account with a cloud service in order to join the shared photo stream. To download the photo stream album, the recipient may have to register his or her device with the cloud service.

In the second stage **910**, the recipient selects (e.g., by tapping the recipient's finger on) the link **940**. As shown in the third stage **915**, the selection causes the image application to be opened. Specifically, the selection results in the display of the photo stream menu **220**. The selection also causes the recipient to be added as a subscriber to the shared photo stream. Accordingly, the recipient does not have to select an accept button from an invitation sheet.

In the third stage **915**, the subscriber selects the photo stream **950** from the photo stream menu **220**. As shown in the fourth stage **920**, the selection resulted in the display of the image display area **105**. The image display area **105** shows thumbnail representations of the images in the shared photo stream. In some embodiments, a return email may be sent to the owner once the recipient accepts the invitation. This return email may state that the recipient joined or subscribed to the shared photo stream. The owner may also be notified of the acceptance through a notification (e.g., a banner) that is displayed on the owner's device. An example of such a notification is described above by reference to FIG. **8**B.

The previous example illustrated accepting an invitation to a shared photo stream through an email message. The image-sharing tool of some embodiments allows a first recipient to forward the invitation to a second recipient. The second recipient can then subscribe to the shared photo stream by accepting the invitation. In some embodiments, the photo stream invitation is associated with a one-time token that can be used by only one individual. That is, the second recipient can take the place of the first recipient. However, the first and second recipients cannot both subscribe to the shared photo stream through the one photo stream invitation.

FIG. **10** provides an illustrative example of a first recipient forwarding the photo stream invitation to a second recipient. Two operational stages **1005** and **1010** of the first recipient's device are illustrated in this figure. In the first stage **1005**, the email application has been opened to display the email. The email includes the message **935**, the link **940**, and the thumbnail image **930**. The email application also displays a bottom bar **1015**. This bar includes a reply button **1020** for replying to the email, a forward button **1025** for forwarding the email, and a delete button **1030** for deleting the email.

In the first stage, the first recipient selects the forward button **1025**. As shown in the second stage **1010**, the first recipient then forwards the email to a second recipient (e.g., to "Joe Parker").

FIG. **11**A provides an illustrative example of the second recipient accepting the photo stream invitation. Three operational stages **1105-1115** of the second recipient's device are illustrated in this figure. The first stage **1105** illustrates the selection of an icon **925** of an email application. In the second stage **1110**, the email application displays the email forwarded from the first recipient's device. The email includes the message **935**, the link **940**, and the thumbnail image **930**.

In the second stage **1110**, the second recipient selects (e.g., by tapping the second recipient's finger on) the link **940**. As shown in the third stage **1115**, the selection causes the image application to be opened. Specifically, the selection results in the display of the photo stream menu **220**. The selection also causes the second recipient to be added as a subscriber to the shared photo stream. Accordingly, the second recipient does not have to select an accept button from an invitation sheet.

FIG. **11**B provides an illustrative example of a notification that is pushed onto the owner's device upon the second recipient subscribing to the shared photo stream. As shown in, a banner **835** is displayed on the owner's device. The banner **835** is superimposed along the top edge of the OS's desktop. The banner **835** includes a message that states that the second recipient has subscribed to the photo stream. The subscriber is identified by the second recipient's name (e.g., "Joe Parker"), and the photo stream is identified by its name (e.g., "Family Photos").

In some embodiments, the banner may state that a person using a different email address has joined the shared photo stream. The banner may further state that the owner can remove the subscriber if the owner does not recognize the person or the email address. Alternatively, or conjunctively with the notification, a return email may be sent to the owner once the second recipient accepts the invitation. This return email may include the same message as the banner.

D. Selecting and Viewing Photo Stream

In several examples described above, a recipient becomes a subscriber to a photo stream by accepting a photo stream invitation. FIG. **12** provides an illustrative example of how the images in the photo stream are presented to the subscriber. Three operational stages **1205-1215** of the subscriber's device are illustrated in this figure.

The first stage **1205** illustrates the image application displaying thumbnails representations of the image in the shared photo stream. As mentioned above, the application of some embodiments displays a marking that identifies the number of new image that are in the photo stream. This is shown in the first stage **1205** as a flag **275** is displayed over the thumbnail **202** of the first new image. The flag is marked with text that states that there are two new images in the photo stream. The application of some embodiments displays such a marking for each new batch of images. For example, when the owner adds a new batch of images to the photo stream, the application may display a similar flag on a first thumbnail image that corresponds to the first image in the new batch.

In some embodiments, the image application displays a visual indication that an image is associated with one or more comments. This visual indication may also indicate that there is at least one unread comment associated with the image. In the example illustrated in the first stage **1205**, the first thumbnail **275** is displayed with a chat bubble **1220** that is colored (e.g., blue). The chat bubble **275** indicates that there is one or more comments associated with the corresponding image, and the color of the chat bubble indicates that there is at least one unread comment associated with the same image.

As shown in the first stage **1205**, the subscriber selects the thumbnail **202**. The second stage **1210** illustrates that the selection resulted in the display of a full-screen representation **1225** of the corresponding image. The full-screen representation **1225** is overlaid by the top and bottom bars **210** and **370**. The top bar **210** includes a back button **330** to return to the thumbnail view. The back button **330** is labeled with the name of the photo stream. The top bar **210** also states that the displayed image **325** is a first of two images in the photo stream.

Different from the top bar **210**, the bottom bar **370** includes (1) a share button **345** to share the selected image, (2) a play button **350** to play a slide show of the images in the photo stream, and (3) a comment button **360** to display the comment associated with the displayed image or leave another comment. In the example illustrated in FIG. **12**, the comment button **360** is displayed with a chat bubble icon **375**. The chat

bubble icon includes a number that identifies the number of comments associated with the displayed image.

In the second stage **1210**, the user selects (e.g., swipes across) the screen to display the next image. As shown in the third stage **1215**, the selection causes the application to display the next image **1230**. The selection also causes the top and bottom bars to disappear. However, the chat bubble icon **375** remains at the same location. As the displayed image is not associated with any comments, the number in the chat bubble has been replaced by a "+" sign. The sign provides a visual indication that a comment can be added for the displayed image **1230**. At any time, the subscriber can add a new comment by selecting the chat bubble.

In the example described above, the top and bottom bars **210** and **370** disappear upon displaying the next image **1230**. Alternatively, the application may remove these bars after a set period of time. For instance, in the second stage **1210**, the top and bottom bars **210** and **370** may automatically disappear once a predefined period (e.g., a few seconds) has been reached.

E. Declining an Invitation

In several examples described above, a recipient becomes a subscriber to a photo stream by accepting a photo stream invitation. FIG. **13** provides an illustrative example of a recipient declining the photo stream invitation. Three operational stages **1305-1315** of the recipient's device are illustrated in this figure.

The first stage **1305** illustrates the image application displaying the photo stream menu **220**. The menu **220** includes the photo stream **1320** created by the owner. The recipient selects the photo stream **1320** from the photo stream menu **220**. The selection causes the application to display a pop-up menu **215** in the second stage **1310**. Included in the pop-up menu **220** is a decline button **255**, which when selected, declines the invitation. As shown at this stage **1310**, the recipient selects the decline button **255** to decline the invitation. The third stage **1315** illustrates the photo stream menu **220** after the recipient has declined the photo stream invitation. As shown, the selection of the decline button **255** results in the removal of the photo stream **1320** from the photo stream menu **220**.

F. Example Process

Having described accepting and declining a photo stream invitation, an example process will now be descried. FIG. **14** conceptually illustrates a process **1400** that some embodiments use to accept or decline a photo stream invitation. The process **1400**, in some embodiments, is performed by the image application.

The process **1400** begins when it receives (at **1405**), from a control server, a message regarding an update to a photo stream. After receiving the message, the process **1400** retrieves (at **1410**) a list of photo streams from the control server. Based on the list, the process **1400** then notifies (at **1415**) the recipient of the update. Several examples of different notifications or markings has been described above, including a banner notification and a badged icon at the OS level, a marking (e.g., a blue dot) at the application's album level, etc. As mentioned above, the recipient's device may also play a sound or vibrate upon receiving the message.

At **1420**, the process **1400** displays the photo stream invitation. Many different examples of such a photo stream invitation are described above. For instance, the invitation may be a part of a pop-up window with buttons for accepting and/or declining the invitation. Different from the pop-up window, the invitation may be an email message with one or more selectable links for accepting and/or declining the invitation. In some embodiments, the photo stream invitation is displayed upon the recipient selecting a notification (e.g., a banner). Alternatively, the invitation may be displayed upon the recipient selecting the photo stream from a photo stream menu.

As shown in FIG. **14**, the process **1400** awaits (at **1425**) input from the recipient. If the invitation has been accepted, the process **1400** sends (at **1430**) a message to the control server regarding the accepted invitation. In some embodiments, the control server receives the message and adds the recipient as a subscriber in access list. In some embodiments, this access list lists each subscriber that is authorized to view the images in the photo stream and make comments regarding those images. The list may also specify whether the subscriber can add images to the photo stream, remove images, add subscribers to the photo stream, and/or remove subscribers from the photo stream.

After notifying the control server of the accepted invitation, the process **1400** retrieves (at **1435**), from the control server, file location data (e.g., with one or more Uniform Resource Locators ("URLs")) for the images in the photo stream. Then, the process retrieves (at **1440**) the images from a storage server (e.g., a third-party storage server) using the location data. The process **1400** then ends.

At **1450**, the process **1400** determines whether the recipient declined the invitation. If the recipient declined the invitation, the process sends (at **1455**) a message to the control server regarding the declined invitation. The process **1400** may also delete the photo stream from the list of photo stream (e.g., that is represented in the photo stream menu). Based on the message, the control server of some embodiments removes the recipient from a list that lists different individuals that are invited to join the photo stream.

If the recipient has not declined or accepted the invitation (e.g., by selecting a cancel button or closing the email message), the process maintains (at **1460**) the pending status of the invitation. As the invitation is pending, the process **1400** may not remove the photo stream from the photo stream menu and/or the marking (e.g., the colored dot) that is displayed with the name of the photo stream in that photo stream menu.

Some embodiments perform variations on the process **1400**. The specific operations may not be performed in one continuous series of operations, and different specific operations may be performed in different embodiments. Furthermore, the process **1400** could be implemented using several sub-processes, or as part of a larger macro process.

II. Adding and Deleting Images

The image application of some embodiments provides tools to add or delete images from a shared photo stream. When a participant of the photo stream adds images, the images may be published to all of the participant's devices as well as the devices of other participants. Similarly, when the participant deletes images, the images may be deleted from all of the participant's devices and the devices of the other participants. Several examples of adding and deleting images will now be described by reference to FIGS. **15-20**.

A. Adding an Image to a Photo Stream

FIG. **15** provides an illustrative example of adding an image to an existing photo stream. Five operational stages **1505-1525** of the owner's device are illustrated in this figure. In the first stage **1505**, the image display area **105** of the application displays thumbnail representations of images from the camera roll collection. Here, the owner selects (e.g., by performing a gesture such as tapping the owner's finger on) the third thumbnail image **1525**.

The second stage **1510** illustrates the image display area **105** after the owner has selected the thumbnail image **1525**. The selection results in the image display area **105** displaying

a full screen representation **1530** of the selected image. To share the image, the owner then selects the share button **345**. As shown in the third stage **1515**, the selection causes the pop-up menu **145** to appear. In some embodiments, the pop-up menu **145** appears with animation by sliding up from the bottom of the screen. The owner then selects the photo stream button **165** from the pop-up menu **145**.

As shown in the fourth stage **1520**, the selection of the photo stream button **165** causes the application to display the photo stream menu **220**. The photo stream menu **220** lists the existing photo stream **1535**. The menu **220** also lists an option **1540** to create a new photo stream. The top bar **210** is superimposed on the photo stream menu **220**. The top bar **210** includes a cancel button **1545** to return to the previous view (e.g., the full screen view illustrated in the second stage **1510**). The top bar **210** also includes a heading that states "Add to a Photo Stream". Alternatively, the heading may indicate that a photo stream should be chosen. When there is no existing photo stream, the application of some embodiments displays the photo stream options sheet **125** that is described above by reference to FIG. **1**. This allows the owner to skip the photo stream menu screen when creating a new photo stream.

In the fourth stage **1520**, the owner selects (e.g., by tapping the owner's finger on) the photo stream **1535** from the menu **220**. As shown in the fifth stage **1525**, the selection of the photo stream **1535** results in the display of the comment sheet **150**. The comment sheet **150** includes the field **155** for inputting a comment for the selected image. A thumbnail representation **1550** of the selected image is also shown on the comment sheet **150**. To add the image to the photo stream, the owner then selects the post button **136**.

In the example described above, the owner selects a single image **1525** from the image display area **105**. Alternatively, the owner can select multiple images from the image display area **105** (e.g., by selecting the edit button **118** in the thumbnail view). An example of selecting multiple images has been described above by reference to FIG. **1**.

When images are added to the photo stream, the subscriber may be notified of the additions. FIG. **16** provides an illustrative example of different markings (e.g., a banner notification, a badged icon) that are displayed on the subscriber's device. Two operational stages **1605** and **1610** of the subscriber's device are illustrated in FIG. **16**.

The first stage **1605** illustrates the different markings that are shown on the subscriber's device. This first stage **1605** occurs after the owner has added the image to the photo stream (e.g., as illustrated in FIG. **15**). Upon the owner adding the image, a banner **1615** is displayed on the subscriber's device. In this example, the banner **1615** is superimposed along the top edge of the operating system's desktop. In some embodiments, the banner **1615** rotates into view in a simulated 3D effect. The banner **1615** may float on top of the main display area for a predetermined period of time and then disappear (e.g., rotate out of view or fade away).

The banner **1615** includes a heading and a message. The heading identifies the photo stream, and the message states there is a new image from the owner. In some embodiments, the message states that the owner has added one new image to the photo stream. As shown, the photo stream is identified by its associated name, and the owner is identified by the owner's name.

In the example illustrated in the first stage **1605**, the banner **1615** includes a thumbnail representation **1620** of the new image added to the photo stream. In some embodiments, the application displays a thumbnail representation of one image (e.g., the first image **1625** in the new batch) regardless of the number of images added to the photo stream. Alternatively, the application of some embodiments displays multiple thumbnail images of the images added to the photo stream. In some embodiments, the thumbnail representation **1620** is only displayed upon the recipient accepting the invitation to the photo stream. Otherwise, the banner **1615** displays the icon of the image application in some embodiments.

As shown in the first stage **1605**, the subscriber is also notified through the icon **435** of the image application that there is an update in the photo stream. Specifically, the icon **435** is displayed with a marking or badge **830**. Here, the badge **830** at least partially overlaps the icon **435**. The badge includes a number that indicates that a photo stream has been updated. Hence, the number on the badge **830** does not represent the number of new images in the photo stream but represents the number of photo streams that are updated or new.

B. Deleting an Image from a Photo Stream

In the example described above, the owner adds a new image to a shared photo stream. FIG. **17** provides an illustrative example of deleting an image from the photo stream. Six operational stages **1705-1730** of the owner's device are illustrated in this figure. In the first stage **1705**, the application displays the photo stream menu **220**. The photo stream menu **220** lists the photo stream **1735**. To modify the photo stream, the owner selects (e.g., by performing a gesture such as tapping the owner's finger on) the photo stream **1735**.

As shown in the second stage **1710**, the selection of the photo stream **1735** results in the application displaying the image display area **105**. The image display area **105** displays thumbnail representations of images **1733**, **1736**, and **1738** in the photo stream. This is indicated by the top bar **210**, which displays the name of the selected photo stream. The owner then selects the second thumbnail image **1736** to display a full screen representation of the same image.

The third stage **1715** illustrates the image display area **105** after the owner has selected the thumbnail image **1736**. The selection results in the image display area displaying a full screen representation of the selected image. The selection also causes the application to display several contextual menu items. These menu items are displayed on the bottom bar **370**. In the example illustrated in the third stage **1715**, the bottom bar **370** includes the share button **345** for sharing the displayed image, the play button **350** for playing a slide show of the images in the photo stream, the stream button **355** for streaming the images in the photo stream to one or more other devices (e.g., a desktop computer, a laptop), the delete button **1740** for deleting the image from the photo stream, and a comment button **360** to leave a comment regarding the displayed image. In some embodiments, the delete function is only available to the user that created the photo stream. As such, the subscriber may not be able to access this button **1740** on the subscriber's device when viewing the photo stream. In other words, the button **1740** may not be displayed at all on the bottom bar **370**.

In the third stage **1715**, the owner selects the delete button **1740**. The selection of the delete button causes a pop-up menu **1745** to be displayed, as illustrated in the fourth stage **1720**. The pop-up menu **1745** includes (1) a confirmation button **1750** to confirm deleting the selected image from the photo stream and (2) a cancel button **1755** to cancel the delete operation (i.e., the delete operation initiated by selecting the delete button **1740**). As shown, the pop-up menu **1745** includes a warning message or a prompt stating that the image will be deleted from all of the owner's devices and the subscribers' devices.

In the fourth stage **1720**, the owner selects the delete button **1750** from the pop-up menu **1745**. The fifth stage **1725** illustrates the owner's device after deleting the selected image from the photo stream. As the second image **1736** has been deleted, the application displays a full screen representation of the next image **1738** in the photo stream. The owner then selects the back button **330** to return to the thumbnail view. As shown in the sixth stage **1730**, the image display area **105** displays only two thumbnail images **1733** and **1738** because the second image **1736** has been deleted from the photo stream.

In the previous example, the owner deletes an image from the owner's device. FIG. **18** provides an illustrative example of the photo stream on the subscriber's device after the owner deletes the image. Two operational stages **1805** and **1810** of the subscriber's device are illustrated in this figure.

As shown in the first stage **1805**, the subscriber's device displays the photo stream menu **220**. The subscriber might have selected the application's icon from the desktop and then navigated to the photo stream menu **220**. When one or more images are deleted from the photo stream, the subscriber may not be notified of this update. For instance, a banner notification may not be shown on the subscriber's device and/or a badge may not be shown on the application's icon.

In the first stage **1805**, the subscriber selects the photo stream **1815** from the photo stream menu **220**. The selection causes the application to display thumbnail representations of the images in the photo stream. As the second image **1736** has been deleted (e.g., by the owner), the image display area only displays representations of the remaining two images **1733** and **1738**.

C. Example Processes

Having described adding and deleting images from a shared photo stream, several example processes will now be described by reference to FIGS. **19** and **20**. FIG. **19** conceptually illustrates a process **1900** that some embodiments use to add or delete images from a photo stream. The process **1900**, in some embodiments, is performed by the image application (e.g., executing on the owner's device).

The process **1900** begins when it receives (at **1905**) input to modify a photo stream. The process **1900** then determines (at **1910**) whether a new batch of images has been added to the photo stream. If not, the process **1900** proceeds to **1935**, which is described below. If so, the process **1900** generates (**1915**) a message regarding the new batch of images. After generating the message, the process **1900** sends (at **1920**) the message to a control server. As mentioned above, the control server facilitates the sharing of content by managing control data associated with a shared photo stream. Examples of such control data include user data (e.g., a list of devices associated with a user) and photo stream data (e.g., a list of photo stream associated with the user, file location data). The control data may also include a subscriber list that lists individuals that can access a particular photo stream. The subscriber list may also specify whether a subscriber can add images to the photo stream, remove images, add subscribers to the photo stream, make comments, and/or remove subscribers from the photo stream.

As shown in FIG. **19**, the process **1900** receives (at **1925**) file location data from the control server. In some embodiments, the file location data includes one or more URLs to upload the images to a storage server (e.g., a third-party storage server). Once the file location data is received, the process **1900** sends (at **1930**) the images to the storage server using the file location data.

At **1935**, the process **1900** determines whether any images have been deleted from the photo stream. If not, the process **1900** proceeds to **1950**, which is described below. If so, the process **1900** generates (**1940**) a message regarding the deleted images. After generating the message, the process **1900** sends (at **1945**) the message to a control server. Based on the message, the control server may disassociate the images from the photo stream. For instance, the control server may remove references to those images from a photo stream list that lists all images associated with the photo stream.

When the modification is another type of modification, the process **1900** modifies (**1950**) the photo stream based on the input. Examples of such modifications include adding a new subscriber, deleting a current subscriber, deleting the photo stream, changing the photo stream's name, etc. Similar to adding and deleting images, the application of some embodiments generates and sends a message to the control server based on the modification. The control server then makes changes to the shared photo stream. For instance, the control server may remove a subscriber from a subscriber list that lists all individuals that are able to access the photo stream. Several examples of such modifications are described below in detail in Section III.

FIG. **20** conceptually illustrates a process **2000** that some embodiments perform when a participant adds images to or deletes images from a photo stream. The process **1900**, in some embodiments, is performed by the image application (e.g., executing on the subscriber's device). The process **2000** begins when it receives (at **2005**), from a control server, a message regarding an update to a photo stream.

After receiving the message, the process **2000** retrieves (at **2010**) a list of photo streams from the control server. Based on the list, the process **2000** then notifies (at **2015**) the subscriber of the update. In some embodiments, the process **2000** only notifies a participant of certain types of updates and ignores other updates. For instance, the process **2000** might display a notification if a new image has been added to the photo stream. On the other hand, if an image has been deleted, the process **2000** might not display any notifications. The application of some embodiment allows its user to specify what type of events (e.g., new comment, new image, new subscriber, etc.) triggers a notification.

As shown in FIG. **20**, the process **2000** determines (at **2020**) whether new images have been added to the photo stream. If not, the process **2000** proceeds to **2025**, which is described below. If so, the process **2000** retrieves (at **2035**) file location data from the control server. The process **2000** then retrieves (at **2040**) the images from a storage server based on the file location data. At **2025**, the process **2000** determines whether any images have been deleted from the photo stream. If so, the process **2000** deletes (at **2030**) the local copies of the images from the photo stream. Otherwise, the process **2000** ends.

Some embodiments perform variations on the processes **1900** and **2000**. The specific operations of each of these processes may not be performed in one continuous series of operations, and different specific operations may be performed in different embodiments. Furthermore, the processes **19** and **20** could be implemented using several sub-processes, or as part of a larger macro process.

III. Photo Stream Management

In the examples described above, a participant modifies a photo stream by adding and deleting images. The image application of some embodiments provides a variety of different tools that allow a participant to manage a photo stream. In some embodiment, the management entails (1) resending an invitation to a recipient who has not responded, (2) adding a new subscriber, (3) deleting a current subscriber, and/or (4)

deleting the photo stream. Several examples of these photo stream management features will now be described by reference to FIGS. **21-28**.

A. Resending an Invitation

FIG. **21** provides an illustrative example of resending a photo stream invitation to a recipient who has not accepted or declined the invitation. Specifically, this figure illustrates in five operational stages **2105-2125** how an owner can use the image application to resend the invitation. This figure includes the photo stream menu **220** that lists one or more photo streams. The figure also includes an edit menu **2130**.

The edit menu **2130** provides several different tools to modify a photo stream. As shown, the edit menu **2130** includes a name field **2135**, a subscriber section **2140**, a public website control **2145**, and a delete button **2150**. The name field **2135** is an area in the edit menu **2130** that displays the name of the photo stream. In some embodiments, the name field **2135** can be used to edit the name of the photo stream. For example, the owner can select the name field **2135** to display a virtual or onscreen keyboard. The owner can then use the virtual keyboard to modify the name of the photo stream. The delete button **2150** can be used to delete the selected photo stream.

The subscriber section **2140** displays a list of individual that have been invited to join the photo stream. Specifically, the section lists the name of each person along with a corresponding subscription status. In some embodiments, the different subscription statuses include pending (e.g., invited), declined, and accepted. The owner can select any person from the list to remove the person as a subscriber, or resend the invitation if the person has not accepted or declined the invitation. As shown in FIG. **21**, the subscriber section includes an add people control **2155**. The owner can select this control to invite other people to join the photo stream.

In some embodiment, the application provides tools to publish the photo stream's images to a website (e.g., a public website). That is, instead of pushing the images to each participant's device, the images can be displayed in a web browser by accessing the website. To facilitate web publication, the edit menu **2130** includes the public website control **2145**. The owner can select or toggle this control **2145** to publish the shared photo stream to the website. For example, the owner can select the control **2145** to turn on or off the public website feature. When turned on, the application of some embodiments displays the URL associated with the photo stream's website. Several examples of publishing images to the website will be described in detail below by reference to FIGS. **38-48**.

In conjunction with one or more of the menu items, or instead of them, the image sharing tools of some embodiments allows the owner to control user access to the photo stream. For example, the owner can control read and write access by specifying one or more individuals that can add images to and/or remove image from the photo stream. The image sharing tools of some embodiments allows the owner to control commenting (e.g., which subscriber can or cannot leave comments, etc.).

Having described the edit menu **2130**, the operations of resending a photos stream invitation will now be described by reference to the state of the application's GUI during the five stages **2105-2125** that are illustrated in FIG. **21**. In the first stage **2105**, the owner's device is displaying the photo stream menu **220**. The photo stream menu **220** includes a selectable item **2182** (e.g., a colored icon with a directional arrow) for the shared photo stream. This item **2182** can be selected to display the edit menu **2130** for the corresponding photo stream. Instead of the selectable item, the application of some embodiments includes an edit button **2160** for entering the photo stream editing mode.

In the first stage **2105**, the owner selects the selectable item **2182** associated with the "Family Photos" photo stream. As shown in the second stage **2110**, the selection of the selectable item **2182** causes the application to display the edit menu **2130**. The edit menu **2130** displays the name of the selected photo stream in the name field **2135**. The subscriber section **2140** includes a list of people that have been invited to the photo stream. The list includes "Derek Parker" and "Susan Parker". The subscriber section also displays the subscription status below the name of each individual. Specifically, the statuses indicate that Derek Parker has accepted the invitation, while Susan Parker's invitation status is pending (e.g., invited).

In the third stage **2115**, the owner selects (e.g., by tapping the owner's finger on) the recipient "Susan Parker" from the subscriber section **2140**. The selection causes the application to display the subscriber menu **2175**, as illustrated in the fourth stage **2120**. The subscriber menu **2175** is overlaid by the top bar **2180**. The top bar **2180** includes a back button **2185** to return to the previous view. The top bar **2180** also includes a heading that states the name of the subscriber.

The subscriber menu **2175** includes (1) an email field **2190**, (2) a resend invitation button **2195**, and (3) a remove subscriber button **2196**. The email field **2190** displays the email address of the recipient. The owner can also use this field to modify the email address of the recipient. The resend invitation button **2195** can be used to resend the invitation to the recipient. The remove subscriber button **2196** can be used to remove the recipient or subscriber from the photo stream.

As shown in the fourth stage **2120**, the owner selects the resend invitation button **2195** to resend the photo stream invitation. When the invitation is resent, the recipient's device may display one more notifications of the invitation. For example, the recipient's device may re-display a banner stating that the owner shared a photo stream with the recipient. Alternatively, or conjunctively with the banner, an email message may be sent to the recipient's device regarding the photo stream invitation. As mentioned above, the email may include a link that when selected adds the recipient as a subscriber to the photo stream.

B. Adding a Subscriber

In the example described above, an owner uses the image application to resend an invitation to a recipient. The image application of some embodiments allows the owner to add additional subscribers. FIG. **22** provides an illustrative example of sending an invitation to another recipient to join the shared photo stream. Three operational stages **2205-2215** of the owner's device are illustrated in this figure.

In the first stage **2205**, the application displays the photo stream edit menu **2130**. The menu includes the add people button **2155**. To add a subscriber, the owner selects (e.g., by tapping the owner's finger on) the add people button **2155**. The selection causes a virtual or on-screen overlay keyboard **140** to be displayed, as illustrated in the second stage **2210**. The owner then begins to input an email address of the subscriber. Based on the input, the application displays, in a suggestion field **535**, a contact from the owner's contacts list or address book. The name of the contact is shown with the contact's associated email address. The owner can selects the name from the list **535** to automatically fill in the subscriber field **130**.

The third stage **2215** illustrates the photo stream edit menu **2130** after the owner has specified another recipient to join the photo stream. The name of the recipient is listed in the sub-

scriber section **2140**. Specifically, the name is listed with the pending status (e.g., invited status), as the person has not yet accepted the photo stream invitation.

C. Removing a Subscriber

In the example described above, the owner uses the image application to invite a person to join the shared photo stream. The image application of some embodiments allows the owner to remove subscribers from the photo stream. This includes the recipients that have not yet responded to the photo stream invitation. FIG. **23** provides an illustrative example of removing a subscriber. Four operational stages **2305-2320** of the owner's device are illustrated in this figure.

In the first stage **2305**, the application displays the subscriber menu **2175**. As shown, the top bar **2180** includes the heading that states the name of the person that subscribed to the photo stream. The menu **2175** also includes the remove subscriber button **2196** for removing the subscriber. As the person has subscribed to the photo stream, the resend invitation button is not shown in the subscriber menu **2175**. To remove the subscriber, the owner selects the remove subscriber button **2196**.

The second stage **2310** illustrates the application after the owner has selected the remove subscriber button **2196**. Here, the application displays a pop-up window **2335** (e.g., an action sheet). The pop-up window states that the photo stream and its images will be removed from all of the subscriber's devices. Here, the owner selects a confirmation button **2330** to confirm removing the subscriber.

In the third stage **2315**, the application is awaiting confirmation of the removal from a server (e.g., the control server) that maintains the list of individuals (e.g., an access list) associated with the photo stream. The menu is overlaid by a prompt **2320** that indicates that the individual is being removed. The application also displays a spinner **2325** while awaiting confirmation of the removal. However, the application may display one or more other graphical symbols (e.g., an hourglass) or text to convey the same meaning.

The fourth stage **2320** illustrates the photo stream edit menu **2130** after the subscriber has been removed from the photo stream. As shown, the name of the subscriber is no longer listed in the subscriber section **2140**.

D. Deleting a Photo Stream

In some embodiments, the image application allows an owner to delete a photo stream. FIG. **24** provides an illustrative example of deleting a photo stream. Four operational stages **2405-2420** of the owner's device are illustrated in this figure.

In the first stage **2405**, the application displays the photo stream edit menu **2130**. The menu includes the delete button **2150** for deleting a photo stream. The owner has previously selected the photo stream from the photo stream menu (not shown). To delete the photo stream, the owner selects the delete button **2150**.

As shown in the second stage **2410**, the selection of the delete button **2150** results in the display of the pop-up window **2430**. The pop-up window **2430** includes a confirmation button **2435** to delete the photo stream and a cancel button **2440** to cancel the delete operation. The pop-up window **2430** also includes a message stating that the photo stream will be deleted from all the owner's devices and the subscribers' devices. The photo stream is identified by its name in the message. Here, the owner selects (e.g., by performing a gesture such as tapping the owner's finger on) the confirmation button **2435** to confirm deletion of the photo stream.

The third stage **2415** illustrates the owner's device after the owner has selected the confirmation button **2435**. The application displays a prompt **2450** stating that the photo stream is being deleted. The photo stream is also displayed with a spring wheel or spinner **2455** indicating that it is awaiting confirmation of the delete operation. In some embodiments, the confirmation is sent from the control server to the owner's device. The fourth stage **2420** illustrates the photo stream menu **220** after the photo stream has been deleted. As the "Family Photos" photo stream has been deleted, it is not listed in the photo stream menu **220**.

E. Unsubscribing

In several of the examples described above, the owner is allowed to modify a photo stream by resending an invitation to a recipient, adding a subscriber, removing a subscriber, and deleting the photo stream. In contrast to the owner, the application of some embodiments prevents subscribers from performing one or more of these operations. However, the application of some embodiments allows the subscriber to unsubscribe from the photo stream.

FIG. **25** provides an illustrative example of unsubscribing from a photo stream. Five operational stages **2505-2525** of the subscriber's device are illustrated in this figure. In the first stage **2505**, the image application displays the photo stream menu **220**. The photo stream menu **220** lists the "Family Photos" photo stream **2535**. To display the edit menu **2130**, the subscriber selects the selectable item **2182**.

As shown in the second stage **2510**, the selection results in the display of the edit menu **2530**. Different from the edit menu described above, this menu includes only the subscriber section and a unsubscribe button **2555**. That is, it does not include menu items to remove or add a subscriber, resend an invitation, rename a photo stream, etc. This is because the subscriber is not the owner of the photo stream. In this example, the subscriber can unsubscribe from the photo stream but has limited control over managing the photo stream. As mentioned above, the image sharing tools may allow an owner of the photo stream to specify access privileges. For example, the owner can specify whether the subscriber can add images to the photo stream, remove images, add subscribers to the photo stream, and/or remove subscribers from the photo stream.

In some embodiments, the name of the subscriber **2540** can be selected from the subscriber section **2140**. The selection results in the display of the subscriber menu (not shown). The subscriber menu may include an email field that displays the email address of the subscriber. In some embodiments, the application allows the subscriber to modify or update the email using this field. One example of such a subscriber menu has been described above by reference to FIG. **21**.

In the second stage **2515**, the subscriber selects (e.g., by performing a gesture such as tapping the subscriber's finger on) the unsubscribe button **2555**. As shown in the third stage **2515**, the selection results in the display of a pop-up window **2560**. The pop-up window **2560** includes a confirmation button **2565** to confirm unsubscribing from the photo stream and a cancel button **2570** to cancel the unsubscribe operation. The pop-up window **2560** also includes a message stating that the photo stream will be deleted from all of the subscribers' devices.

As shown in the third stage **2515**, the owner selects (e.g., by performing a gesture such as tapping the owner's finger on) the confirmation button **2565** to confirm unsubscribing from the photo stream. When the input is received, the application of some embodiments generates a message having information (e.g., a user ID such as an email address) to unsubscribe the subscriber. The message is then sent to the control server. After receiving the message, the control server may remove the user ID from an access list associated with the photo

stream. As mentioned above, the access list contains a list of authorized individuals that are able to access the photo stream.

The fourth stage **2520** illustrates the subscriber's device after the subscriber has selected the confirmation button **2560**. The application displays a prompt **2575** indicating that the photo stream is being removed. The photo stream is also displayed with a spring wheel or spinner **2580** indicating that it is awaiting confirmation of the unsubscribe operation. The fifth stage **2525** illustrates the photo stream menu **220** after the unsubscribe operation. As the subscriber has been unsubscribed from the photo stream, the "Family Photos" photo stream is removed from the photo stream menu **220**.

F. Parental Control

The image application of some embodiments provides tools to set restrictions or parental controls for one or more of its features. In some embodiments, the restrictions include preventing a user of a device from sending and receiving photo stream invitations. FIG. **26** provides an illustrative example of preventing the user from receiving photo stream invitations. Four operational stages **2605-2620** of the user's device are illustrated in this figure.

The first stage **2605** illustrates the device **400** displaying a desktop graphical user interface of its operating system. The operating system's desktop includes several selectable icons of different applications (e.g., image application, camera application). The desktop also displays an icon **2625** for the settings menu. To open the settings menu, the user selects the icon **2625** from the desktop.

The second stage **2610** illustrates the settings menu **2630** after the user has selected the icon **2625**. As shown, the settings menu **2630** displays "General" in the heading, under which different general settings relating to the operating system and/or the device are displayed. The user might have navigated to this section from a main settings menu (not shown). The general section includes a selectable item **2635** for setting restrictions or parental controls. To set restrictions, the user selects the item **2635** from the general section of the settings menu **2630**.

The third stage **2615** illustrates the user's device after the selection of the selectable item **2635**. The selection causes a passcode field **2640** and the virtual or on-screen keyboard **140** to appear. The passcode field **2640** is for restricting unwanted users (e.g., children) from making changes to device or application settings. The user then uses the keyboard **140** to type the passcode into the passcode field **2640**.

Once the correct passcode is entered, the settings menu **2630** displays the restriction section **2650** as illustrated in the fourth stage **2620**. The restriction section **2650** includes a list of restriction controls for different applications. To simply the discussion, only two restriction controls related to the image application area shown in the fourth stage **2620**. Specially, the restriction section **2650** includes a send invitation control **2655** (e.g., toggle switch) to turn on or off the send invitation feature. The restriction section **2650** also includes a receive invitation control **2660** to turn on or off the receive invitation feature. Each of these controls **2655** and **2660** is displayed with an icon that indicates that the control is associated with the image application. As shown in the fourth stage **2620**, the user selects the receive invitation control **2660** to prevent any user of the device from receiving photo stream invitations.

In the previous example, the user places restrictions on receiving photo stream invitations. Alternatively or conjunctively, the image sharing tools allow the user to freeze or lock a cloud service account in its current state. By locking the account, the user cannot create a new photo stream (e.g., with the user's device associated with the account) or become a subscriber to another photo stream. In some embodiments, the master account lock is provided in the restriction section **2650**. For example, instead of the controls **2655** and **2660**, the restriction section **2650** may include a "Don't Allow Changes" option for locking the account its current state or an "Allow Changes" option for unlocking the account.

In conjunction with the restriction controls or instead of it, the image application of some embodiments provides tools to specify whether a particular device can be used to create a shared photo stream and to subscribe to different shared photo stream. FIG. **27** provides an illustrative example of turning off such shared photo stream features. Two operational stages **2705** and **2710** of the user's device are illustrated in this figure.

In the first stage **2705**, the device is displaying a settings menu **2715** for managing cloud services associated with an account. Examples of such cloud services include cloud storage service, synchronizing data across user devices, etc. The settings menu **2715** includes an account tab **2720** that can be selected to view account information (e.g., account payment information, available storage space). The settings menu **2715** also includes a photo stream menu item **2725** for displaying a photo stream settings menu **2740**. The photo stream menu item **2725** is displayed with text that indicates that the personal photo stream and/or the shared photo stream is currently turned on.

The first stage **2715** illustrates the user selecting the photo stream menu item **2725**. As shown in the second stage **2710**, the selection causes the image application to display the photo stream menu **2740**. This menu includes a first control **2730** (e.g., a toggle switch) for turning on or off the personal photo stream feature (e.g., device to device syncing). The first control **2730** is displayed with text that indicates that, when the control is turn on, the new images (e.g., captured or imported images) will automatically be uploaded and sent to one or more other devices associated with the cloud service account.

In addition, the menu **2740** includes a second control **2735** (e.g., a toggle switch) for turning on or off the shared photo stream feature. The second control is displayed with text that indicates that, when the control has been turned on, the device can be used to create new photo streams to share with other people, or subscribe to other people's photo stream. In the example illustrated in the second stage **2710**, the user selects the second control **2735** to turn off the shared photo stream feature.

G. Managing Notifications

The image application of some embodiments provides different tools to manage notifications. These tools can be used to specify whether a banner is displayed, an alert is shown, and/or a sound is played (e.g., when a new comment has been received for a photo stream, when there is a new photo stream invitation, etc.). The application of some embodiments allows the user to granularly manage notification by implementing a whitelist feature. The whitelist feature allows the user to specify whether photo stream notifications are presented for everyone or presented for only those entities that are listed in the user's contact list.

FIG. **28** provides an illustrative example of turning on the whitelist feature. Two operational stages **2805** and **2805** of the user's device are illustrated in this figure. In the first stage **2805**, the device is displaying a notification section **2815**. The user might have navigated to this section from the main settings menu. In this section, the user can select an application to manage different notifications (e.g., banner, sound, badge, etc.). As shown, the image application is listed in the list of applications **2870**.

In the first stage **2805**, the user selects the image application from the list **2870**. The second stage **2810** illustrates the device after the selection of the image application from the notification section **2815**. The selection results in the display of the image application's notification menu **2820**. The menu includes multiple controls **2825-2865** for managing notifications. This menu **2820** includes a control **2835** to turn on or off a notification center and a control **2840** to specify the number of notifications to show in the notification center. In some embodiments, the notification center is a display area that lists different notifications.

As shown in the second stage **2810**, the menu **2820** includes selectable items **2845-2855** for turning on or off banner notification and alerts. The menu **2820** also includes a control **2860** to turn on or off badging icons (e.g., with a number), and a control **2865** to turn on or off playing sound. Lastly, the menu **2820** includes selectable items **2825** and **2830** for switching between receiving alerts from everyone or from only those in the user's contacts. In the second stage **2810**, the user selects the selectable item **2830** to display alerts for only those in the user's contact list.

IV. Commenting

In some embodiments, the image application provides tools to share comments regarding images in the photo stream. Several examples of sharing comments will now be described by reference to FIGS. **29-37**.

A. Exchanging Comments

FIG. **29** provides an illustrative example of leaving a comment regarding an image in a shared photo stream. Six operational stages **2905-2930** of the owner's device are illustrated in this figure. The first stage **2905** illustrates the image display area **105**, which includes thumbnail representations of images. As indicated by the heading **2935**, the thumbnails represent images associated with the photo stream (e.g., "Family Photos"). The owner might have first selected the name of the photo stream from the photo stream menu (not shown) to display these thumbnail images. To leave a comment for an image, the owner selects the corresponding thumbnail image **2940** from the image display area **105**.

As shown in the second stage **2910**, the selection causes the image display area **105** to display a full screen representation **2945** of the corresponding image. The selection also causes the top and bottom bars **210** and **370** to be modified. The top bar **210** includes a back button **330** to return to the thumbnail view. The top bar **210** also includes a heading that states that the displayed image **2945** is the second of two images in the photo stream. The top bar **210** may also include an edit button that when selected provides different editing tools to edit the displayed image. In some embodiments, the editing entails enhancing the image, removing red eye from the image, and/or cropping the image.

Different from the top bar **210**, the bottom bar **370** includes (1) a share button **345** for sharing the selected image, (2) a play button **350** for playing a slide show of the images in the photo stream, (3) a delete button **1740** for deleting the image from the photo stream, and (4) a comment button **360** for leaving comments regarding the displayed image. The bottom bar may also include a stream button (not shown) for streaming the images in the photo stream to one or more other devices (e.g., a desktop computer, a laptop). In the example illustrated in the second stage **2910**, each item in the bottom bar **370** is displayed with a corresponding icon. For example, the comment button **360** is displayed with a chat bubble icon **375**. The chat bubble icon **375** includes a plus sign (i.e., "+") that provides a visual indication that a comment can be added for the displayed image **325**.

As shown in the second stage **2910**, the owner selects the comment button **360**. The selection causes a virtual or on-screen overlay keyboard **140** to appear, as illustrated in the third stage **2915**. The owner then types in a comment regarding the image **2945** in a comment field **155**. The post button **2950** may also change its appearance when the owner types in a character in the comment field. Here, the owner types in a comment into the comment field and selects the post button **2950**. In some embodiments, the application provides a selectable item for deleting a comment. For example, the application may display a delete button next to a comment. The delete operation can only be performed by the person that left the comment, in some embodiments.

The fifth stage **2925** illustrates the image display area **105** after posting the comment. As shown, the comment is displayed over the image **2945**. The comment is also associated with metadata. The metadata is displayed below the comment, and identifies the person that left the comment and the time the comment was left. As shown in the fifth stage **2925**, the person who left the comment is identified as "Me". This is because the owner left the comment with his or her device. The comment is also displayed with an add comment field **365** that can be selected to add additional comments.

In the example illustrated in the fifth stage **2925**, the top and bottom bars **210** and **370** disappear upon selection of the post button **2950**. However, the chat bubble icon **375** remains in the same position. As shown, the "+" sign has been replaced with the number "1", and the color of the chat bubble icon has been changed from a first color (e.g., white) to a second different color (e.g., blue). The number identifies the number of comments associated with the image. The color of the icon indicates that the image application is in a comment displaying mode. Here, the owner can select the chat bubble icon to (1) hide the comment, (2) hide the add comment field **365**, and (1) return the chat bubble icon to its first color (e.g., white). In some embodiments, the number remains visible on the chat bubble icon (e.g., by changing color).

Upon posting, the comment is pushed to all devices of participants associated with the photo stream. FIG. **30** provides an illustrative example of how the comment appears on a subscriber's device. Six operational stages **3005-3030** of the subscriber's device are illustrated in this figure. In the first stage **3005**, the subscriber's device displays the desktop of its operating system. The desktop includes the icon **435** for opening the image application. In this example, the icon **435** does not display any marking indicating that there are one or more updates to the photo stream. For instance, the icon **435** is not overlaid by a badge with a number indicating that a photo stream has been updated. As will be described in detail by reference to FIG. **31**, the application of some embodiments displays a marking on the icon **435** when the subscriber has participated in the conversation (i.e., previously left a comment regarding the same image).

As shown in the first stage **3005**, the subscriber selects the icon **435** to open the image application. The second stage **3010** illustrates the application's photo stream menu **220**. The subscriber might have previously selected the photo stream tab **114** to display this menu. Different from the desktop icon **435**, the name of the photo stream is listed with a marking **3040**. The marking **3040** provides a visual indication to the subscriber that there is one or more updates to the photo stream. In the example illustrated in the second stage **3010**, the marking **3040** is a blue dot. However, different types of markings can be used to convey the same meaning. For instance, the icon **285** of the "Photo Stream" tab **114** can be badged with a number **280** that indicates that there is an update to a photo stream.

In the second stage **3010**, the subscriber selects the photo stream **3045** from the menu **220**. The selection causes the application to display the image display area **105**, as illustrated in the third stage **3015**. The image display area **105** includes thumbnail representations and of images in the photo stream **3045**. The application of some embodiments provides a visual indication that an image is associated with one or more comments. This is shown in the third stage **3015** because the second thumbnail image **3050** is displayed on the image display area **105** with a marking **3055**. In the example illustrated in the third stage **3015**, the marking **3055** is a chat bubble that is displayed at least partially over the image **3050**. The chat bubble is also colored (e.g., blue). The color provides a visual indication to the subscriber that there is an unread comment associated with the corresponding image.

As shown in the third stage **3015**, the subscriber selects the thumbnail image **3050**. The selection causes the image display area **105** to display a full screen representation **3060** of the corresponding image. The selection also causes the comment button **360** to appear along the bottom bar **370**. The comment button **360** contains a chat bubble icon **375**. The chat bubble icon **375** is colored white and includes a number "1". The number represents the number of comments associated with the image. To display the comment, the subscriber selects the comment button **360**.

The fifth stage **3025** illustrates the image display area **105** after the selection of the comment button **360**. As shown, the comment is displayed over the image **3060**. The comment is also associated with metadata. The metadata is displayed below the comment, and identifies the person who left the comment and the time when the comment was left. In the example illustrated in the fifth stage **3025**, the person who left the comment is identified as "Emily Parker".

In the fifth stage **3025**, the subscriber selects the comment field **365** to add another comment. The sixth stage **3030** illustrates the subscriber leaving another comment. Specifically, the comment is inputted into the comment field using the on-screen keyboard **140**.

In the example described above, the subscriber is notified of the update to the photo stream after opening the image application and navigating to the photo stream menu **220**. The application of some embodiments provides one or more different types of notifications to alert a participant that a new comment has been posted. In some embodiments, the owner is always notified of any new comments that have been posted. A subscriber may be notified when the subscriber has participated in the conversation. That is, the subscriber has left a comment regarding an image and another comment was left regarding that same image by another participant. In some embodiment, if a participant (e.g., subscriber, owner) shared an image, that participant is always notified of any new comments that have been posted regarding the same image.

FIG. **31** provides an illustrative example of how the image application notifies an owner of a new comment and presents the new comment on the owner's device. Five operational stages **3105-3125** of the owner's device are illustrated in this figure. In the first stage **3105**, the owner's device displays the desktop of its operating system. The desktop includes the icon **435** for opening the image application. As the device is associated with the owner, the image application displays a banner **3130** indicating that a new comment has been left for an image. Specifically, the banner **3130** is superimposed along the top edge of the operating system's desktop. In some embodiments, the banner **3130** rotates into view by simulating a 3D effect. The banner **3130** may float on top of the main display area for a predetermined period of time and then disappear (e.g., rotate out of view, fade away).

As shown in the first stage **3105**, the banner **3130** includes the comment and the name of the subscriber that left the comment. The banner **3130** also includes a thumbnail representation **3135** of the image associated with the comment. In some embodiments, the banner **3130** is a selectable item that when selected opens the image application. The image application may also open to display a full screen representation of the image with the comment.

In conjunction with the banner or instead of it, the image application may provide a different type of marking. One such type of marking is a badge that is displayed at least partially over the icon of the image application. This is shown in the first stage **3105** as the icon **435** is displayed with a badge **830** that is marked with a number "1". In this example, the number represents the number of photo streams that have one or more updates, and does not represent the number of new comments. However, the application of some embodiments may display such a marking to identify the number of new comments that have been received for a photo stream.

In the first stage **3105**, the owner selects the icon **435** to open the image application. The second stage **3110** illustrates the application's photo stream menu **220** after the application is opened. The owner might have previously selected the photo stream tab **3035** to display this menu **220**. The name of the photo stream **3140** is listed with a marking **3040**. The marking **3040** provides a visual indication to the subscriber that there is one or more updates to the photo stream **3140**.

In the second stage **3110**, the owner selects the photo stream **3140** from the menu **220**. The selection causes the application to display the image display area **105**, as illustrated in the third stage **3115**. The image display area **105** includes thumbnail representations of images in the photo stream. As mentioned above, the application of some embodiments provides a visual indication that an image is associated with one or more comments. This is shown in the third stage **3115** because the second thumbnail image **3050** is displayed on the image display area with a marking **3150**.

In the example illustrated in the third stage **3115**, the marking **3150** is a double chat bubble or speech bubble icon. Different from a single chat bubble, the double chat bubble indicates that the owner has participated in the conversation. That is, the owner has previously left a comment regarding the image and a new comment has been received. The double chat bubble is displayed at least partially over the thumbnail image **3050**. The double chat bubble is also colored (e.g., blue). The color provides a visual indication to the owner that there is an unread comment associated with the corresponding image. In some embodiments, the application does not differentiate whether a person participated in a conversation. For example, the application may display a same marking (e.g., the single chat bubble and not the double chat bubble) regardless of whether the person participated in the conversation.

As shown in the third stage **3115**, the owner selects the thumbnail image **3050**. The selection causes the image display area **105** to display a full screen representation **3060** of the corresponding image as illustrated in the fourth stage **3120**. As shown, the new comment is displayed over the image **3060**. The new comment is also associated with metadata that identifies the person who left the comment and the time when the comment was left. The comments are sequentially displayed in the image display area **105**. Specifically, the new comment is shown below the previous comment. The add comment field **365** is displayed below the previous comment.

The fifth stage **3125** illustrates the image display area **105** after navigating out of the full screen view (e.g., by selecting

a back button). The thumbnail view is identical to the one shown in the third stage **3115**. However, the double chat bubbles **3150** have been modified to indicate that there are no unread comments. Specifically, the color of the double chat bubble **3150** has been modified from one color (e.g., blue) to another color (e.g., white). One of ordinary skill in the art would understand that modifying the color is just one of many different ways in which the application can provide such visual indication. For instance, the double chat bubble **3150** can be removed from the thumbnail image **3050** to provide the same indication (e.g., no unread comments).

In the example described above, the different marking are displayed over images with comments. In some embodiments, the application follows a set of rules to display the different markings. For example, a first marking (e.g., a comment or chat bubble) that is colored a first color (e.g., blue) indicates that the image is associated with an unread comment and the participant has not left a comment for the same image. A first marking (e.g., a comment bubble) that is colored a second different color (e.g., white) indicates that all comments have been read and the participant did not leave any comments for the same image.

A second different marking (e.g., a double comment or chat bubble) that is colored the first color (e.g., blue) indicates the image associated with an unread comment and the participant has previously left a comment for that image. The second different marking (a double comment bubble) that is colored the second different color (e.g., white) indicates that all comments have been read and the participant previously left a comment for that same image.

B. Marking Images

In the examples described above, the owner and the subscriber exchange comments regarding an image. The image application of some embodiments allows a participant to mark an image. In some such embodiments, the marking provides a visual indication that the participant approves or likes the image. FIG. **32** provides an illustrative example of marking an image. Three operational stages **3205-3215** of the user's device are illustrated in this figure.

The first stage **3205** illustrates the image application displaying a full screen representation of an image **3220**. The image **3220** is associated with several comments and a mark **3225**. The mark **3225** includes an image or symbol. Here, the mark **3225** is a smiley face or happy face that provides an indication that one or more individuals listed adjacent to it approves or likes the displayed image **3220**. However, any number of different symbols (e.g., heart symbol) and/or images (e.g., flags, icons) can be used to provide the same indication. In the example illustrated in the first stage **3205**, the name of a subscriber is displayed next to the smiley face symbol **3225**.

The second stage **3210** illustrates the owner selecting the marking **3225** to indicate that he or she likes the marking. Specifically, the user selects the marking **3225** from the image display area **105**. The third stage **3215** illustrates the image display area **105** after the selection of the symbol **3225**. As shown, the selection results in the owner being added to the list of individuals adjacent to the symbol **3225**. Specifically, the owner's identification has been added next to the subscriber's name. In this example, the owner is identified as "Me".

In some embodiments, the application counts the association of the approval mark as one comment. That is, the number of likes is counted towards the number of comments. This is shown in the second and third stage **3210** and **3210** because the number of comments in the comment bubble **3235** is incremented by one (i.e., changes from three comments to four comments). The application of some embodiments allows a participant to remove the approval mark. For instance, the owner can reselect the marking **3225** to unlike the displayed image.

C. Displaying Comments

The previous two examples illustrated adding comments or markings to images. Several examples of displaying and scrolling comments will be described by reference to FIGS. **33-35**. FIG. **33** provides an illustrative example of how the image application of some embodiments displays an image with comments. Four operational stages **3305-3320** of the owner's device are illustrated in this figure.

The first stage **3305** illustrates the image application displaying a full screen representation of an image **3325** with comments. The full screen representation is overlaid by the top bar **210** and the bottom bar **370**. The top bar **210** includes the back button **330** and a heading. The heading indicates that the displayed image is the second of two images. Different from the top bar **210**, the bottom bar **370** includes (1) a share button **345** for sharing the displayed image, (2) a play button **350** for playing a slide show of the images in the photo stream, (3) a delete button **1740** for deleting the displayed image, and (4) a comment button **360** for leaving a comment regarding the displayed image. The bottom bar may also include a stream button (not shown) for streaming the images in the photo stream to one or more other devices (e.g., a desktop computer, a laptop).

In the first stage **3305**, the owner selects the full screen representation of the second image in the photo stream. As illustrated in the second stage **3310**, the selection causes the top and bottom bars to disappear (e.g., fade away). However, the comments remain overlaid on the full screen representation. In addition, the icon **3335** of the comments button **360** (e.g., the comment bubble) is displayed in the same location over the full screen representation. As shown in the second stage **3310**, the owner then selects a location **3340** on the full screen representation **3325** to zoom in on the image.

The third stage **3315** illustrates the image display area **105** after the selection of the location **3340** on the full screen representation. The selection results in the application zooming in on the displayed image towards the selected location. As shown, the icon **3335** of the comment button **360** (e.g., the comment bubble) remains in the same location with respect to the device's screen. However, the comments are not displayed in this zoomed view. To display the comments, the owner selects the icon **3335**.

The fourth stage **3320** illustrates the image display area **105** after the selection of the icon **3335**. The selection results in the application displaying the comments in the zoomed view. Alternative, the selection may result in the application displaying the full screen representation with the comment. For instance, the selection may cause the application to zoom out of the displayed image. The selection may also cause the comments to reappear over the full screen representation **3325**. Accordingly, upon selection of the icon **3335**, the application of some embodiments displays the full screen view that is illustrated in the second stage **3310**.

The previous example illustrated zooming in on an image with comments. In some embodiments, the comment toggle is persistent across other images. For example, when the comment mode has been activated, the application allows its user to scroll through images with comments. FIG. **34** provides an illustrative example of scrolling through different images with comments. Three operational stages **3405-3415** of the owner's device are illustrated in this figure.

The first stage **3405** illustrates the image application displaying the full screen representation **3420** of the image asso-

ciated with several comments. The comments and the comment icon **3335** appear over the full screen representation **3420**. The comment icon **3335** has been activated (e.g., changed from a first color to a second different color) to indicate that comments are being displayed. The top and bottom bars are not shown in this full screen view.

In the second stage **3410**, the user selects (e.g., swipes across) the screen to display the next image. This causes the application to display the next image **3425**. As shown in the third stage **3415**, the next image **3425** is also displayed with its associated comment. When the next image is not associated with any comments, the application of some embodiments only displays the add comment field **365** and the icon **3335** (e.g., with the plus sign instead of a number).

The previous example illustrated scrolling through different images with comments. FIG. **35** provides an illustrative example of scrolling through the comments associated with one image. Three operational stages **3505-3515** of the owner's device are illustrated in this figure. The first stage **3505** illustrates the image application displaying the full screen representation of the image with the comment. Specifically, there are six comments associated with the displayed image and five of those are shown in the image display area. The comments are also in a sorted order, starting with the oldest comment at or near the top and the newest one at the bottom. In some embodiments, the application displays the comments in opposite order, starting with the newest comment at the top and the oldest one at the bottom. The application of some embodiments presents the comment with shading. For example, the application may display the top of the comment list being white down to the bottom becoming grayer and grayer.

As shown in the first stage **3505**, there is limited amount of space to display different comments. Here, the image display area displays four comments and the add a comment field **365**. In the second stage **3510**, the user then scroll through the comments associated with the image by using a touch gesture (e.g., moving or dragging the user's finger up or down the device's screen). The gesture causes the application to display one older comment while removing the add comment field **365**. In the third stage **3510**, the user inputs the same gesture to display another comment. As shown, the input causes another comment comes into view while a newer comment scrolls out of the view. The input also causes a marking tool (e.g., the smiley face, the like icon) also comes into view.

D. Example Processes

Several example processes for exchanging comments will now be described by reference to FIGS. **36** and **37**. FIG. **36** conceptually illustrates a process **3600** that some embodiments use to post a new comment. The process **3600**, in some embodiments, is performed by the image application. The process **3600** begins when it receives (at **3605**) a user input to post a new comment for an image in a shared photo stream. As mentioned above, the user might have first inputted a comment into a comment field and then selected a post button.

After receiving the input, the process **3600** generates (at **3610**) a message regarding the new comment. The message may include the new comment. The message may also include one or more identifying information, such as (1) a user identification ("ID") that identifies a participant that left the new comment, (2) a photo stream ID that identifies the photos stream, (3) an image ID that identifies the image with the new comment, (4) comment ID that identifies the new comment, and (5) a timestamp that identifies the time and date the new comment was left.

The process **3600** then sends (at **3615**) the message to a control server. In some embodiments, the control server receives the message and stores the comment. Based on the message, the control server may also identify entities (e.g., owner, subscribers) associated with the photo stream. The control server may then send a message regarding an update to a photo stream to each device associated with the identified entities.

FIG. **37** conceptually illustrates a process **3700** that some embodiments use to display the new comment. The process, in some embodiments, is performed by the image application. The process begins when it receives (at **3705**), from a control server, a message regarding an update to the shared photo stream. After receiving the notification, the process **3700** retrieves (at **3710**) a list of photo streams from the control server. Based on the list, the process **3700** retrieves (at **3715**) the new comment from the control server.

At **3720**, the process **3700** notifies a participant (e.g., the device's user) of the new comment. As mentioned above, the application of some embodiments always notifies the owner when a new comment has been posted regarding an image in the shared photo stream. A subscriber may be notified when the subscriber has participated in the conversation. That is, the subscriber has left a comment regarding an image and another comment was left regarding that same image by another participant. In some embodiment, if a participant (e.g., subscriber, owner) shared an image, that participant is always notified of any new comments that have been posted regarding the same image.

In notifying the participant, the process **3700** may display one or more marking and/or cause the participant's device to play a sound or vibrate. For instance, a visual indication of the association of the comment may be shown with a banner and a badge over an icon. The visual indication may be presented at a thumbnail view (e.g., with a chat bubble near or at least partially over the thumbnail representation) and/or at a full-screen view (e.g., with a similar chat bubble near or at least partially over the thumbnail representation).

As shown in FIG. **37**, the process **3700** determines (at **3725**) whether there is an input to display the new comment. Many different examples of such an input are described above. For instance, the participant might select (e.g., tap the participant's finger on) a banner notification. Alternatively, the participant might select a comment tool (e.g., the chat bubble icon) to display the new comment. If there is an input to display the new comment, the process **3700** displays (at **3730**) the new comment with the associated image. Otherwise, the process **3700** ends.

Some embodiments perform variations on the processes **3600** and **3700**. The specific operations of each of these processes may not be performed in one continuous series of operations, and different specific operations may be performed in different embodiments. Furthermore, the processes **3600** and **3700** could be implemented using several sub-processes, or as part of a larger macro process.

V. Public Website

The image application of some embodiments allows a participant to publish the photo stream to a website. In some embodiments, the website is a public website that can be accessed by any browser with the correct uniform resource locator (URL) address. Several example of publishing a photo stream to a website will now be described by reference to FIGS. **38-48**.

A. Publishing a Photo Stream to a Website

FIG. **38** provides an illustrative example of publishing a shared photo stream to a website. Specifically, in three operational stages **3805-3815**, this figure illustrates how an owner

can publish the photo stream using the image application. This figure includes the edit photo stream menu **2130** that has been described above by reference to FIG. **21**.

The first stage **3805** illustrates the owner's device displaying the edit menu **2130**. To display the edit menu **2130**, the owner might have first selected a selectable item (e.g., a colored icon with a directional arrow) that is displayed with the name of the photo stream in the photo stream menu. As shown, the edit menu **2130** includes the public website control **2145**. The owner can select the control **2145** to turn on or off the public website feature. In the example illustrated in the first stage **3805**, the public website feature is turned off or disabled. To publish the photo stream, the owner selects (e.g., by performing a gesture such as tapping the owner's finger on) the control **2145**.

The second stage **3810** illustrates the image application after the selection of the control **2145**. The selection causes the application to send data to one or more servers to publish the photo stream to the website. For example, the application may generate one or more lower resolution images from a stored image (e.g., raw image) and send those images to a server. The application may exchange messages with a control server regarding publication. In the example illustrated in the second stage **3810**, the edit menu **2130** is overlaid by a spinner or spinning wheel **2325** (e.g., below the control in the edit menu). The spinner **2325** provides a visual indication that the application is awaiting confirmation of the publication.

The third stage **3815** illustrates the image application after the publication of the images associated with the photo stream. The publication of the photo stream results in the display of a share link control **3820**. In this example, the share link control **3820** is displayed below the public website control **2145**. The share link control **3820** can be selected to generate a message (e.g., an email) that contains a link to the URL to access the website. In some embodiments, the message can be sent to anyone, including those that are not subscribed to the photo stream. The selection of the share link button may cause the application to display different options (e.g., buttons with icons). Each of these options may allow the user to share the link differently, e.g., through an email message, text message, social network post, social network message, etc. As shown, the URL is also displayed on the edit menu **2130**. Here, the edit menu **2130** is overlaid by a message **3825** stating that the photo stream can also be viewed at the URL (e.g., http) address.

FIG. **39**A provides an illustrative example accessing the webpage with the subscriber's device. Three operational stages **3905-3915** of the subscriber's device are illustrated in this figure. The first stage **3905** illustrates the selection of an icon **925** of the email application. In the second stage **3910**, the email application displays the email sent from the owner's device. The email includes a message **935**, a link **940**, and a thumbnail image **930**. The message **935** states that the owner shared a photo stream with the recipient. The thumbnail image **930** shows the icon of the image application. The icon is shown with a marking or badge **945** indicating that there is a new photo stream or an update to an existing photo stream. The link **940** is a selectable item for the webpage that contains the images from the photo stream.

As shown in the second stage **3910**, the subscriber selects the link **940**. The selection causes a web browser to be opened, as illustrated in the third stage **3915**. The browser **3930** displays the webpage that includes the images from the photo stream. The webpage is overlaid by a top bar **3920**. The top bar **3920** states the title of the photo stream and the name of the owner. In addition to the top bar, the group of images includes its own heading **3925**. Specifically, the heading **3925** includes (1) the date and time the group of images was added to the photo stream, and (2) the number of photos in the group.

In the example illustrated in the third stage **3915**, the images are displayed in a grid format. Specifically, the images are displayed in a two by two grid with two images on each grid row. The images are displayed side by side with minimal or no spacing between them in either the horizontal or vertical direction. In some embodiments, the image layout is selected based on the number of images in a batch and the orientation of the images in the batch. Several examples of selecting a layout for the images will be described by reference to FIGS. **42-47**.

FIG. **39**B provides an example of an alternate email message that is received at the subscriber's device. This figure is identical to stage two **3910** of the previous figure. However, the link to the public website is a secondary link **3935**. The primary link **3940** being a link to join the photo stream, which is similar to the one described above by reference to FIG. **9**.

The previous example illustrated publishing images in the photo stream to a website. In some embodiments, the webpage containing the published images is updated each time a participant adds additional images to a shared photo stream. FIG. **40** provides an illustrative example of how the webpage is updated when a new image is added to the photo stream. Three operational stages **4005-4015** of the subscriber's device are illustrated in this figure.

In the first stage **4005**, the browser **3930** displays the webpage that includes the images from the photo stream. In this example, the webpage displays the batches in reverse chorological order, starting with the newest batch at the top and the previous batch below. The images in each batch are displayed in chronological order, starting from the oldest to the newest. Specifically, the images are sequentially displayed starting with top left image **4020** of the first row, which represents the oldest image, to the bottom right image **4025** of the second row, which represents the newest image.

As shown in the second stage **4010**, the user uses a touch gesture to scroll down the webpage to display a second batch of images. The third stage **4015** illustrates the webpage displaying a second batch of images that were added at a different time than the first batch. Here, the batch includes only one image. The heading **4020** indicates that the older batch contains one image and the time when the image was added, which is before the first batch of images.

FIG. **41** provides an example of scrolling through images in the photo stream. In the first stage **4105**, the subscriber selects an image **4140** from the webpage. As shown in the second stage **4110**, the selection causes the web browser to display a full-screen representation **4125** of the selected image. The full-screen representation may be displayed with one or more comments. In some embodiments, the full-screen representation **4125** is displayed only with the first associated comment **4120**. As shown, the comment **4120** appears as a caption that is displayed over the lower portion of the full-screen representation **4125**.

In the example illustrated in the second stage **4110**, the full-screen representation **4125** is displayed with a back button **4135** for returning to the previous view (i.e., the view illustrated in the first stage **4105**) and a slide show button **4130** for playing a slide show of the published images. In some embodiments, the full-screen representation **4125** is displayed with navigation buttons (not shown) that can be used to display a next or previous image.

In the second stage **4110**, the subscriber selects (e.g., swipes across the device's screen to display a previous image. The third stage **4115** illustrates the web browser **3930** after the selection. As shown, the browser displays a previous

image **4145** in the photo stream. In this example, the displayed image **4145** is the last image (e.g., the newest image) in another batch (e.g., the newest batch). In some embodiments, the selection to display a previous image may result in the browser displaying a full-screen representation of the first image (e.g., the oldest image) in the batch.

B. Webpage Layouts

In some embodiments, a web publishing server publishes images in a photo stream as one or more webpages to a website. The web publishing server of some embodiments selects a webpage layout based on the number of images in different batches and the orientation of those images. The webpage layout may display images in a particular order (e.g., starting with the oldest image and ending with the newest image, or vice versa). The webpage layout may display different batches in a particular order (e.g., starting with the oldest batch to the newest batch, or vice versa). Several example webpage layouts will now be described by reference to FIGS. **42-45**. In these examples, the boxes represent horizontal or landscape images. Each box is numbered, and the number represents the sequence of images, starting from the oldest image to the newest image.

FIG. **42** provides an illustrative example of webpage layouts for a batch that includes two images. Four different example layouts **4205-4220** are shown in this figure. The layout **4205** represents a layout for a batch that contains two portrait images, while layout **4210** represents one with two landscape images. When the batch includes a portrait image and a landscape image, the portrait image may occupy one square grid cell, while the width of the landscape image is matched with the width of the square grid cell. The layout **4215** represents a layout where the first image is a portrait image while the second image is a landscape image. Conversely, the layout **4220** represents a layout where the first image is a landscape image while the second image is a portrait image.

FIG. **43** provides an illustrative example of a webpage layout for a batch that includes three or four images. Specifically, the layout **4305** represents a batch with three images, where the first image is a portrait image, while the layout **4310** represents one where the first image is a landscape image. In these two layouts **4305** and **4310**, the remaining two images in batch are displayed as square images. Irrespective of the orientation of the images, the layout **4315** shows that all images are displayed as square images when there are four images in a batch.

FIG. **44** provides an illustrative example of a webpage layout for a batch that includes five images. In particular, the layout **4405** is for a five-image batch shows that the first four images are arranged in a two-by-two block and the fifth image is placed below the block. The fifth image is also four times the size of each of the first four images. In contrast, the five-image layout **4410** (e.g., the landscape layout) shows that first four images are arranged in a two-by-two block and the fifth image (i.e., the largest one) is placed thereafter (e.g., to the right). In some embodiments, the landscape layout used to display images on certain platforms (e.g., smart TV, digital media receivers). For example, an image application that operates on a digital media receiver may select this layout to display images in a batch.

FIG. **45** illustrates webpage layouts for a batch that includes more than six images. Specifically, the seven-image layout **4505** is the same as the six-image layouts, except a seventh image is arranged below the first six images. There are also three different layouts **4510-4520** for photo streams containing eight images. Specifically, the layout **4510** is for a batch where the seventh and eighth images are a mix of landscape and portrait images, the layout **4515** is for a batch where the seventh and eighth images are landscape images, and the layout **4520** is for a batch where the seventh and eighth images are portrait images. This figure also illustrates examples of nine-image layouts **4525-4535**, a ten-image layout **4540**, an eleven-image layout **4545**, and a twelve-image layout **4550**. Several of these layouts **4525-4550** follow a pattern by adding one or more of the layouts described above. Similar to the twelve-image layout **4550**, a layout may be added to another layout by inverting or flipping the order in relation to the different image sizes. This figure illustrates example portrait layouts. However, the groups of images can be arranged side-by-side for different landscape layouts for certain platforms (e.g., smart TV, digital media receivers).

C. Image Framing

In many of the examples described above, the images are displayed in square cells or blocks, regardless of whether they are landscape or portrait images. To account for the mismatch in the aspect ratio, the web publishing system of some embodiments performs a framing operation that fits the image's smaller dimension (i.e., width or height) on a square cell and displays the portion of the image that is within the grid cell. The framing operation may also entail centering or top aligning the image on the grid cell.

FIG. **46** provides several examples of how images are framed in a webpage layout. The figure includes two square cells **4605** and **4610**. The landscape image **4615** is placed on the cell **4605**. As shown, the height of the landscape image **4615** is matched with the height of the cell **4605**. The landscape image **4615** is then centered on the grid cell **4605**. The portion of the landscape image **4615** within the square cell **4605** is the displayed portion of the landscape image.

The portrait image **4620** is placed on the cell **4610**. As shown, the width of the portrait image **4620** is matched with the width of the cell **4610**. Different from the landscape image **4615**, the portrait image **4620** is not centered on the grid cell **4610**. Instead, the portrait image **4620** is top aligned on the cell.

In conjunction with the framing operation, or instead of it, an image may be cropped or different portions (e.g., the outer parts) of the image may be removed from the layout. FIG. **47** provides an illustrative example of how portrait and landscape images **4705** are presented in a batch layout (e.g., two-image layout, three-image layout, etc.). As shown, the layout crops the top portion of the landscape image **4705** after shifting the image up a particular amount (e.g., 10% of the image). That is, the top portion of the image and the lower portion of the image are not shown in the batch layout. In this example, the lower portion of the image is cutoff more than the top portion. Different from the landscape image, the center portion of the portrait image **4710** is cropped. Specifically, the portrait image **4710** is cropped such that the left and right outer portions are not shown in the batch layout.

D. Example Process for Publishing a Photo Stream to a Website

Having described several example batch layouts, an example process for publishing a photo stream will now be described. FIG. **48** conceptually illustrates a process **4800** that some embodiments use to publish images in a photo stream to a website. The process **4800**, in some embodiments, is performed at the server-side by a server computer (e.g., by the web publishing server). Alternatively, a client device may generate the web page and upload it to the web publishing server.

The process **4800** begins when it receives (at **4805**) a request to publish images. For instance, the process **4800** might receive a request to turn on the website from a client

device. The process **4800** then identifies (at **4810**) the number of images and the orientations of the images in a batch. Based on the identifications, the process **4800** specifies (at **4815**) a layout for the batch.

At **4820**, the process **4800** determines whether there are any other batches. If so, the process **4800** returns to **4810**, which is described above. Otherwise, the process **4800** generates (at **4825**) a webpage based each specified layout. When the batch has been previously published, the process **4800** might use a previously selected layout to generate the webpage. The process **4800** then publishes (at **4830**) the webpage to a website (e.g., to a web servers).

Some embodiments perform variations on the process **4800**. The specific operations may not be performed in one continuous series of operations, and different specific operations may be performed in different embodiments. For instance, the process **4800** might receive images from a client device in order to publish those images. In some embodiments, the process **4800** returns a Uniform Resource Locator ("URL") address for accessing the webpage to the client device. Furthermore, the process **4800** could be implemented using several sub-processes, or as part of a larger macro process.

In some embodiments, the batch layout operations described above may be performed at a client device to display the images. For instance, an image application that operates on a digital media receiver, smart TV, or a personal computer may perform the batch layout operation to generate a batch view of the images in the photo stream. Several examples presenting images on different clients are described below

VI. Tablet Example

In the examples described above, the image sharing tools are implemented as part of an image application. The image application executes on both the owner and subscriber's device to facilitate image sharing and commenting operations. In some embodiments, the image sharing tools are implemented across different devices (e.g., smart phone, tablet, laptop, desktop, digital media receiver, etc.) and/or different operating systems (e.g., Windows®, iOS, MAC OS X, etc.). These implementations allow the different platforms to inter-operate in order to share images and comments. An example implementation of the image sharing tools on a tablet device will now be described by reference to FIGS. **49-51**.

FIG. **49** provides an illustrative example of the image sharing tools on a tablet. The image sharing tools are provided as part of the image application described above. However, the tablet's user interface is different from the smart phone's user interface because the tablet has a larger screen than the smart phone. Four operational stages **4905-4920** of the owner's tablet are illustrated in this figure. This figure includes an image display area **4925**, a photo stream menu **4955**, a photo stream options sheet **4960**, and a comment sheet **4965**. These user interface items correspond to those items that are described above for the smart phone by reference to FIGS. **1** and **2**.

In the first stage **4905**, the image application displays images from a collection (e.g., an image library). Specifically, the application displays thumbnail representations of the images. Each thumbnail image is not displayed as a square image but is displayed in its corresponding aspect ratio (e.g., as a portrait image, a landscape image). Three images have been selected using the image display area **4925**. To share the selected images, the user has also selected the share button **4930**. The selection of the share button **4930** results in the display of a pop-up menu **4935**. Here, the pop-up menu **4935** appears below the share button **4930** and overlays a portion of the upper-left hand corner of the image display area **4925**. The pop-up menu **4935** includes (1) a photo stream button **4940** to create a new photo stream or add images to an existing photo stream, (2) an email button **4945** to email the selected images, and (3) a print button **4950** to print the selected images.

To create a new photo stream, the user selects (e.g., by tapping the user's finger on) the photo stream button **4940**. The second stage **4910** illustrates the owner's tablet after the selection of the photo stream button **4940**. The selection results in the display of the photo stream options sheet **4960**. In the tablet version, the photo stream options sheet **4960** covers only a portion of the image display area **4925**. Here, the options sheet **4960** is presented similar to a fill-in card with a field **4970** to input one or more subscribers for the photo stream, a field **4975** to input a name of the photo stream. The option sheet also includes a control **4980** to turn on or turn off the public website version of the photo stream.

In the second stage **4910**, the owner has specified a subscriber and a name for the photo stream. The third stage **4915** illustrates the image application after the owner has selected a next button **4985**. The selection caused the application to display the comment sheet **4965**. Similar to the options sheet **4960**, the comment sheet **4965** is presented similar to a fill-in card and covers only a center portion of the image. In some embodiments, the image application displays an animation when switching or transitioning from one display area to another display area. For example, the application may display the photo stream options sheet **4960** being flipped over to the comment sheet **4965**, similar to a two-sided card being flipped over.

The comment sheet includes a comment filed **4966** and a post button **4968**. The user can use the comment field **4966** to input a comment regarding an image (e.g., the first image) in the photo stream. The post button **4968** can be selected to publish the photo stream. Here, the user does not input any comment into the comment field **4966** and selects the post button **4968**.

The fourth stage **4920** illustrates the photo stream menu **4955** after the selection of the post button **4968**. As shown, the new photo stream **4956** is listed with its name. In addition, the new photo stream **4956** includes previews of one or more images in the photo stream. Here, the thumbnail representations of images in the photo stream are sequentially stacked on top of each other starting with the first image on top and the third image at the bottom. One of ordinary skill in the art would understand that the image preview could be presented differently. For example, the thumbnail images can be presented in a grid format instead of being stacked on top of each other.

FIG. **50** illustrates another example of the image sharing tools on a tablet. This figure is identical to the previous figure; however, the pop-up menu **4935** includes a grid of icons, instead of the text-based buttons. A similar grid of icons has been described above by reference to FIG. **1**.

The previous example illustrated creating a new photo stream using a tablet. FIG. **51** provides an illustrative example of how comments are presented on the tablet. Three operational stages **5105-5115** of the owner's tablet are illustrated in this figure.

The first stage **5105** illustrates the image application displaying thumbnail representations of images in the photo stream. The thumbnail images **5120-5125** are also marked with markings. These markings indicate that there are comments associated with the corresponding images. In the example illustrated in the first stage **5105**, the thumbnail image **5120** is marked with a single chat bubble and the

thumbnail image **5125** is marked with a double chat bubble. The single chat bubble indicates that the owner has not participated in the conversation (e.g., left a comment regarding the image). The double chat bubble indicates that the owner has previously left a comment regarding the corresponding image. The color of these markings (e.g., blue markings) indicates that there are new or unread comments.

In the first stage **5105**, the owner selects (e.g., by tapping the owner's finger on) the thumbnail representation **5125** of the image. The selection causes the image application to generate a display of a full screen representation **5130** of the image. The image display area **4925** is overlaid by a semi-transparent bottom bar **5135**. The thumbnail representations of images in the photo stream are sequentially displayed along the bottom bar **5135**. The owner can select any one of these images to display the corresponding full screen representation in the image display area **4925**.

As shown in the second stage **5110**, the selection of the thumbnail image **5125** results in the display of a comment bubble **5140**. The comment bubble **5140** includes a number (e.g., "2") that represents the number of comments associated with the image. The comment bubble **5140** is also colored (e.g., colored white) to indicate that the comment mode has not been activated.

In the second stage **5110**, the owner selects the comment bubble **5140** to activate the comment mode. Selection of the comment bubble **5140** causes it to change colors (e.g., turn blue), which in turn provides the owner with a visual indication that the comment mode has been activated. The selection of the comment bubble also results in the display of the comments **5150** associated with the image.

As shown in the third stage **5115**, the comments **5150** are displayed sequentially with the oldest one on top and the newest one at the bottom. The comments **5150** are also associated with metadata. The metadata is displayed below each comment, and identifies the person who left the comment and the time when the comment was left. The comments **5150** are also displayed with an add comment field **5155** that can be selected to add additional comments. In some embodiments, the application displays a marking (e.g., a like button, smiley face icon) that can be selected to specify that the participant likes the displayed image. Several examples of such a marking have been described above by reference to FIG. **32**.

VII. Digital Media Receiver

In some embodiments, the image sharing tools are provided as part of an image application that executes on a digital media receiver (e.g., high-definition ("HD") media streaming device) or smart television ("TV"). Several examples of such an image application that executes on a digital media receiver will now be described by reference to FIGS. **52-55**. In these examples, the digital media receiver is controlled by a remote control. The remote control may include a set of navigation buttons (e.g., up, down, left, right buttons) and a selection button. The remote control may also include other controls such as a menu button to return to a preview view (e.g., previous menu).

FIG. **52** provides an illustrative example of opening a shared photo stream with a digital media receiver. Specifically, this figure illustrates in three operational stages **5205-5215** how the image application presents the photo stream on a wide screen television ("TV"). As shown, the figure includes an operating system desktop **5220** (hereinafter a grid view), a photo stream menu **5225** (hereinafter an album list), and an image display area **5230** (hereinafter a batch view).

The grid view **5220** displays different application icons in a grid formation. The user can select any one of the icons to open a corresponding application. To simplify the discussion, the grid view **5220** includes only two icons, namely a photo stream icon for opening the image application and a TV show icon for opening a TV show streaming application. However, the grid view **5220** can include other icons for other applications (e.g., movie streaming application, music streaming application, etc.). The grid view may also include a settings icon for opening a settings menu.

Similar to the photo stream menu **220** described above, the album list **5225** displays a list of photo streams. Here, each photo stream is listed with its name, a thumbnail representation of an image (e.g., a first image) in the photo stream, and a number that identifies the number of images in the photo stream). The photo stream menu includes a preview display area **5235** that displays one or more images from a photo stream selected from the list.

In the example illustrated in FIG. **52**, the photo stream list **5225** is organized into four different sections. Here, the top section lists a personal photo stream that represents a group of images shared only across the user's devices. The remaining sections include (1) a shared albums section (e.g., "my shared albums") listing the name of each photo stream shared by the user, (2) an invitation section listing the name of each pending invitation for a photo stream from another user, and (3) a shared by others section listing the name of each photo stream shared by another user. One of ordinary skill in the art would understand that this is just one example organization scheme and that the application may organize the different types of photo streams differently in different embodiments. For example, the four sections can be organized into two sections with the personal photo stream in one section and the remaining photo streams in another section.

In some embodiments, the image application lists different shared photo streams in chronological or reverse chronological order by publication dates of the shared photo streams (e.g., the time and date the shared photo stream was created). Alternatively, the image application of some embodiments uses a different ordering to list the photo streams. For instance, the application may group all shared photo stream invitations at top or upper section of the photos stream menu list and sort them alphabetically. The application may also alphabetically sort all remaining photo streams and group them underneath the invitations. The alphabetical sorting is useful in that it allows the application's user to quickly find a shared photo stream when there are several different shared photo streams. For example, when there are many shared photo streams that were published at different dates, this sorting allows the user quickly search for a particular shared photo stream by its name. In some embodiments, the application provides user interface items to change the sorting of the shared photo streams and/or search for a particular photo stream.

Returning to FIG. **52**, the batch view **5230** displays one or more images in a selected photo stream. When the photo stream includes sets of images that were added at different time, the batch view **5230** presents the images in different groups or batches. Each group of images may be sequentially ordered (e.g., in chronological order starting with the oldest image on the top left corner to the newest image on the bottom right corner). In addition, all groups may be sequentially ordered (e.g., in reverse chronological order starting with the newest group and ending with the oldest group).

As shown, the batch view **5230** is overlaid by a top bar **5240** that includes a new comments button **5250**, a slide show button **5255**, a settings button **5260**, and an unsubscribe button **5265**. The new comments button **5250** can be selected to display only images with new comments. An example of displaying only images with new comments will be described

below by reference to FIG. **54**. The slide show button **5255** can be selected to play a slide show of the images in the photo stream. The slide show may start with a first selected (e.g., highlighted) image in the batch view **5230**. In some embodiments, one or more music clips may be selected or streamed to accompany the slide show presentation.

The settings tool **5260** can be selected to modify different photo stream setting. In some embodiments, the settings are contextual so they relate directly to the displayed photo stream. For example, the settings for a personal photo stream may differ from the settings for a photo stream shared with others. The unsubscribe button **5265** can be used to unsubscribe from a photo stream. In some embodiments, the button **5265** may only appear in the top bar **5240** when a subscribed photo stream is selected from the album list **5225**. The selection of this button **5265** may also display a prompt requiring confirmation of the unsubscribe operation. One reason for the displaying the prompt is that the images in the subscribed photo stream may be deleted from all devices associated with the subscriber.

Having described several user interface elements, the operations of opening a photo stream will be described by reference to three stages **5205-5215** that are illustrated in FIG. **52**. The first stage **5205** illustrates the grid view **5220** of the device's operating system. The grid view **5220** includes the photo stream icon and the TV show icon. In some embodiments, the icon for the image application displays a marking when one or more photo streams have been updated. In the example illustrated in the first stage **5205**, the marking is badge **5270** that is displayed partially over the photo stream icon. The badge **5270** includes a number "2" that indicates the number of new invitations and/or the number of photo streams that have been updated. The badge **5270** is removed from the icon when the image application is opened (e.g., to the album list **5225**).

In the first stage **5205**, the photo stream icon is selected (e.g., with the device's remote). The user then selects the application (e.g., by selecting the select or enter button on the remote). The second stage **5210** illustrates the image application after the selection of the photo stream icon. The selection results in the display of the album list **5225**. The album list **5225** lists different photo streams. Specifically, it lists the user's personal photo stream, a "Vacation" photo stream that is shared by the user, and a "Family Photos" photo stream that is shared by another user. The list **5225** also includes an invitation to a "Kids" photo stream. The user can select the "Kids" photo stream to accept or decline the invitation. The "Kids" photo stream is moved to the "Shared by Others" section when the invitation is accepted, and it is removed from the album list **5225** when the invitation is declined.

Similar to the marked icon, several of the photo streams listed in the album list **5225** are marked with a marking **5275**. This inner marking represents a second level of marking, the first level being at the icon level. As shown, the "Kids" photo stream is marked because it is a new photo stream invitation, and the "Family Photos" photo stream is marked because it has been updated (e.g., includes new images and/or comments). Here, the marking **5275** is a colored circle or dot (e.g., blue circle). In some embodiments, the number of circles corresponds to the number shown on the photo stream icon's badge **5270**. A marking may be removed from the list once the corresponding photo stream has been opened.

As shown in the second stage **5210**, the album list **5225** has been navigated (e.g., by selecting the down button on the remote) to the "Family Photos" photo stream. The user then selects the "Family Photos" photo stream (e.g., by selecting the select or enter button on the remote). The selection results in the display of the batch view **5230**, as illustrated in the third stage **5215**.

The third stage **5215** illustrates the application displaying the batch view **5230**. The batch view **5230** is overlaid by the top bar **5240** with the new comments button **5250**, the slide show button **5255**, the settings button **5260**, and the unsubscribe button **5265**. The top bar **5240** also includes the name of the photo stream, the name of the owner of the photo stream, and a number (e.g., in parentheses) that identifies the number of images in the photo stream.

As shown in the third stage **5215**, two groups of images are displayed in the batch view **5230**. The first group includes six images and the second group includes four images. The owner of the photo stream has added these groups of images to the photo stream at different times. Each group includes a bottom field (**5280** or **5285**) that states the date and time the corresponding group of images were added, and the number of images in the group. In some embodiments, the application uses relative dating to display the date and time information. For example, if the date is within the week, the application may display "Today", "Yesterday", "Monday", "Tuesday", etc. However, if the date is not within the week, the application may display the day and the month of the date. If the date is not within the year, the application may display the year in some embodiments.

In the example illustrated in the third stage **5215**, several of the images are associated with comments. Specifically, three images are associated with comments. This is indicated by a marking that is displayed over each of the three corresponding thumbnail representations **5232-5234**. Here, the marking is a comment bubble. The comment bubble is colored a first color (e.g., white) for the thumbnail image **5232** and a second different color (e.g., blue) for the thumbnail images **5233** and **5234**. The first color provides a visual indication to the user that the first image in the first group is associated with viewed comments, and the first and second images in the second group is associated with one or more unread comments. The number of images associated with new comments is also indicated by the new comments button **5250** that includes a number (e.g., in parentheses).

The previous example illustrated opening a photo stream using the digital media receiver. FIG. **53** provides an illustrative example of navigating images in the photo stream. Three operational stages **5105-5115** of the image application are shown in this figure.

The first stage **5305** illustrates the image application displaying the batch view **5230**. The user has navigated to the first image **5320** (e.g., by using the remote's directional buttons). The user then selects the first image **5320** (e.g., by selecting the remote's select or enter button). The selection causes the display of the full screen representation **5325** of the selected image, as illustrated in the second stage **5310**. Here, the full screen representation is displayed with a marking **5330**. The marking **5330** is a comment bubble with a number. This number corresponds to the number of comments associated with the image.

The user can navigate through the images in the photo stream in this full screen view. In some embodiments, the full-screen view displays images (e.g., across batches) in chronological order starting with the oldest image and ending with the newest images. The batches may also be sorted in reverse chronological order, starting with the newest batch and ending with the oldest batch. Alliteratively, the batches may be sorted in chronological order, starting with the earliest batch and ending with the latest batch. In addition, the images

may be ordered in reverse chronological order starting with the latest image and ending with the earliest image.

In the second stage **5310**, the user makes another selection (e.g., by selecting the select button or down button on the remote). The selection causes the application to display a carousel view **5335**, as illustrated in the third stage **5315**. The carousel view **5335** displays several images of the photo stream across a screen. The images are displayed at different sizes that emulate a three-dimensional carousel of images. That is, the center image is the largest one while other images are progressively smaller. At any time, the user can change the center image by selecting a next or previous image (e.g., by selecting the next button on the remote).

In some embodiments, the carousel view **5335** displays each image in a group along the virtual carousel in chronological order (i.e., from the newest to the oldest). Similar to the full screen view, the carousel view shows all images (e.g., across batches) in chronological order, starting with the oldest image on the left to the newest image on the right. The batches may also be sorted in reverse chronological order, starting with the newest batch and ending with the oldest batch. This is illustrated in the first stage **5305** as the first image **5320** in the batch view **5230** is not the first image along the virtual carousel or in the list of images as it is the oldest image amongst the first group of images. Accordingly, five other images are in the list prior to the first image **5320**. Only two of the five images are shown in the third stage **5315**. Similarly, the list of images includes different groups of images in chronological order. This is also shown in the third stage **5315** as the last image (e.g., the image with the earliest timestamp) from the second group (e.g., the earlier batch) is displayed adjacent to the first image **5320** in the first group. In some embodiments, the batches are sorted in chronological order, starting with the earliest batch and ending with the latest batch. In addition, the images may be ordered in reverse chronological order starting with the latest image and ending with the earliest image.

As shown in the third stage **5315**, the comment **5340** is displayed below the image **5320**. The comment's metadata is also shown in the carousel view **5335**. Specifically, the name of the person who left the comment and the time when the person left the comment are displayed below the comment **5340**. A chat bubble **5360** with the number of comments is also shown above the comment **5340**. In addition, an icon **5350** is displayed next to the chat bubble **5360**. The user can select this icon **5350** to indicate that the user likes or approves of the image **5320**. In some embodiments, the approval rating is counted similar to a comment in that the number of comments increases (e.g., in the chat bubble **5360**).

In conjunction with the selectable icon, or instead of it, the application of some embodiments allows the user to add and/or delete comments. The comment may be selected for different actions or operations, such as replying to a comment, deleting the comment, etc. For example, a participant of the shared photo stream can navigate to the comment with the remote's navigational buttons and then press the select button. Upon selection of the comment, the application may display a list of different operations that can be performed.

In some embodiments, the image application allows the user to view only images that are associated with one or more new comments. FIG. **54** provides an illustrative example of filtering a display to only display images with one or more new comments. Three operational stages **5405-5415** of the application are shown in this figure.

The first stage **5405** illustrates the image application displaying the batch view **5230**. The user has navigated to the new comments button **5250** (e.g., by using the remote's directional arrows). The new comments button **5250** is labeled with a number two indicating that two images are associated with unread comments. The user then selects the button **5250** (e.g., by selecting the remote's select or enter button).

The second stage **5410** illustrates the image application's user interface after the selection of the new comments button **5250**. The selection causes the application to display the carousel view **5335**. Different from the carousel view described above, the carousel view **5335** in this figure includes only images **5420** and **5425** associated with unread comments. Here, the image **5420** is the center image. The one comment that is associated with the image is displayed below the image **5420**. To view the next image with one or more unread comments, the user then navigates to the next image **5425** (e.g., by selecting the remote's next button).

Third stage **5415** illustrates the carousel view **5335** after navigating to the image **5425**. As shown, the image **5425** is associated with five comments and one approval rating. The number of comments and/or approval ratings is indicated by the number that is shown on the comment bubble **5430**. In this example, only four single-lined comments are shown below the image **5425**. The other remaining comment is not shown. Different embodiments may display more or less lines of comments.

In some embodiments, the carousel view **5335** presents comments associated with an image by automatically scrolling through them. The application of some embodiments automatically scrolls through unread comments starting from the newest to the oldest unread comment and then stops. The comments can also be scrolled with the remote's navigational buttons, in some embodiments. For example, the user can scroll up the comments by selecting the up (e.g., top) button and scroll down by selecting the down (e.g., bottom) button.

Several examples of the image application of some embodiments are described above. FIG. **55** illustrates an example of another image application for a digital media receiver or smart TV. The image application is an alternate embodiment that implements the image sharing tools. Different from the examples described above, this application includes three controls along a top bar **5540**: a new comments button **5525**, a slide show button **5530**, and a more button **5535**. The new comments **5525** button is the same as the one described above by reference to FIG. **54**.

In the example illustrated in FIG. **55**, the selection of the slide show button **5530** causes the application to display several selectable items relating to the slide show presentation. Specifically, the application provides a selectable item (e.g., a play button) for starting a slide show using the images in the shared photo stream. The selection of the slide show button **5530** also causes the application to display a set of slide show configuration tools for configuring the slide show presentation (e.g., to add a music track to the presentation, to specify how the images are presented, etc.). When the more button **5535** is selected, the application of some embodiments provides different management commands. For example, the application may provide a selectable item for unsubscribing from the displayed photo stream. The application may also provide a selectable item for using the images in the shared photo stream as a screen saver. Several other management commands are described above by reference to FIG. **21**.

Three operational stages **5510**, **5515**, and **5520** of the image application are illustrated in FIG. **55**. These stages are similar to the ones shown in FIG. **52**. Specifically, the images are grouped into two different batches **5545** and **5550**. In some embodiments, each batch is a publishing of a group of one or more images to a shared photo stream. The primary sort order is reverse chronological order by batch, and the

secondary sort order is chronological by image. That is, the batch **5545** on the left-hand side is the newest batch, and the batch **5550** on the right-hand side is the older batch. The images (**5501-5504** or **5505-5508**) in each batch are sorted starting with the oldest image on the top left and the newest image on the bottom right.

Different from several examples described above, the application of some embodiments linearizes the photo stream's images by taking the batch order and flattening into a straight set. This is shown in the third stage **5520** because the first four images **5501-5504** in the carousel view **5555** represent the first four images from the first batch **5545**. The fifth image in the carousel view **5555** is the first image from second batch **5550**. The user can view the remaining three images **5506-5508** in their batch order by using the remote control to scroll though the carousel view. Although this linearization does not sort the images in a proper chronological order, it allows the user to view the images in an order that was shown in the batch view. Instead of flattening the images into a straight set, the application may present the images in a number of different ways. For instance, the application may display the images from different batches in chronological order starting with the oldest image to the newest image without regard to the batch sorting. In some embodiments, the application provides selectable items to switch from one type of sorting (e.g., the sorting illustrated in the third stage **5520**) to another type of sorting (e.g., chronological or reverse chronological sorting).

VIII. Personal Computer

The image sharing tools of some embodiments are integrated into a main graphical user interface or shell of an operating system ("OS"). That is, the image sharing tools are not part of an image application but are part of the main graphical user interface ("GUI"). Several example of such image sharing tools will now be described by reference to FIGS. **56-61**. In these examples, the operating system is a Windows operating system that is extended to support image-sharing operations. However, other types of operating systems (e.g., Linux, Mac OS X) can be extended to support the same or similar features.

A. Control Panel

In some embodiments, the image sharing tools are integrated into an OS upon executing an installer program. FIG. **56** provides an illustrative example of installing and configuring the image sharing tools. Four operational stages **5605-5620** of the owner's personal computer (PC) are illustrated in this figure.

The first stage **5605** illustrates the OS's desktop. The owner has selected the installation program (e.g., executable file) to display an installation window **5690**. The owner might have first downloaded the installation program using a web browser (not shown) or obtained it from a storage device (e.g., hard disk, flash driver, etc.). As shown, the installation window **5690** includes a heading indicating that it is installing a control panel item for configuring the image sharing tools. In addition to the heading, the installation window includes a message that the control panel item will be installed on the PC. The control panel is a part of the OS's GUI that allows users to configure different software and hardware settings. In the first stage **5605**, the user selects (e.g., with a cursor click operation) a next button **5625**. Alternatively, the user can select a cancel button **5630** to cancel the installation of the image sharing tools.

The second stage **5610** illustrates the OS's desktop after installing the control panel item. Specifically, the control panel item has been opened to display a login window **5635**. The owner has typed in a username (e.g., an email address) and password into a username field and a password field, respectively. The user might have first created an account with a cloud service provider in order to register the username and password. The user then selects a sign-in button **5640** to sign in with the cloud service provider. As will be described in detail below, the cloud service provider of some embodiments facilitates the image sharing operations between different user devices.

The selection of the sign-in button **5640** results in the display of a cloud service control panel window **5650** (herein after a settings menu), as illustrated in the third stage **5615**. The settings menu **5650** includes several selectable items (e.g., check boxes) for synchronizing bookmarks across user devices. The settings menu **5650** may also include selectable items for syncing calendars and other data.

In the example illustrated in the third stage **5615**, the settings menu **5650** includes a selectable item **5655** for selecting a photo stream and a button **5685** for setting photo stream options. The user can select (e.g., through a cursor click operation) this item to turn on or off the image streaming features. When selected, the owner's PC may be registered with the cloud service provider to share images with other devices associated with the owner and/or different users. In addition, the selection of this item **5655** may cause the image sharing tools to be integrated in the OS's shell.

In the third stage **5615**, the owner selects the button **5685**. As shown in the fourth stage **5620**, the selection results in the display of a photo stream options window **5665**. This window list a first selectable item **5670** for turning on or off the owner's personal photo stream, and a second selectable item **5675** for turning on or off shared photo streams. That is, the window **5665** includes separate controls for activating a personal photo stream that is shared across only the user's device, and for activating a shared photo stream that is shared with other users. The window **5665** also includes a control **5680** to specify the location of the photo stream folder (e.g., that contain folders for the personal and shared photo streams). The window **5664** may also include one or more controls for blocking or allowing notifications (e.g., photo stream invitations, comment notifications, new image notifications) from people that are not in the user's address book or contact list. In some embodiments, the window **5665** include other options to turn on or off sending or receiving photos stream invitations, showing notifications in a notification area (e.g., a system tray on a taskbar), receiving invitations from only those in the owner's contact list, etc.

B. Creating a New Photo Stream

The previous example illustrates installing and configuring image sharing tools on the owner's PC. Once configured, the image sharing tools allow a user to create and modify a photo stream and share comments with other users (e.g., regarding images). An example of creating a photo stream will now be described by reference to FIGS. **57-58**. Specifically, FIG. **57** illustrates an example of specifying a subscriber and a name for the photo stream. This is followed by FIG. **58**, which illustrates selecting images for the photo stream and inputting comments for several of the images.

Four operational stages **5705-5720** of the OS are illustrated in FIG. **57**. As shown, the OS is displaying a browser or explorer window **5725**. The image-sharing tool has been integrated into the browser window **5725**. Specifically, the browser's menu bar **5730** includes a new photo stream menu item **5735** for creating a new photo stream, add photos menu item **5740** for adding images to an existing photo stream, and an options menu item **5745** for specifying options for the photo stream. In some embodiments, the selection of the add photo menu item **5740** causes the browser **5725** to display a list of

available photo streams to add one or more selected images. In some embodiments, the selection of the options menu item **5745** causes the OS to display different options for adding a new subscriber, deleting a subscriber, resending a photo stream invitation, and/or turning on or off web publication for the photo stream. The displayed options may also include an option for unsubscribing from a photo stream. This unsubscribe option may only be selected or displayed when the photo stream (e.g., the photo stream displayed in the browser **5725**) is one that was subscribed to by the PC's user.

In addition to the new menu items, the browser's hierarchical or tree view includes a photo stream item **5750** (hereinafter a photo stream folder) with a photo stream icon. The photo stream folder **5750** includes a sub folder for the photo stream that is shared only by the owner's devices.

As shown in the first stage **5705**, the owner selects (e.g., through a cursor click operation) the new photo stream menu item **5735**. The selection causes the OS to display a photo stream options window **5755**, as illustrated in the second stage **5710**. This window **5755** includes the photo stream icon **5760** on the top left-hand corner with a heading that states "New Photo Stream". Beneath the heading is a subscriber field **5765** for inputting subscribers for the photo stream. The subscriber field **5765** is followed by a name field **5770** for specifying a name for the photo stream and a selectable item (e.g., a check box **5775**) for turning on or off the option to publish the photo stream to a website (e.g., a public website).

In the second stage **5710**, the owner inputs an email address of a potential subscriber. The owner can input one or more email addresses of other potential subscribers into this field **5765**. As shown in the third stage **5715**, the user then inputs a title or name for the photo stream in the name field **5770**. In the fourth stage **5720**, the user then selects a next button **5780** to continue creating the photo stream.

FIG. **58** illustrates the OS after the selection of the next button **5780**. Four operational stages **5805-5820** of the OS are illustrated in this figure. In the first stage **5805**, the owner selects several images for the photo stream. Specifically, the images are selected using a choose photos window **5825**. The first image **5830** is named "Me_Singing", the second image **5832** is named with a default name (e.g., one specified by a camera), and the third image **5835** is named "Bike". After choosing the images, the user then selects a continue button **5840**.

The second stage **5810** illustrates the OS after selecting the continue button **5840**. As shown, the selected images are displayed in a comments window **5845**. The comments windows **5845** displays each selected image with a field to associate a comment with the selected image. In some embodiments, the comment field is automatically populated based on the name of the image. For example, one or more installed components of the image sharing tools may analyze the filename of the image and determine whether to input the filename as a comment.

The filename may be analyzed using a number of different techniques. In some embodiments, the analysis entails identifying one or more words, names, or people in the filename. The analysis may entail identifying random names that are generated by different image capturing devices (e.g., digital cameras, smart phones, tablets). The analysis may also entail identifying different characters (e.g., underscore) and replacing them with a space. In the example illustrated in the second stage **5810**, the first image **5830** and the third image **5835** are associated with their corresponding filenames. In addition, the underscore in the name of the first image **5830** has been replaced with a space for the first image's comment. The owner can modify any one of these comments by inputting a new comment in the corresponding comment field.

As shown in the second stage **5810**, the owner selects a done button **5850** to create the new photo stream. The third stage **5815** illustrates the browser **5725** after creating the photo stream. As shown, the new photo stream folder **5855** is displayed on the browser **5725**. The new photo stream folder **5855** is displayed with an icon that provides a visual indication of the images in the photo stream. Specifically, the icon includes thumbnail representations of the three images **5830-5835** in the photo stream. The thumbnails are also sized differently. That is, the first thumbnail image is shown larger than the other two thumbnail images. In addition to the photo stream folder **5855**, the new photo stream is listed in the browser's hierarchical or tree view **5750**.

The fourth stage **5820** illustrates the browser **5725** after the owner has selected the photo stream folder icon **5855**. The selection results in the browser **5725** displaying the images in the photo stream. In the example illustrated in the fourth stage **5820**, each of the images **5830-5835** associated with a particular comment is shown with a marking **5860** (e.g., a comment bubble). The marking **5860** provides a visual indication to the owner as to the association of the particular comment with the corresponding image. In some embodiments, the color of the marking indicates whether the image is associated with one or more unread comments. For instance, a first color (e.g., white) may indicate that there are no unread comments associated with an image, and a second different color (e.g., blue) may indicate that there are one or more unread comments associated with the image.

Here, the batch view **5865** includes a photo stream heading **5870** that identifies the name of the photo stream and the number of images in the photo stream, a batch heading **5875** that identifies the date and time when the images were added to the photo stream and the number of images in the batch. The batch heading **5875** is followed by the images in the photo stream. In presenting the images, the image sharing tools select a particular layout based on the number of images and/or the orientations of those images. Several examples of selecting different layouts are described above by reference to FIGS. **42-47**.

As shown in the fourth stage **5820**, the browser window **5725** displays additional information (e.g., metadata) associated with the photos stream. Specifically, the browser's metadata section **5880** lists (1) the name of the photo stream, (2) the owner of the photo stream, the number of images in the photo stream, (3) each subscriber with corresponding subscription status, and (4) a public website status stating that the feature of publishing to the public website is not activated or turned on for this photo stream.

C. Accepting the Invitation

In the previous two examples, the owner creates a new photo stream using the image sharing tools that are integrated into the browser. Once the new photo stream is created, a photo stream invitation is pushed to one or more devices associated with the person invited to the photo stream. One or more of these devices may be the same type of computing device (e.g., a PC) or some other type of device with a different platform (e.g., a smart phone, tablet, digital media receiver, etc.).

FIG. **59** provides an illustrative example of accepting a photo stream invitation with a subscriber's device. In this example, the subscriber's device is a PC that is running the same OS as the owner's device. Three operational stages **5905-5915** are shown in this figure. The figure includes the OS's desktop **5920** and taskbar **5925**.

The first stage **5905** illustrates an example notification that is received via the taskbar **5925**. As shown, the notification appears as a pop-up window **5930** (e.g., bubble). In some embodiments, the pop-up window **5930** appears over a cloud service system tray icon **5935** in the task bar **5925**. As shown, the pop-up window **5930** includes a photo stream icon and a notification stating that a new photo stream invitation has been received. The notification also states how to select (e.g., click) the window to view the photo stream invitation.

In the first stage **5905**, the recipient selects the pop-up window **5930**. The selection causes the OS to display the photo stream invitation window **5940**, as illustrated in the second stage **5910**. The invitation includes the photo stream icon and the invitation. The invitation states the owner and name of the photo stream. The photo stream invitation window **5940** also includes an accept button **5945** to accept the invitation, a decline button **5950** to decline it, and a decide later button **5955** to keep the invitation pending.

The third stage **5915** illustrates the OS after the recipient has accepted the invitation. The selection results in a window browser **5725** displaying the images in the photo stream. Similar to the owner's device, the images are displayed in the batch view **5865**.

D. Modifying a Photo Stream

In the previous example, the recipient accepts a photo stream invitation to view images in the photo stream. In some embodiments, the image sharing tools can be used to add or delete images from the photo stream. FIG. **60** provides an example of adding an image to a photo stream. Three operational stages **6005-6015** of the owner's PC are illustrated in this figure.

In the first stage **6005**, the OS displays its desktop. The desktop includes an icon **6020** for an image file. The owner selects (e.g., by selecting the right-click button on the cursor controller, or holding a modifier key and selecting the left-click button) the image icon **6020** from the desktop.

As shown in the second stage **6010**, the selection causes the OS to display a context menu **6025**. The context menu **6025** includes a menu item **6030** to open the image file. The context menu **6025** also includes a menu item to add to photo stream **6035** for adding one or more selected images to a particular photo stream. This context menu **6025** is an extension to the shell (e.g., when the cloud service control panel was installed on the owner's PC). In some embodiments, the menu item to add to photo stream **6035** only appears upon turning on the image sharing feature (e.g., by selecting a check box in the cloud service control panel (not shown)).

In the second stage **6010**, the owner has selected the menu item to add to photo stream **6035**. The selection results in a list of existing photo streams displayed in a sub-menu **6040**. The sub-menu **6040** includes a menu item **6045** to add the selected image to the owner's personal photo stream, a menu item **6050** to add it to a photo stream shared with a subscriber, and a menu item **6055** to add it to a new photo stream. Here, the owner selects the menu item **6050** to add the selected image to the photo stream that is shared with the subscriber.

The third stage **6015** illustrates the OS after selecting the menu item **6050**. As shown, the selected image is displayed in the comments window **5845**. As mentioned above, the comments windows **5845** displays each selected image with a field to associate a comment for the selected image. In the third stage **6015**, the owner selects the done button **6060** to add the selected image to the photo stream.

The previous example illustrated one of several different ways one or more selected images can be added to a photo stream. In conjunction with or instead of the context menu, the image sharing tools of some embodiments allow an owner to add images to a photo stream by dragging and dropping images onto the photo stream folder. The owner can also delete one or more selected images from the photo stream folder. When deleted, the images may be deleted from one or more of the owner's other devices and/or one or more of each subscriber's device. In some embodiments, the owner can delete the photo stream folder to delete the entire photo stream from one or more of the owner's other devices and/or one or more of each subscriber's device.

E. Commenting

Several examples of commenting with different devices have been described above. These examples include commenting using a smart phone, tablet, and a digital media receiver. FIG. **61** provides an illustrative example of leaving a comment using a PC. Four operational stages **6105-6120** of the user's PC are illustrated in this figure.

In the first stage **6105**, the browser **5725** displays images in a photo stream. The heading **6125** includes the name of the photo stream and the number of images in the photo stream. The sub-heading **6130** includes the date and time that the group of images was added to the photo stream. The first image **6135** has been selected from the browser **5725**. The selection results in the display of the image's metadata in the metadata section **6140**. Specifically, the metadata section **6140** states (1) the image format (e.g., JPEG, GIF, PNG), (2) the date (e.g., timestamp, file creation date) associated with the image, and (3) the number of comments associated with image. The metadata section also includes a comments button **6145** for opening a comments tool that is described below.

As shown in the first stage **6105**, the image **6135** is associated with four comments. A marking **6150** is displayed over the image **6135** on the lower right-hand corner. The marking **6150** (e.g., the double comment bubble) indicates that the user is a part of the conversation. That is, the user has previously left at least one comment regarding the image **6135** and a subscriber has left at least one other comment regarding the same image. The color of the marking **6150** indicates that there are one or more unread comments.

The first stage **6105** illustrates the selection of the comments button **6145**. The selection causes the browser **5725** to display the comments tool **6155**, as illustrated in the second stage **6110**. The comments tool **6155** appears as a side bar of the browser. In this example, the comments tool **6155** is shown on the right side of the browser **5725**. The comments tool includes a comment field **6160** for inputting a comment and a post button **6165** to post the comment. The comment field **6160** displays a line of text that invites the user to add a comment. The comments tool **6155** is displayed with a heading "Comments". Adjacent to the heading is a selectable item or selectable icon **6170** (e.g., of a heart, smiley face) that can be selected to indicate that the user approves or likes the images.

As shown in the second stage **6110**, the comments are listed under the comments heading. Specifically, there are four comments associated with the image **6135**. As shown by the comments' metadata, the user has left one comment at one time and the subscriber has left another comment at another time. The remaining two comments are attributed to the selections of the selectable item **6170**. Accordingly, the image sharing tools of some embodiments counts the number of approvals or likes as comments.

The third stage **6115** illustrates the comments tool **6155** after the user has inputted a comment into the comment field **6160**. The user then selects the post button **6165** to post the comment. As shown in the fourth stage **6120**, the new comment has been added into the comments tool **6155**. Specifically, the new comment has been displayed at the top of the

comments list but below the approval ratings. The number of comments displayed in the metadata section **6140** has also been incremented by one. In the example described above, a number of different comments are listed in the comments tool **6155**. When the number of comments exceeds the display area of the comments tool, the comments tool of some embodiments provides a scroll bar for scrolling through the comments.

Several examples of the integrated image sharing tools are described above. FIG. **62** provides an illustrative example of an alternate embodiment of the integrated image sharing tools. Three operational stages **6205-6205** of the user's PC are illustrated in this figure. FIG. **62** is similar to the ones described above. However, the image sharing tools do not include a bottom section that displays information about a shared photo stream or its images. As described above, the bottom section contained a comment button for showing comments. Instead of the comment button, the menu bar **6245** includes a menu item **6220**. The menu item can be selected to display any comment associated with a selected image and/or to leave a comment regarding the image. Alternatively, the user can select the comment bubble **6250** to display or leave comments.

In the example illustrated in FIG. **62**, the menu bar **6245** includes a menu item **6225** for displaying a photo stream option window **6230**. The photo stream options window may also be displayed through a context menu item. The window **6230** is similar to the options sheet described above by reference to FIG. **21**. Specially, the window includes a name field **6235** for specifying the name of the shared photo stream, a subscriber field **6240** for adding or removing subscribers, and a control **6245** (e.g., a checkbox) for specifying whether the shared photo stream is published to a public website. In some embodiments, the image sharing tools provide different controls depending on whether the user is an owner or subscriber. For instance, the photo stream options window **6230** may include a control (e.g., button) for unsubscribing from a subscribed photo stream when the browser window displays images from the subscribed photo stream.

IX. Image Organizing and Editing Application

The previous section describes several examples of how the image sharing tools are provided in one computing platform (e.g., Windows platform). Several examples of the image sharing tools on another computing platform will now be described below by reference to FIGS. **63-65**. In these examples, the image sharing tools are integrated into an image organizing and editing application that operates on a Mac Operating System (e.g., Mac OS X). The OS may include one or more other applications (e.g., a professional image editing and management application) that include the same or similar image sharing features.

A. Image Sharing Tools in an Image Organizing and Editing Application

FIG. **63** provides an illustrative example of the image sharing tools that are integrated into an image organizing and editing application. Specifically, this figure illustrates in four operational stages **6305-6320** how an owner can create a photo stream using the image organizing and editing application.

As shown in the first stage **6305**, the name of the application is "Photo Application". The photo application includes (1) a sidebar **6325** that displays different collections of images, (2) an image display area **6330** that displays images in a collection, and (3) a share button **6335** to share one or more images selected from the image display area **6330**. The photo application also includes a bottom bar **6340** that displays different tools, such as a search tool **6345** for searching images, a slider **6350** for resizing images in the image display area **6330**, a slide show tool **6355** for playing a slideshow of images in a collection, an edit button **6360** for selecting different editing operations (e.g., removing red eye, cropping, enhancing, etc.) to perform on a selected image. In addition, the bottom bar **6340** includes an add to button **6365** for adding selected images to a particular collection (e.g., an album, a photo stream, etc.) and a share button **6335** for sharing the selected images.

The first stage **6305** illustrates selecting a photo stream option using the share button **6335**. As shown, the "Photos" collection has been selected from the side bar **6325**. Based on the selection, the image display area **6330** displays thumbnail representations of the images in the collection. The owner has selected two images from the image display area **6330**. To share these images, the owner has also selected the share button **6335**. The selection of the share button results in the display of a pop-up window **6370**. The pop-up window **6370** includes a list of share options. Here, the list includes an option **6372** to order prints of the selected images, an option **6373** to email the images, and an option **6375** to create a photo stream using the images.

As shown in the first stage **6305**, the owner selects the photo stream option **6375** from the pop-up window **6370**. The selection causes the application to display other options in a pop-up window **6380**, as illustrated in the second stage **6310**. The pop-up window **6380** includes an option **6382** to create a new photo stream using the selected images and an option **6383** to add the selected images to a previous created photo stream. In this example, the previously created photo stream is the owner's personal photo stream. As mentioned above, the personal photo stream represents a group of images that are streamed or pushed to those devices associated with one owner (e.g., the owner). A slider for scrolling through different photo streams may be presented on the pop-up window **6380** (e.g., when all of the different photo streams cannot be listed in its limited space).

The third stage **6315** illustrates the photo application after the selection of the new photo stream option **6382**. The selection causes the application to display a photo stream options window **6385**. This window includes the photo stream icon on the top left-hand corner with a heading that states "New Photo Stream". Beneath the heading is a subscriber field **6386** for designating subscribers for the photo stream. The subscriber field **6386** is followed by a name field **6388** for specifying a name for the photo stream and a selectable item (e.g., a check box **6389**) for turning on or off the option to publish the photo stream to a website (e.g., a public website).

In the third stage **6315**, the owner has inputted an email address of a potential subscriber. The owner can input one or more email addresses of other potential subscribers into this field **6386**. The owner has also inputted a name for the photo stream in the name field **6388**. As shown, the owner then selects the OK button **6387** to create the photo stream. In some embodiments, the application provides a window (not shown) to input a particular comment for one or more of the selected images.

The fourth stage **6320** illustrates the application after the owner has created the photo stream. As shown, the image display area **6330** includes a heading that includes a top bar **6390** that includes an option **6393** to display each image the personal photo stream, an option **6395** to display each image in the newly created photo stream, and an option **6392** to display all images in the different photo streams. Here, the image display area **6330** displays all the images as the option **6392** is selected from the top bar **6390**. The image display area **6330** is also organized by new images and old images.

The new images are displayed at the top and the one previous image is displayed below. Each group of images includes a heading that states the group name (e.g., "New Photos", "Previous Photos") and the number of images in the group.

Conceptually, the application provides a form of a batch view that is different from the one that was discussed above (e.g., by reference to FIGS. **50-52**). As illustrated in this figure, the previous or new image section can include multiple different batches. One reason for displaying the images in this format is that it makes more efficient use of screen real estate than the above-described batch view. In some embodiments, the application displays images in one view format and provides an option to display the images in another view format.

B. Accepting the Invitation

In the previous example, the owner creates a new photo stream using the image sharing tools that are integrated into the photo application. Once the new photo stream is created, a photo stream invitation is pushed to one or more devices associated with the person who was invited to the photo stream. One or more of these devices may be the same type of computing device or some other type of device with a different platform (e.g., a smart phone, tablet, digital media receiver, etc.)

FIG. **64** provides an illustrative example of accepting a photo stream invitation with a subscriber's device. In this example, the subscriber's device is the same type of device that is running the same OS as the owner's device. Four operational stages **6405-6420** are shown in this figure. The figure includes the OS's desktop **6425** and a dock **6430**. The dock **6430** displays icons for opening different applications. As shown, the dock includes an icon **6435** for opening the photo application.

The first stage **6405** illustrates an example notification that is at the OS level. As shown, the notification appears as a marking on the application's icon **6435**. One type of notification is a marking or a badge that appears at least partially over the application's icon. This is shown in the first stage **6405** as a badge **6440** that is displayed on the icon of the photo application. The badge **6440** includes a number (e.g., "1"). In the example illustrated in the first stage **6405**, it indicates there is one new photo stream invitation. Alternatively, the badge may indicate that there is an update to one existing photo stream.

In the first stage **6405**, the user selects the icon of the photo application on the dock **6430**. The selection causes the photo application to open a pop up window **6445** that includes a message, as illustrated in the second stage **6410**. The message states that the recipient has received a first photo stream invitation, and that the owner would like to share a photo stream with the recipient. The message also provides instructions for viewing the photo stream. Specifically, it states how to select the photo stream under the web section in the source list on the left (i.e., the side bar **6450**). In some embodiments, the application displays this window only once upon the recipient receiving a first invitation. That is, the application may not display the window when another invitation is received at the recipient's device.

As shown, the window **6445** includes a show me button **6460** and a cancel button **6455**. In some embodiments, the selection of the show me button **6460** causes the application to display a top level a photo stream menu. The cancel button **6455** closes the window. In the second stage **6410**, the user selects the show me button **6460**.

The third stage **6415** illustrates the application after the selection of the show me button **6460**. The selection causes the application to display an icon representing the new photo stream **6465** in the image display area **6330**. The photo stream **6465** has also been highlighted in the side bar **6450**. The photo stream **6465** in the side bar is also marked with a number that indicates that there is a new invitation for a new photo stream or an update to an existing one. This marking provides the recipient with a visual indication at the application level, as opposed to a visual indication at the OS level.

As shown, the image display area **6330** is overlaid by a heading **6470** that state "Photo Stream". The name of the new photo stream is also marked with a marking. Here, the marking is a colored dot (e.g., a blue dot). Different from the markings described above, the marking here provides the recipient with a visual indication at the album level or photo stream level.

In the third stage **6415**, the recipient selects the new photo stream **6465** from the image display area **6330**. The selection causes the application to display a photo stream invitation window **6475**, as illustrated in the fourth stage **6420**. The invitation includes the photo stream icon and the invitation. The invitation originates from a device of the owner that shared the images. The invitation states the name and owner of the photo stream. The photo stream invitation window **6475** also includes an accept button **6480** to accept the invitation, a decline button **6485** to decline it, and a decide later button **6482** to keep the invitation pending. Here, the recipient selects the accept button **6480** to accept the invitation. Once accepted, the images in the photo stream may be downloaded and presented in the image display area **6330**.

C. Commenting

The previous example illustrated accepting a photo stream invitation on a subscriber's device. FIG. **65** provides an illustrative example of how the image sharing tools of some embodiments present comments on the photo application. Four operational stages **6505-6520** of the subscriber's device are illustrated in this figure.

The first stage **6505** illustrates the image display area **6330** displaying the photo stream. The user has added an image to the photo stream, and two new comments have been left for the image. In some embodiments, the application plays a sound when there is an update to a photo stream. For example, the application may play a ding sound, a bell sound, a ring sound, or some other sound to indicate there is an update to a photo stream (e.g., there is a new comment, new image, etc.) and/or when there is a new photo stream invitation. The application may play different sounds for different events, in some embodiments.

In the example illustrated in the first stage **6505**, the application provides several different visual indications of an update to a photo stream. At the application level, the side bar **6450** displays a marking next to the photo stream **6525**. Here the number (i.e., "1") indicates that there is an update to one photo stream. At the photo stream list or album list level, a photo stream representation (e.g., a thumbnail representation) may be marked with one or more markings. For example, the photo stream representation **6530** is marked with a number (i.e., "1") next to an image symbol **6535** (e.g., a photo icon) and a different number (i.e., "2") next to a comment symbol **6540** (e.g., a chat bubble). These markings provide a visual indication to the subscriber that there is one new image and two new comments.

In the first stage **6505**, the user selects the photo stream representation **6530** from the image display are **6330**. As shown in the second stage **6510**, the selection causes the application to display thumbnail representations of the images in the photo stream. In some embodiments, the display is dynamically or automatically updated each time a person (e.g., the owner shares) additional images. At this photo stream level, the application provides another visual

indication of the updates. For example, the images are batched into different sections (e.g., a new image section and a previous image section). Different from several of the batch view described above, the current batch view display images by displaying new images separately from all other images that were added previously. This can entail grouping previous sets or batches of images into one group (e.g., labeled previous photos). In addition, the thumbnail representation of the image is marked with a marking (e.g., a chat bubble). Many examples of such a marking are described above.

As shown in the second stage **6510**, the thumbnail representation **6545** of the new image is associated with new comments. In the third stage **6515**, the user selects an info button **6550** from the bottom bar **6340**. The selection of the info button **6550** causes the application to display an info pane **6555**, as illustrated in the fourth stage **6520**.

The fourth stage **6520** illustrates the application displaying the info pane **6555**. The info pane **6555** appears on the right hand side of the image display area **6330**. The info pane displays information (e.g., metadata) associated with the selected image. In this example, the info pane **6555** lists (1) the image resolution, (2) the name of the image, and (3) a date or timestamp associated with the image. However, the info pane may list other information, such location information (e.g., based on GPS data associated with the image), people information (e.g., based on face detection algorithms), etc.

In addition to image info, the info pane **6555** lists comments associated with the image. In some embodiments, the application provides tools to send and receive comments across multiple different sources. This is illustrated in the fourth stage **6520** as the info pane **6555** lists comment from a subscriber of the photo stream as well as a comment that is received through a social network website. That is, the application is not only integrated with the image sharing tools but is also integrated with the social network website (e.g., through the website's API). This allows the info pane display area to display comments from people associated with the social network website as well as those people associated with the shared stream.

In the example illustrated in the fourth stage **6520**, the comment section includes a heading that states the total number of comments that are received from both sources. Each source includes a heading. Specifically, the photo stream comment is listed under a photo stream heading and the social network comment is listed under a social network heading. Each of the two sections includes an add comment field to add a comment (i.e., **6556** or **6558**) and a post button for adding comments. The photo stream section also includes an icon or symbol (e.g., a smiley face icon) that can be selected to indicate that the subscriber approves or likes the selected image. The social network website section may have a similar selectable item in some embodiments.

In the example described above, the info pane **6555** lists the image's metadata as well as the comments associated with the image. In some embodiments, the application displays other information relating to the photo stream in the info pane. For example, the photo application of some embodiments displays information regarding a photo stream. For example, when no image is selected in the image display area, the application may present the photo stream's name, a list of subscribers, or an indication of whether the public website version of the photo stream has been turned on or off. In some embodiments, the info pane can be used to modify the photo stream. For example, the info pane can be used to rename the photo stream, add or remove subscribers, resend an invitation or nudge the recipient, or turn on or off the public website version. When the public website is turned on, the info pane may list the URL of the public website.

X. Example System Architecture

In some embodiments, the image sharing tools are implemented across different user devices and/or different platforms (e.g., from different vendors). To facilitate the image and comment sharing operations, the devices (hereinafter clients) may communicate with several different servers. These servers may include storage servers (e.g., third-party storage servers) and control servers. FIG. **66** conceptually illustrates an example system architecture in which the clients communicate with the different servers to share images and comments.

As shown in FIG. **66**, the figure includes different clients **6620-6640**, a set of control servers **6610** and a set of storage servers **6615**. The clients are different computing devices that communicate with the control and storage servers over network **6605**. Any one of these devices can be used to create a photo stream that includes a set of images, and invite one or more individuals to view and/or comment on the set of images. In the example illustrated in FIG. **66**, the clients includes a smart phone **6620**, a laptop **6630** (e.g., that operates on a MAC OS), a personal computer **6625** (e.g., that operate on a Windows OS), a tablet **6635**, and a digital media receiver **6640**. However, a client can be one of any number of different types of devices, such as a Personal Data Assistant (PDA), a workstation, etc.

The set of storage servers **6615** stores photo stream images for the different clients. The set of storages may be contracted by the cloud service provider (e.g., that manages the set of control servers **6610**) to store content for the different clients. According, the set of storage servers may be a set of third-party servers. To facilitate the storage service, the set of third-party storage servers may be associated with an application program interface (API). The client devices may use this API to store and receive images stored by the third-party storage servers. The set of storage servers may store the images for a temporary period of time, in some embodiments.

The set of control servers **6610** manages control data associated with the different clients. Examples of such control data include user data, photo stream data (e.g., a list of photo stream albums associated with a user, a list of individuals that can access a particular photos stream), etc. The control data may include references to the images that are stored by the set of storage servers **6615**. Thus, the set of control servers may maintain information relating to different shared streams, while not storing any of the images associated with those shared streams. However, the set of control servers may store comments associated images in the photo stream. To manage control data, each control server is associated with one or more storages (e.g., data stores). In some embodiments, the control server and the one or more storages is a logical partition in which data relating a particular user resides.

In some embodiments, the control server is configured to receive notifications from a client that one or more files are to be transmitted from the client. In response to such a notification, the control server sends, to the client, storage location data that indicates where the one or more files are to be sent. The storage location data may be data associated with a storage server. The client uses the storage location data to transmit the one or more files to the storage service.

The control server of some embodiments is a push server that pushes notifications (e.g., event triggers) to clients. For instance, when one user creates a shared photo stream that invites another person, the control server may add the other person to a list of authorized users that are able to access the shared stream. The control server may add the person once he

or she accepts the invitation, in some embodiments. The control server may also send messages to all of the clients associated with the person. The clients then request for a list of albums from the control server. The content server provides the list with a new photo stream associated with an invitation. When the person accepts the invitation on one client, then all of the clients may retrieve the images in the photo stream from the set of storage servers **6615**. As mentioned above, the notifications may be presented differently in different clients. For example, the smart phone client **6620** may display a badge (e.g., over an application icon, play a sound, and/or cause it to vibrate), while the PC client **6625** may display a notification through the OS's system tray.

In some embodiments, the set of control servers communicates with the different clients using one custom protocol. That is, each client uses the same protocol to communicate with a control server. The protocol may identify a particular type of client device (e.g., a digital media receiver, a smart phone). However, the control server may not perform any special operation or logic for that particular type of client. In some embodiments, the protocol is based on an API that includes different API calls or messages for modifying the photo stream's images (e.g., adding images, deleting images), inviting subscribers, accepting invitations, declining invitation, managing comments (e.g., creating a comment, deleting a comment), etc.

FIG. **67** conceptually illustrates an example of how a user's photo streams are represented at the server side (e.g., at a control server). As shown, the figure includes a hierarchical structure that represents the different hierarchical levels of the user's photo stream data. This figure includes user **6705**, a set of photo streams **6710-6720**, a set of images **6725-6735**, and a set of comments **6740-6750**. These different boxes represent data structures associated with the user's photo streams.

In the example illustrated in FIG. **67**, the user is at the top of the hierarchical structure. The user may be associated with a user identification ("ID") and password. As shown, the user can be associated with any number of photo streams, including a personal photo stream and a shared stream. Here, the user is associated with three photo streams **6710-6720**.

In some embodiments, each photo stream is associated with a photo stream ID that uniquely identifies the photo stream and a name that identifies a name for the photo stream. Each photo stream is associated with one or more images. For example, the images **6725-6735** are associated with the photo stream **6710**. As mentioned above, the images may be stored at one or more third party storages. Accordingly, the control server may store a reference to each image (a URL) using the photo stream data structure.

In some embodiments, the control server references the image using a first key (e.g., unique key) for identifying the image in the photo stream. The first key may be associated with a second key for accessing the image file that is stored at a storage server (e.g., a third party storage server). The second key may include or is a checksum of that one image file. In some embodiments, the image file is run through a computation algorithm that generates the checksum, which is a hash of the image's content. When a same image is inputted multiple times, the algorithm returns the same file hash (e.g., hash value). Different from the control server, the storage server may reference the image by the file hash, instead of the first key. This allows the storage server to store one image, even though that image is in multiple different photo streams. On the other hand, the control server may reference the same image in different photo streams using different unique keys. Each client may generate keys and/or checksums for its images, in some embodiments.

As shown in FIG. **67**, the comments are at the last level and are associated with the image. Many comments can be associated with the one image. For example, the comments **6740-6750** are associated with the image **6725**. In some embodiments, the data structure for a comment is associated with a name or user ID of the user that left the comment. The data structure may also include a comment ID for locating or accessing the comment and a timestamp for identifying the time and/or date the comment was left or posted.

XI. Example Server-Side Processes

The previous section described a control server that facilitates the sharing of content (e.g., images, video clips) and comments by managing control data associated with a shared content stream. Examples of such control data include user data (e.g., a list of devices associated with a user) and photo stream data (e.g., a list of photo stream associated with the user, a list of individuals that can access a particular photo stream, file location data, etc.). Several example processes of such a control server will now be described by reference to FIGS. **68-71**.

A. Notifying Recipients of a Shared Stream Invitation

FIG. **68** conceptually illustrates an example process **6800** that some embodiments perform to notify recipients of a new-shared stream invitation. The process **6800**, in some embodiments, is performed by the control server. The process **6800** begins when it receives (at **6805**) a message regarding a new shared content stream from a source device (e.g., the owner's device). The process **6800** then sends (at **6810**) file location data to the source device. In some embodiments, the file location data includes one or more URLs to upload content to a storage server (e.g., a third-party storage server).

At **6815**, the process **6800** identities each recipient that has been invited to join the shared stream. For example, the process **6800** might identify a username associated with each recipient. In some embodiment, the username is the same as the recipient's email address. Based on the identification, the process **6800** identifies (at **6820**) one or more devices (e.g., destination devices) associated with each recipient. The process **6800** sends (at **6825**) a message regarding the shared stream invitation to each recipient device. The process **6800** then ends.

Some embodiments perform variations on the process **6800**. The specific operations may not be performed in one continuous series of operations, and different specific operations may be performed in different embodiments. Furthermore, the process **6800** could be implemented using several sub-processes, or as part of a larger macro process. For instance, the process **6800** might identify each device associated with the owner and send a message regarding an update to a shared content stream. The process **6800** might also send the file location data to one or more owner devices. The owner devices may then download the content using the file location data.

B. Adding Subscribers to a Shared Stream

The previous example described sending a shared stream invitation to each recipient device that is associated with a shared content stream. FIG. **69** conceptually illustrates an example process **6900** that some embodiments perform when it receives a response from a recipient device. The process **6900**, in some embodiments, is performed by the control server. The process **6900** begins when it receives (at **6905**) receives a message that requests a list of shared streams from a recipient's device. The process **6900** then sends (at **6910**) the list of shared streams to the recipient device.

At **6915**, the process **6900** receives, from the recipient's device, a message regarding the shared stream invitation. Based on the message, the process **6900** determines (at **6920**)

whether the shared stream invitation has been accepted. If so, the process **6900** marks or specifies (at **6925**) the recipient as a subscriber in an authorization list that is associated with the shared content stream. In some embodiments, the authorization list lists different individuals that can access the shared content stream. The list may also specify whether a subscriber can add content to a shared stream, remove content, add or remove subscribers, and/or make comments.

After marking the recipient as a subscriber, the process **6900** sends (at **6930**) file location data to each device associated with the recipient. Each recipient device may then download the shared content from the storage server using the file location data. The process **6900** then notifies the owner of the acceptance of the shared stream invitation. Specifically, the process **6900** sends (at **6935**) a message regarding the acceptance of to each device associated with the owner. One or more of the owner's device may then display a notification (e.g., banner notification, system tray notification) regarding the acceptance of the shared stream invitation.

If the recipient has not accepted the shared stream invitation, the process **6900** removes (at **6940**) the recipient from the authorization list. Instead of removing the recipient, the process **6900** might mark the recipient as a person that declined the invitation. In some embodiments, the process **6900** maintain two separate lists, e.g., one that lists different subscribers and another that lists different recipients that have not subscribed to the shared stream.

Some embodiments perform variations on the process **6900**. The specific operations may not be performed in one continuous series of operations, and different specific operations may be performed in different embodiments. Furthermore, the process **6900** could be implemented using several sub-processes, or as part of a larger macro process.

C. Commenting

The content sharing tools of some embodiments allow different participants to share comments regarding the shared content. FIG. **70** conceptually illustrates an example process **7000** that some embodiments perform to notify participants of a new comment. The process **7000**, in some embodiments, is performed by the control server. The process **7000** begins when it receives (at **7005**) receives a message with the new comment. The process **7000** then stores (at **7010**) the comment.

At **7015**, the process **7000** identifies participants of the shared content stream. Based on the identification, the process **7000** sends a message regarding an update to the shared content to the devices that are associated with the participants. The process **7000** then ends.

FIG. **71** conceptually illustrates an example process **7100** that some embodiments perform to deliver a new comment. The process **7100**, in some embodiments, is performed by the control server. The process **7100** begins when it receives (at **7105**) receives a message that requests a list of shared content streams from a recipient device. The process **7100** then sends (at **7110**) the list of shared streams to the recipient device.

At **6915**, the process **7100** receives, from the participant device, a message request for the new comment. Based on the message, the process **710** sends (at **7120**) the comment to the participant's device. Some embodiments perform variations on the processes **7000** and **7100**. The specific operations may not be performed in one continuous series of operations, and different specific operations may be performed in different embodiments. Furthermore, each of the processes **7000** and **7100** could be implemented using several sub-processes, or as part of a larger macro process.

XII. Software Architecture

In some embodiments, the processes described above are implemented as software running on a particular machine, such as a computer or a handheld device, or stored in a machine readable medium. FIG. **72** conceptually illustrates the software architecture of content sharing tools **7200** of some embodiments. In some embodiments, the content sharing tools are provided as a stand-alone application or are integrated into another application, while in other embodiments the content sharing tools are implemented within an operating system. Furthermore, in some embodiments, the content sharing tools are provided as part of a server-based solution. In some such embodiments, the content sharing tools are provided via a thin client. That is, the content sharing tools runs on a server while a user interacts with the content sharing tools via a separate machine remote from the server. In other embodiments, the content sharing tools are provided via a thick client. That is, the content sharing tools are distributed from the server to the client machine and runs on the client machine.

The content sharing tools **7200** includes a user interface (UI) interaction and generation module **7210** and a shared stream manager **7220**. As shown, the user interface interaction and generation module **7210** generates a number of different UI elements, including a content display area **7212**, a shared stream menu **7214**, shared stream management tools **7216**, and comment tools **7218**. The figure also illustrates stored data associated with the content sharing tools: shared stream data **7244**, content data **7244**, and other data **7248**. In some embodiments, the shared stream data **7244** stores data related to a shared stream (e.g., a list of photo streams, list of individuals associated with a photo stream, references to images, comments, etc.). The content data **7246** may include images and/or video. The content data **7246** of some embodiments includes multiple versions of one image (e.g., at different resolution).

FIG. **72** also illustrates an operating system **7202** that includes input device driver(s) **7204**, display module **7206** and notifications tools. In some embodiments, as illustrated, the device drivers **7204** and display module **7206** are part of the operating system **7202** even when the content sharing tools **7200** is part of an application that is separate from the operating system **7270**. The input device drivers **7204** may include drivers for translating signals from a keyboard, mouse, touchpad, tablet, touchscreen, etc. A user interacts with one or more of these input devices, each of which send signals to its corresponding device driver. The device driver then translates the signals into user input data that is provided to the UI interaction and generation module **7210**.

The present application describes a graphical user interface that provides users with numerous ways to perform different sets of operations and functionalities. In some embodiments, these operations and functionalities are performed based on different commands that are received from users through different input devices (e.g., keyboard, trackpad, touchpad, mouse, etc.). For example, the present application illustrates the use of touch controls in the graphical user interface to control (e.g., select, move) objects in the graphical user interface. However, in some embodiments, objects in the graphical user interface can also be controlled or manipulated through other controls, such as a cursor control. In some embodiments, the touch control is implemented through an input device that can detect the presence and location of touch on a display of the device. An example of such a device is a touch screen device. In some embodiments, with touch control, a user can directly manipulate objects by interacting with the graphical user interface that is displayed on the display of the touch screen device. For instance, a user can select a particu-

lar object in the graphical user interface by simply touching that particular object on the display of the touch screen device. As such, when touch control is utilized, a cursor may not even be provided for enabling selection of an object of a graphical user interface in some embodiments. However, when a cursor is provided in a graphical user interface, touch control can be used to control the cursor in some embodiments.

The display module **7206** translates the output of a user interface for a display device. That is, the display module **7206** receives signals (e.g., from the UI interaction and generation module **7210**) describing what should be displayed and translates these signals into pixel information that is sent to the display device. The display device may be an LCD, plasma screen, CRT monitor, touchscreen, etc.

In some embodiments, the notification tools **7208** presents notifications (e.g., at the operating system level). Examples of such notifications may include one or more of the following: an icon badge, banner notification, system tray notification, lock-screen alert, notification center message, etc. In some embodiments, the notification tools **7208** causes a computing device (e.g., smart phone, tablet) to play a sound or vibrate.

The UI interaction and generation module **7210** of the content sharing tools **7200** interprets the user input data received from the input device drivers **7204** and passes it to various UI components, including the content display area **7212**, the shared stream menu **7214**, the shared stream management tools **7216**, and the comment tools **7218**. The UI interaction and generation module **7210** also manages the display of the UI, and outputs this display information to the display module **7206**. In some embodiments, the UI interaction and generation module **7210** generates a basic UI and populates the UI with information from the other modules and stored data (e.g., stored data **7244**, **7248**).

As shown, the UI interaction and generation module **7210**, in some embodiments, generates a number of different UI elements. These elements, in some embodiments, include the content display area **7212**, the shared stream menu **7214**, the shared stream management tools **7216**, and the comment tools **7218**. In many of the examples described above, the content display area **7212** is referred to as an image display, and the shared stream menu **7214** is referred to a photo stream menu. In some embodiments, the shared stream management tools **7216** include a photo stream options sheet, a comment sheet, a photo stream management sheet (e.g., to add or remove subscriber, to resend a photo stream invitation, to delete a photo stream, etc.). The comment tools of some embodiments include an add comment field, like button, delete comment button, etc. All of these UI elements are described in many different examples above.

As shown in FIG. **72**, the shared stream manager includes several components to facilitate the content and comment sharing features. The components include (1) a data manager **7222**, (2) a checksum generator **7224**, (3) a web publication module **7226**, (4) a layout manager **7228**, (5) an image generator **7230**, (6) a comment module **7232**, (7) a filename analyzer, and (8) a notification module. Different components may be provided for different platforms. For instance, the filename analyzer may be provided in one platform (e.g., a PC platform) while not provided for another platform (e.g., a smartphone or tablet platform).

In some embodiments, the data manager **7222** facilitates the uploading and downloading of content data from one or more the storage servers **7238** (e.g., third-party storage servers). The data manager **7222** may receive file location data (e.g., URL address), and upload to or download content from a storage server. This data manager **7222** of some embodiments operates automatically without any user input. For example, the shared stream manager **7220** may receive a message regarding a new batch of images in a shared image, and direct the data manager **7222** to download the batch from the storage server.

The checksum generator **7224** runs an image file through a computation algorithm that generates a checksum of that image file, which is a hash of the image's content. The content sharing tools and the control server may reference an image using a first key (e.g., unique key) for identifying the image in the photo stream. The first key may be associated with a second key for accessing the image file that is stored at an external data source (e.g., a storage server). The second key may include or is a checksum of that one image file. This checksum allows the storage server to store one image, even though that image is in multiple different photo streams.

The web publication module **7230** allows images to be published as a set of webpages to a website. In some embodiments, the website is a public website that can be accessed by any browser with the correct URL address. To publish the images, the web publication module **7230** may communicate with one or more of the web publishing servers **7242**.

In some embodiments, the content display area **7212** presents images similar to the ones that are published to a website. To present the images, the shared stream manager **7220** may include the layout manager **7228**. This layout manager of some embodiments selects a layout based on the number of images in a batch and the orientation of those images. The images may be presented in a particular order (e.g., starting with the oldest image and ending with the newest image, or vice versa). The batches may be presented in a particular order (e.g., starting with the oldest batch to the newest batch, or vice versa).

In some embodiments, the comment module **7232** allows the sharing of comments regarding content in a shared stream. This module of some embodiments receives a comment and generates a message regarding the comment to send to a control server. The comment module may also receive a message regarding a new comment and perform operations to display the comment (e.g., in the content display area **7212**). These operations may include identifying the image associated with the comment, the timestamp of the comment, and the person that left the comment. These operations may also entail counting the number of comments and/or likes associated with that same image.

The filename analyzer **7234** analyzes a filename of a piece of content to automatically input a comment. The filename may be analyzed using a number of different techniques. In some embodiments, the analysis entails identifying one or more words, names, or people in the filename. The analysis may entail identifying random filenames that are generated by different image capturing devices (e.g., digital cameras, smart phones, tablets). The analysis may also entail identifying different characters (e.g., underscore) and replacing them with a space.

The notification module detects notifications from a control server and facilitates their presentation. For example, the notification module may cause different photo streams to be marked with a marking (e.g., colored dot) in the shared stream menu **7214** and/or cause images to be marked with a marking (e.g., a chat bubble, double chat bubble, a flag that identifies the number of new images, etc.) in the content display area **7212**. In some embodiments, the notification module interoperates with the notifications tools **7208** to present notifications (e.g., icon badge, banner notification, system tray notification) at the operating system level.

While many of the features of the content sharing tools **7200** have been described as being performed by one module (e.g., the comment module **7232**, the web publication module **7226**, etc.), one of ordinary skill in the art will recognize that the components (e.g., functions, modules) described herein might be split up into multiple components. Similarly, components that are described as being performed by multiple different modules might be performed by a single module, in some embodiments.

XIII. Electronic Systems

Many of the above-described features and applications are implemented as software processes that are specified as a set of instructions recorded on a computer readable storage medium (also referred to as computer readable medium). When these instructions are executed by one or more computational or processing unit(s) (e.g., one or more processors, cores of processors, or other processing units), they cause the processing unit(s) to perform the actions indicated in the instructions. Examples of computer readable media include, but are not limited to, CD-ROMs, flash drives, random access memory (RAM) chips, hard drives, erasable programmable read-only memories (EPROMs), electrically erasable programmable read-only memories (EEPROMs), etc. The computer readable media does not include carrier waves and electronic signals passing wirelessly or over wired connections.

In this specification, the term "software" is meant to include firmware residing in read-only memory or applications stored in magnetic storage, which can be read into memory for processing by a processor. In addition, in some embodiments, multiple software inventions can be implemented as sub-parts of a larger program while remaining distinct software inventions. In some embodiments, multiple software inventions can also be implemented as separate programs. Finally, any combination of separate programs that together implement a software invention described here is within the scope of the invention. In some embodiments, the software programs, when installed to operate on one or more electronic systems, define one or more specific machine implementations that execute and perform the operations of the software programs.

A. Mobile Device

The image editing and viewing applications of some embodiments operate on mobile devices. FIG. **73** is an example of an architecture **7300** of such a mobile computing device. Examples of mobile computing devices include smartphones, tablets, laptops, etc. As shown, the mobile computing device **7300** includes one or more processing units **7305**, a memory interface **7310** and a peripherals interface **7315**.

The peripherals interface **7315** is coupled to various sensors and subsystems, including a camera subsystem **7320**, a wireless communication subsystem(s) **7325**, an audio subsystem **7330**, an I/O subsystem **7335**, etc. The peripherals interface **7315** enables communication between the processing units **7305** and various peripherals. For example, an orientation sensor **7345** (e.g., a gyroscope) and an acceleration sensor **7350** (e.g., an accelerometer) is coupled to the peripherals interface **7315** to facilitate orientation and acceleration functions.

The camera subsystem **7320** is coupled to one or more optical sensors **7340** (e.g., a charged coupled device (CCD) optical sensor, a complementary metal-oxide-semiconductor (CMOS) optical sensor, etc.). The camera subsystem **7320** coupled with the optical sensors **7340** facilitates camera functions, such as image and/or video data capturing. The wireless communication subsystem **7325** serves to facilitate communication functions. In some embodiments, the wireless communication subsystem **7325** includes radio frequency receivers and transmitters, and optical receivers and transmitters (not shown in FIG. **73**). These receivers and transmitters of some embodiments are implemented to operate over one or more communication networks such as a GSM network, a Wi-Fi network, a Bluetooth network, etc. The audio subsystem **7330** is coupled to a speaker to output audio (e.g., to output different sound effects associated with different image operations). Additionally, the audio subsystem **7330** is coupled to a microphone to facilitate voice-enabled functions, such as voice recognition, digital recording, etc.

The I/O subsystem **7335** involves the transfer between input/output peripheral devices, such as a display, a touch screen, etc., and the data bus of the processing units **7305** through the peripherals interface **7315**. The I/O subsystem **7335** includes a touch-screen controller **7355** and other input controllers **7360** to facilitate the transfer between input/output peripheral devices and the data bus of the processing units **7305**. As shown, the touch-screen controller **7355** is coupled to a touch screen **7365**. The touch-screen controller **7355** detects contact and movement on the touch screen **7365** using any of multiple touch sensitivity technologies. The other input controllers **7360** are coupled to other input/control devices, such as one or more buttons. Some embodiments include a near-touch sensitive screen and a corresponding controller that can detect near-touch interactions instead of or in addition to touch interactions.

The memory interface **7310** is coupled to memory **7370**. In some embodiments, the memory **7370** includes volatile memory (e.g., high-speed random access memory), non-volatile memory (e.g., flash memory), a combination of volatile and non-volatile memory, and/or any other type of memory. As illustrated in FIG. **73**, the memory **7370** stores an operating system (OS) **7372**. The OS **7372** includes instructions for handling basic system services and for performing hardware dependent tasks.

The memory **7370** also includes communication instructions **7374** to facilitate communicating with one or more additional devices; graphical user interface instructions **7376** to facilitate graphic user interface processing; image processing instructions **7378** to facilitate image-related processing and functions; input processing instructions **7380** to facilitate input-related (e.g., touch input) processes and functions; audio processing instructions **7382** to facilitate audio-related processes and functions; and camera instructions **7384** to facilitate camera-related processes and functions. The instructions described above are merely exemplary and the memory **7370** includes additional and/or other instructions in some embodiments. For instance, the memory for a smartphone may include phone instructions to facilitate phone-related processes and functions. The above-identified instructions need not be implemented as separate software programs or modules. Various functions of the mobile computing device can be implemented in hardware and/or in software, including in one or more signal processing and/or application specific integrated circuits.

While the components illustrated in FIG. **73** are shown as separate components, one of ordinary skill in the art will recognize that two or more components may be integrated into one or more integrated circuits. In addition, two or more components may be coupled together by one or more communication buses or signal lines. Also, while many of the functions have been described as being performed by one component, one of ordinary skill in the art will realize that the functions described with respect to FIG. **73** may be split into two or more integrated circuits.

B. Computer System

FIG. **74** conceptually illustrates another example of an electronic system **7400** with which some embodiments of the invention are implemented. The electronic system **7400** may be a computer (e.g., a desktop computer, personal computer, tablet computer, etc.), phone, PDA, or any other sort of electronic or computing device. Such an electronic system includes various types of computer readable media and interfaces for various other types of computer readable media. Electronic system **7400** includes a bus **7405**, processing unit(s) **7410**, a graphics processing unit (GPU) **7415**, a system memory **7420**, a network **7425**, a read-only memory **7430**, a permanent storage device **7435**, input devices **7440**, and output devices **7445**.

The bus **7405** collectively represents all system, peripheral, and chipset buses that communicatively connect the numerous internal devices of the electronic system **7400**. For instance, the bus **7405** communicatively connects the processing unit(s) **7410** with the read-only memory **7430**, the GPU **7415**, the system memory **7420**, and the permanent storage device **7435**.

From these various memory units, the processing unit(s) **7410** retrieves instructions to execute and data to process in order to execute the processes of the invention. The processing unit(s) may be a single processor or a multi-core processor in different embodiments. Some instructions are passed to and executed by the GPU **7415**. The GPU **7415** can offload various computations or complement the image processing provided by the processing unit(s) **7410**.

The read-only-memory (ROM) **7430** stores static data and instructions that are needed by the processing unit(s) **7410** and other modules of the electronic system. The permanent storage device **7435**, on the other hand, is a read-and-write memory device. This device is a non-volatile memory unit that stores instructions and data even when the electronic system **7400** is off. Some embodiments of the invention use a mass-storage device (such as a magnetic or optical disk and its corresponding disk drive) as the permanent storage device **7435**.

Other embodiments use a removable storage device (such as a floppy disk, flash memory device, etc., and its corresponding drive) as the permanent storage device. Like the permanent storage device **7435**, the system memory **7420** is a read-and-write memory device. However, unlike storage device **7435**, the system memory **7420** is a volatile read-and-write memory, such a random access memory. The system memory **7420** stores some of the instructions and data that the processor needs at runtime. In some embodiments, the invention's processes are stored in the system memory **7420**, the permanent storage device **7435**, and/or the read-only memory **7430**. For example, the various memory units include instructions for processing multimedia clips in accordance with some embodiments. From these various memory units, the processing unit(s) **7410** retrieves instructions to execute and data to process in order to execute the processes of some embodiments.

The bus **7405** also connects to the input and output devices **7440** and **7445**. The input devices **7440** enable the user to communicate information and select commands to the electronic system. The input devices **7440** include alphanumeric keyboards and pointing devices (also called "cursor control devices"), cameras (e.g., webcams), microphones or similar devices for receiving voice commands, etc. The output devices **7445** display images generated by the electronic system or otherwise output data. The output devices **7445** include printers and display devices, such as cathode ray tubes (CRT) or liquid crystal displays (LCD), as well as speakers or similar audio output devices. Some embodiments include devices such as a touchscreen that function as both input and output devices.

Finally, as shown in FIG. **74**, bus **7405** also couples electronic system **7400** to a network **7425** through a network adapter (not shown). In this manner, the computer can be a part of a network of computers (such as a local area network ("LAN"), a wide area network ("WAN"), or an Intranet, or a network of networks, such as the Internet. Any or all components of electronic system **7400** may be used in conjunction with the invention.

Some embodiments include electronic components, such as microprocessors, storage and memory that store computer program instructions in a machine-readable or computer-readable medium (alternatively referred to as computer-readable storage media, machine-readable media, or machine-readable storage media). Some examples of such computer-readable media include RAM, ROM, read-only compact discs (CD-ROM), recordable compact discs (CD-R), rewritable compact discs (CD-RW), read-only digital versatile discs (e.g., DVD-ROM, dual-layer DVD-ROM), a variety of recordable/rewritable DVDs (e.g., DVD-RAM, DVD-RW, DVD+RW, etc.), flash memory (e.g., SD cards, mini-SD cards, micro-SD cards, etc.), magnetic and/or solid state hard drives, read-only and recordable Blu-Ray® discs, ultra density optical discs, any other optical or magnetic media, and floppy disks. The computer-readable media may store a computer program that is executable by at least one processing unit and includes sets of instructions for performing various operations. Examples of computer programs or computer code include machine code, such as is produced by a compiler, and files including higher-level code that are executed by a computer, an electronic component, or a microprocessor using an interpreter.

While the above discussion primarily refers to microprocessor or multi-core processors that execute software, some embodiments are performed by one or more integrated circuits, such as application specific integrated circuits (ASICs) or field programmable gate arrays (FPGAs). In some embodiments, such integrated circuits execute instructions that are stored on the circuit itself. In addition, some embodiments execute software stored in programmable logic devices (PLDs), ROM, or RAM devices.

As used in this specification and any claims of this application, the terms "computer", "server", "processor", and "memory" all refer to electronic or other technological devices. These terms exclude people or groups of people. For the purposes of the specification, the terms display or displaying means displaying on an electronic device. As used in this specification and any claims of this application, the terms "computer readable medium," "computer readable media," and "machine readable medium" are entirely restricted to tangible, physical objects that store information in a form that is readable by a computer. These terms exclude any wireless signals, wired download signals, and any other ephemeral signals.

While the invention has been described with reference to numerous specific details, one of ordinary skill in the art will recognize that the invention can be embodied in other specific forms without departing from the spirit of the invention. For instance, many of the figures illustrate various touch gestures (e.g., taps, double taps, swipe gestures, press and hold gestures, etc.). However, many of the illustrated operations could be performed via different touch gestures (e.g., a swipe instead of a tap, etc.) or by non-touch input (e.g., using a cursor controller, a keyboard, a touchpad/trackpad, a near-touch sensitive screen, etc.). In addition, a number of the

figures (including FIGS. **7**, **14**, **19**, **20**, **36**, **37**, **48**, and **68-71**) conceptually illustrate processes. The specific operations of these processes may not be performed in the exact order shown and described. The specific operations may not be performed in one continuous series of operations, and different specific operations may be performed in different embodiments. Furthermore, the process could be implemented using several sub-processes, or as part of a larger macro process. Thus, one of ordinary skill in the art would understand that the invention is not to be limited by the foregoing illustrative details, but rather is to be defined by the appended claims.

While the invention has been described with reference to numerous specific details, one of ordinary skill in the art will recognize that the invention can be embodied in other specific forms without departing from the spirit of the invention. For example, one of ordinary skill in the art will understand that many of the UI items of in FIGS. **1-6**, **8-13**, **15-18**, **21-35**, **38-41**, and **49-65** can also be activated and/or set by a cursor control device (e.g., a mouse or trackball), a stylus, keyboard, a finger gesture (e.g., placing, pointing, tapping one or more fingers) near a near-touch sensitive screen, or any other control system in some embodiments. Thus, one of ordinary skill in the art would understand that the invention is not to be limited by the foregoing illustrative details, but rather is to be defined by the appended claims.

What is claimed is:

1. A non-transitory machine readable medium storing sets of instructions that when executed by at least one processing unit of a device provides a user interface (UI) for sharing a plurality of image streams, each image stream created by a subscriber and shared by one or more other subscribers, the UI comprising:

a first display area for displaying a plurality of images;

a set of image sharing tools for (i) receiving a selection of a set of images from the first display area to create an image stream, (ii) sharing the set of images with a group of subscriber devices, and (iii) exchanging comments with the group of subscriber devices regarding the set of images in the created image stream and images in one or more image streams created by other subscriber devices; and

a second display area for displaying a notification regarding a new comment associated with a shared image, wherein the notification is displayed on a subscriber device that created the image stream comprising the shared image and on a subscriber device that has previously left a comment regarding the shared image, wherein the notification is not displayed on a subscriber device that has not created the image stream comprising the shared image and has not previously left a comment regarding the shared image.

2. The non-transitory machine readable medium of claim **1**, wherein the UI further comprises a selectable item that when selected causes the first display area to display images that are shared with the group of subscriber devices and exclude any images that are not shared with the group of subscriber devices.

3. The non-transitory machine readable medium of claim **1**, wherein each image that is associated with at least one comment is displayed in the first display area with a marking or number that identifies a number of comments associated with the image.

4. The non-transitory machine readable medium of claim **1**, wherein each image that is associated with at least one comment is displayed in the first display area with a marking that indicates whether the image is associated with at least one unread comment or is not associated with any unread comment.

5. The non-transitory machine readable medium of claim **4**, wherein the marking is displayed in a first color to indicate that the image is associated with at least one unread comment or is displayed in a second different color to indicate that the image is not associated with any unread comment.

6. The non-transitory machine readable medium of claim **1**, wherein each image that is associated with a plurality of comments is displayed in the first display area with a marking that identifies whether the subscriber device has previously left at least one comment regarding the same image.

7. The non-transitory machine readable medium of claim **1**, wherein the notification is displayed with at least one of the new comment, a name of the subscriber that posted the new comment, a thumbnail representation of the image associated with the new comment.

8. The non-transitory machine readable medium of claim **1**, wherein a selection of the notification causes the image associated with the new comment to be displayed in the first display area with the new comment.

9. The non-transitory machine readable medium of claim **1**, wherein the set of image sharing tools comprises a selectable item that when selected associates an image in the set of images with a marking that indicates a liking of the image.

10. A non-transitory machine readable medium storing sets of instructions that when executed by at least one processing unit of a device provides a user interface (UI) for sharing a plurality of image streams, each image stream created by a subscriber and shared by one or more other subscribers, the UI comprising:

a display area for displaying a plurality of images; and

a set of image sharing tools for (i) receiving a selection of a set of images from the display area, (ii) sharing the set of images with a group of subscriber devices, (iii) exchanging comments with the group of subscriber devices regarding the set of image, and (iv) displaying a unitary multi-state marker on each image that is associated with a set of comments regarding the image, the multi-state marker displayed on each image comprising:

a first state to indicate that the subscriber device has previously left at least one comment regarding the image and the image is associated with at least one unread comment, and

a second state to indicate that the subscriber device has not previously left any comments regarding the image and the image is associated with at least one unread comment.

11. The non-transitory machine readable medium of claim **10**, the UI further comprising a selectable item that when selected causes the display area to display images that are shared with the group of subscriber devices and exclude any images that are not shared with the group of subscriber devices.

12. The non-transitory machine readable medium of claim **10**, wherein the multi-state marker further comprises a number that identifies a number of comments associated with the image.

13. The non-transitory machine readable medium of claim **10**, wherein the multi-state marker is displayed in a first color to indicate that the image is associated with at least one unread comment or is displayed in a second different color to indicate that the image is not associated with any unread comment.

14. The non-transitory machine readable medium of claim **10**, wherein the display area is a first display area, wherein the

UI further comprises a second display area to display a notification regarding a new comment associated with an image in the set of images.

15. The non-transitory machine readable medium of claim **14**, wherein the notification is displayed with at least one of the new comment, a name of the subscriber that posted the new comment, a thumbnail representation of the image associated with the new comment.

16. The non-transitory machine readable medium of claim **14**, wherein a selection of the notification in the second display area causes the image associated with the new comment to be displayed in the first display area with the new comment.

17. The non-transitory machine readable medium of claim **14**, wherein the notification is displayed on a subscriber device that created the image stream comprising the image associated with the new comment and on a subscriber device that has previously left a comment regarding the image associated with the new comment, wherein the notification is not displayed on a subscriber device that has not created the image stream comprising the shared image and has not previously left a comment regarding the shared image.

18. The non-transitory machine readable medium of claim **10**, the multi-state marker displayed on each image further comprising:

a third state to indicate that the subscriber device has previously left at least one comment regarding the image and all comments associated with the image have been read, and

a fourth state to indicate that the subscriber device has not previously left any comments regarding the image and all comments associated with the image have been read.

19. The non-transitory machine readable medium of claim **10**, wherein the set of image sharing tools comprises a selectable item that when selected associates an image in the set of images with a marking that indicates a liking of the image.

20. The non-transitory machine readable medium of claim **10**, wherein the multi-state marker is displayed with a first shape that indicates the image is associated with at least one comment left by the subscriber device or displayed with a second shape that indicates the image is not associated with any comments left by the subscriber device.

21. The non-transitory machine readable medium of claim **10**, wherein the multi-state marker is displayed with a first color that indicates the image is associated with at least one comment left by the subscriber device or displayed with a second color that indicates the image is not associated with any comments left by the subscriber device.

22. The non-transitory machine readable medium of claim **10**, wherein the multi-state marker is displayed with a first shape that indicates the image is associated with at least one unread comment or displayed with a second shape that indicates the image is not associated with any unread comment.

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