DocCode - APPENDIX

SCORE Placeholder Sheet for IFW Content

Application Number: 17833188 Document Date: 06/06/2022

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

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- Appendix

At the time of document entry (noted above):

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- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: March 1, 2019

SCORE Placeholder Sheet for IFW Content

Application Number: 17833188 Document Date: 06/06/2022

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Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

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- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: March 1, 2019

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SGIC-002US02
	Application Number	
Title of Invention	SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Peter		AZUOLAS	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

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State/Province	NV
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Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
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Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

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State/Province	IL
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Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Brian		SILSTON	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SGIC-002US02
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City	New York	State/Province	NY	Country of Residence	US

Mailing Address of Inventor:

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Address 2			
City	New York	State/Province	NY
Postal Code	10023	Country	US

Inventor 4 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Philip	Nicholas	SCHUPAK	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Brooklyn	State/Province	NY	Country of Residence	US

Mailing Address of Inventor:

Address 1	138 Joralemon Street, Apartment 2F		
Address 2			
City	Brooklyn	State/Province	NY
Postal Code	11201	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	149890		
Email Address	sud@smithbaluch.com	Add Email	Remove Email

Application Information:

Title of the Invention	SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET CHANNELS		
Attorney Docket Number	SGIC-002US02	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	67	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SGIC-002US02
	Application Number	
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Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	◯ Limited Recognition (37 CFR 11.9)
Customer Number	149890		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	16685782	2019-11-15

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SGIC-002US02
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Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
16685782	Continuation of	PCTUS2018033016	2018-05-16
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCTUS2018033016	Claims benefit of provisional	62627859	2018-02-08
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCTUS2018033016	Claims benefit of provisional	62542729	2017-08-08
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCTUS2018033016	Claims benefit of provisional	62507158	2017-05-16

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

PTO/AIA/14 (01-22)
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☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SGIC-002US02
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Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SGIC-002US02
	Application Number	
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Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	SportsCastr, Inc.		
Mailing Address Information For Applicant:			
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Address 2	Suite 390		
City	Las Vegas	**State/Province**	NV
Country	US	Postal Code	89104
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	SportsCastr, Inc.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	1810 E Sahara Ave		
Address 2	Suite 390		
City	Las Vegas	**State/Province**	NV
Country i	US	Postal Code	89104
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Joseph Teja, Jr./			Date (YYYY-MM-DD)	2022-06-06
First Name	Joseph	Last Name	Teja, Jr.	Registration Number	45157

Additional Signature may be generated within this form by selecting the Add button. Add

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This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET CHANNELS

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application is a continuation application of U.S. non-provisional application serial no. 16/685,782, filed November 15, 2019, entitled "Systems, Apparatus, and Methods for Scalable Low-Latency Viewing of Integrated Broadcast Commentary and Event Video Streams of Live Events, and Synchronization of Event Information with Viewed Streams via Multiple Internet Channels," which claims a priority benefit, as a bypass continuation application, to PCT Application No. PCTUS2018033016, filed May 16, 2018, entitled "Systems, Apparatus, and Methods for Scalable Low-Latency Viewing of Integrated Broadcast Commentary and Event Video Streams of Live Events, and Synchronization of Event Information with Viewed Streams via Multiple Internet Channels," which PCT application in turn claims a priority benefit to U.S. provisional application serial no. 62/627,859, filed February 8, 2018, entitled "Systems, Apparatus, and Methods for Scalable Low-latency Viewing of Integrated Broadcast Commentary and Even Video Streams of Live Events, and Synchronization of Event Information with Viewed Streams via Multiple Internet Channels;" U.S. provisional application serial no. 62/542,729, filed August 8, 2017, entitled "Systems, Apparatus, and Methods for Scalable Low-latency Viewing of Integrated Broadcast Commentary and Even Video Streams of Live Events, and Synchronization of Event Information with Viewed Streams via Multiple Internet Channels;" and U.S. provisional application serial no. 62/507,158, filed May 16, 2017, entitled "Systems, Apparatus, and Methods for Scalable Low-latency Viewing of Integrated Broadcast Commentary and Even Video Streams of Live Events, and Synchronization of Event Information with Viewed Streams via Multiple Internet Channels." Each of the foregoing applications is incorporated by reference herein in its entirety.

BACKGROUND

[0002] The public's access to the Internet, as well as the amount of bandwidth for Internet users, increased greatly in the mid-1990s to the early 2000s. The available Internet bandwidth

allowed for the streaming of both recorded audio and recorded video content to a user's home. Also, additional increase of Internet access was sparked by the rise of the smartphone and the ability for smartphones to access the Internet on-the-go. In 2005, YouTube™ began to offer Internet users the ability to upload, edit, view, rate, share and comment on a wide variety of user-generated and corporate media video content. Examples of such content include video clips, television show clips, music videos, audio recordings, movie trailers, video blogs, short original videos, and educational videos. Within one year of its inception, YouTube™ reached 65 thousand daily video uploads, with 100 million daily views.

[0003] The first Internet live video streaming platform in the United States, aptly called Livestream, was launched in 2007. Livestream, as well as other nascent live video streaming platforms, were content agnostic, and over time Internet viewers desired more specialized, content-specific, and niche live video streaming platforms. To accommodate evolving viewer demand, various live video streaming platforms have launched since Livestream; examples of such more specialized platforms include Twitch.tv (a live video streaming platform for creative arts and gaming content, which launched in 2011), and musical.ly (a live video streaming platform designed for music video content, which launched in 2014).

[0004] Live video streaming platforms have also aimed to attract social network users, and social networking platforms have evolved to include live video streaming capabilities. For example, Twitch.tv includes social networking components, and in 2015 the social media platform Twitter acquired the live video streaming platform Periscope. Other social media platforms have followed suit, with both Facebook and Instagram implementing live video streaming capabilities into their mobile applications in 2016. The widespread use of smartphones enables users of these social media platforms to share live videos with their social network.

SUMMARY

[0005] In spite of the proliferation of live video streaming over the Internet, the Inventors have recognized and appreciated various technological problems in conventional techniques for transmission of digital content via the Internet that adversely impact the live video streaming viewer experience. One such technological problem relates to viewer "latency," i.e., the delay between a first user generating a live video stream for transmission via the Internet and a second

user receiving a copy of the live video stream via the Internet for viewing. For example, the live video streaming platform Twitch.tv has a latency of approximately 15 seconds, and Facebook's live streaming platform has an average latency of approximately 10 seconds. Other technological challenges for live video streaming arising from shortcomings in conventional techniques, as recognized and appreciated by the Inventors, include, for example, the difficulties in providing relatively low latency copies of live video streams with relatively high quality (e.g., high definition HD and high bit rate, such as 2 to 5 megabits per second), synchronizing such low latency and high quality copies of a live video stream amongst multiple viewers (particularly as the number of viewers of a given live video stream significantly increases), and allowing for different classes or types of viewers to flexibly access copies of a live video stream via different live streaming formats (which may lead to different qualities of service).

[0006] With these various technological challenges in mind, the present disclosure relates generally to inventive systems, apparatus, and methods for facilitating one or more broadcasters to create/provide video and/or audio (also referred to herein as a "broadcast") and allow one or more viewers to consume the video and/or audio, either by receiving a copy of a live stream representing the video and/or audio essentially in real-time as created/provided by a given broadcaster, or by retrieving and playing a recording of the live stream at a later time. In the context of essentially real-time viewing of live streams, in various implementations the inventive systems, apparatus and methods discussed in detail herein address one or more technological problems relating to viewer latency, synchronization amongst different numbers of viewers, and providing scalable and flexible access to live streams to different classes/types of viewers and/or with different qualities of service.

[0007] With reference to FIG. 1A, in various implementations a given broadcaster uses a network-connected client device (e.g., a first smart phone or other personal computing device communicatively coupled to the Internet) to generate a live stream of digital content corresponding to the video and/or audio created/provided by the broadcaster, wherein the live stream is transmitted to an inventive server and memory storage architecture (additional details of the server and memory storage architecture are shown, for example, in FIGS. 2 and 3). The inventive server and memory storage architecture processes the broadcaster's live stream to generate multiple copies of the live stream which are provided to respective viewers, and also records the live stream and stores the recording for later replay. One or more viewers using

different network-connected client devices (e.g., a second and third smart phone or other personal computing device communicatively coupled to the Internet) may communicatively couple to the server and memory storage architecture to receive a copy of the live stream of the digital content as a real-time or essentially real-time consumer of the broadcast created/provided by the broadcaster, or retrieve and play a recording of the live stream generated by the broadcaster client device (and recorded by the server and memory storage architecture). In some implementations, a given broadcaster themselves may view their own broadcast as a viewer on the same client device (e.g., by opening a separate tab on their client device and connecting to the server and memory storage architecture as both a broadcaster and a viewer). In one aspect, the inventive server and memory storage architecture allows any number of broadcasters to generate respective live streams of digital content, and any number of viewers to receive respective copies of a given broadcaster's live stream of digital content. In another aspect, the inventive server and memory storage architecture allows a given viewer of a first broadcaster's live stream to effectively switch in essentially real-time to view one or more other broadcasters' live streams.

[0008] In some implementations, the inventive systems, apparatus, and methods further facilitate a social platform in tandem with broadcasting video and/or audio to one or more viewers, in which a given broadcaster and their viewer(s) may communicate with one another (e.g., via chat messages) in essentially real-time during a broadcast. In one aspect, one or more chat messages, as well as various viewer-related information (e.g., name, surname, profile photo), may be displayed on respective client devices used by the broadcaster and the one or more viewers as the video and/or audio is rendered on the respective client devices.

[0009] In some implementations, the video and/or audio created/provided by one or more broadcasters is video-based commentary about a live event being observed by a given broadcaster. In various aspects, the broadcaster may take the role of a main commentator for the event, or a "color commentator" (e.g., analyst or summarizer) for the event; in a given role, the broadcaster may describe the event as it occurs (e.g., provide chronological or "play-by-play" updates to "call" the event), and/or may provide expert analysis, background or anecdotal information about the event and/or participants in the event, and/or relevant statistics regarding the event, participants in the event, or related events. FIG. 1B illustrates a display of an example client device, in which a broadcaster is providing video-based commentary about a sports game,

and in which chat messages from one or more viewers, event information about the sports game, and other graphics and/or animations are displayed together with the broadcaster's video-based commentary.

[0010] Examples of various activities constituting events according to the present disclosure include, but are not limited to, a variety of sports games (e.g., professional, semi-professional, intramural, community-oriented) or sporting activities (e.g., exercise-related activities, physical training activities, fishing, hunting), musical performances, theatrical performances, other artistic or entertainment-oriented activities, speeches or presentations, political activities (e.g., election-related activities, campaign-related activities, public or "town hall" meetings, public marches or demonstrations), military activities, professional activities (e.g., meetings or conferences), academic or educational activities (e.g., academic presentations or lectures, research activities, medical or scientific procedures, ceremonies), cooking or baking activities, competitive activities (e.g., racing activities), game-related activities (e.g., online gaming, board games, chess matches, role-playing games), social activities, and news-related activities. In one aspect, the video-based commentary provided by one or more broadcasters about the event and consumed by one or more viewers may provide a "second screen" experience for the viewers; in particular, in some implementations, the viewers may consume the video-based commentary about the event on their respective client devices as they are watching the event itself on another device (e.g., a television), or watching and/or participating in the event at the event's venue.

[0011] As discussed in greater detail below, in various aspects the inventive systems, apparatus and methods described herein provide an improvement in computer network functionality by facilitating scalable and appreciably low-latency viewing of copies of multiple broadcasters' live streams of video-based commentary about an event by significant numbers of viewers as the event unfolds. Particularly in the context of a "second screen" experience relating to a live event, discernible delay between the observation of the event itself and a given broadcaster's video-based commentary would significantly undermine viewer experience. Accordingly, the inventive systems, apparatus and methods described herein specifically address multiple technological problems in conventional techniques relating to transport of digital content via the Internet by providing multiple technological solutions to ensure a low-latency viewing experience for significant numbers of viewers.

[0012] In such implementations relating to video-based commentary about events, the inventive systems, apparatus and methods disclosed herein further may facilitate display, on respective client devices used by the broadcaster and the one or more viewers, of various event information in tandem with the video-based commentary rendered on the respective client devices. For example, in connection with sports games, displayed event information may include, but is not limited to, one or more of team information (e.g., team names, abbreviations and/or logos), score information (e.g., with essentially real-time score updates synchronized with the video-based commentary), player information, venue information, game status information (e.g., on-base, at-bat, timeouts, fouls, pole position, yards-to-go, yards-to-goal, down), team statistics, player statistics and the like. In some implementations, such event information about a sports game may be rendered in the display of a client device as a "scorebug" that may include for example, team abbreviations or logos, team scores, game status (e.g., period, quarter, inning), and actual or elapsed time for the game, with updates to one or more information elements in essentially real-time as the game progresses. It should be readily appreciated that for other types of events, a wide variety of information germane to the event may be displayed as event information (e.g., with essentially real-time updates of evolving information as the event progresses) together with the rendering of the video-based commentary on respective client devices. In another aspect, various event information or other information germane to a given broadcaster's video-based commentary may be rendered on a viewer client device in a "lower third" (also sometimes referred to as a "bottom third") of a display (e.g., as an overlay to the video-based commentary).

[0013] In view of the foregoing, in other aspects the inventive systems, apparatus and methods described herein provide additional improvements in computer network functionality by facilitating scalable and appreciably low-latency synchronization of displayed event information with multiple broadcasters' live streams of video-based commentary about an event as viewed by significant numbers of viewers as the event unfolds. Particularly in the context of a "second screen" experience relating to a live event, discernible delay between the observation of the event itself and the status of event information displayed in tandem with a given broadcaster's video-based commentary would significantly undermine viewer experience. Accordingly, the inventive systems, apparatus and methods described herein specifically address multiple technological problems in conventional techniques relating to transport of digital content via the

Internet by providing multiple technological solutions to ensure not only a low-latency viewing experience for significant numbers of viewers (e.g., relative to the event about which a broadcaster is providing video-based commentary), but appropriate synchronization of event information across all broadcasters of an event and their associated viewers.

[0014] In some implementations as discussed herein, these technological solutions contemplate multiple Internet communication channels to provide relevant and synchronized information to client devices (as would be readily appreciated in the relevant arts, a "communication channel" refers to a physical or logical connection over a transmission medium to convey information signals from one or more senders to one or more receivers). For example, in one implementation, a first "video" Internet communication channel (e.g., between a media server or other media source and a client device) conveys the digital content corresponding to the video-based commentary provided by the broadcaster and consumed by one or more viewers, and a second "event information" Internet communication channel (e.g., between a particular socket of a socket server and the client device) conveys the event information. In other implementations, an additional "chat/system event" Internet communication channel (e.g., between another socket of a socket server and the client device) is employed to convey chat information and other information relating to system events regarding a particular broadcaster's live stream. In one aspect, connections between client devices and a particular socket of a socket server are persistent authenticated connections, so that the number of users (broadcasters and viewers) connected to a particular socket (e.g., and currently watching a particular live stream and/or particular event) may be tracked.

[0015] In some implementations, the inventive systems, apparatus, and methods further facilitate a variety of screen animations (e.g., motion graphics), customized displays or screen backgrounds, and other special effects graphics (e.g., augmented reality) that are generally associated with the video and/or audio created by a broadcaster, and rendered by client devices in tandem with a given broadcaster's video and/or audio.

[0016] In some implementations in which the broadcaster may be creating/providing video and/or audio content about an event, one or more such screen animations, customized displays or screen backgrounds, and other special effects graphics may be related to some aspect of the event. For example, as noted above, a "scorebug" providing information about a sporting event

may be presented on a viewer's display with a variety of motion or other special effects graphics. In one aspect, the information provided by such a scorebug is derived from the synchronized event information that is received by the client device on an event information Internet communication channel that is separate from the video content representing the video-based commentary. In another aspect, the scorebug and/or other special effects graphics or animations may be rendered in the display of the client device pursuant to execution of a client app or program on the client device (rather than having these display elements integrated into the broadcaster's live stream itself). In other aspects, one or more such screen animations and other special effects may be provided in a lower/bottom third of a client device's display, and may be interactive (e.g., in that a user of a client device may select or thumb-over an animation, special effect and/or scorebug to retrieve additional information and/or initiate other animations/graphics) and/or user-customizable (e.g., a broadcaster may select from one of multiple background displays so that they may appear to be in any of a variety of locations or venues, customize their video-based commentary with a broadcaster-generated lower third, and/or add create/provide introduction videos to be shown before their live stream begins).

[0017] In yet other aspects, screen animations, customized displays or screen backgrounds, and/or other special effects graphics may be related to one or more of advertising or branding (e.g., by sponsors of a broadcaster, sponsors of an event about which a broadcaster is providing commentary, participants in the event itself, etc.), premium features and digital gifts (e.g., provided by one or more viewers to one or more broadcasters or other viewers). For example, in some implementations, via a client app or software program executing on a client device, users will be able to purchase digital gifts for other users (e.g., a viewer following a particular broadcaster may purchase digital beers, various digital concession stand items, ticker tapes, penalty flags, etc.), and the digital gifts will appear in the broadcaster's profile and/or be represented on a display (e.g., as an icon or sprite) together with the broadcaster's video-based commentary. In one implementation, information regarding digital gifts may be communicated between client devices and the server and memory storage architecture via a chat/system event Internet communication channel associated with a given broadcaster's live stream of digital content.

[0018] In some implementations, the video and/or audio created/provided by one or more broadcasters may relate to various types of news, other types of current or past events, and

various topics of interest about which a given broadcaster wishes to provide commentary. For example, a given broadcaster, or multiple broadcasters (which may be globally-distributed broadcasters, e.g., a first broadcaster in Europe, a second broadcaster in Africa, and a third broadcaster in Asia) may wish to broadcast about an ongoing, recent or past event (e.g., news about a bombing, a fire, an arrest, an economic development, a political or military development, or any of the other activities discussed above) or a particular topic of interest (e.g., healthy eating or dieting, gardening, religion, dating, politics, culture, art, music, playing a musical instrument, learning a language, auto repair, real estate, business, economics, legal issues, global warming, space exploration, a particular TV program or series, a particular entertainment or sports personality, video games, hobbies, etc.). As noted above, various event information regarding the ongoing, recent or past event (or particular topic of interest) may be provided to respective viewer devices, in tandem with the video-based commentary, in a variety of form factors and in a manner that ensures appropriate synchronization of event information across all broadcasters of an event and their associated viewers.

[0019] In yet other implementations, inventive systems, apparatus, and methods according to the present disclosure facilitate one or more broadcasters in providing video-based commentary regarding a live event, and combine the broadcaster's video-based commentary with an audio/video feed of the live event itself so as to generate an integrated live event and commentator stream. Multiple viewers interested in a particular broadcaster's commentary may receive synchronized copies of the integrated live event and commentator stream via a content delivery network that accesses the copy of live stream from a first media server endpoint corresponding to the live stream (e.g., according to a first live stream Internet URL). Respective viewer devices receiving copies of this live stream also connect to an event socket of a socket server (e.g., according to a first event socket Internet URL) to receive synchronized event information (e.g., real time scores) relating to the event. Based on the received copy of the integrated live event and commentator stream and the synchronized event information, a given viewer device displays the broadcaster's video-based commentary together with the audio/video of the live event itself, as well as the event information (e.g., as a "scorebug"), to provide a "single screen experience."

[0020] In some implementations relating to such a single screen experience, the event socket also may provide event broadcaster information relating to different broadcasters offering video-

based commentary about the same live event. Respective viewers of the same live event may select amongst different broadcasters for the event, based on the event broadcaster information provided by the event socket, to access a different but synchronized integrated live event and commentator stream (e.g., according to a second live stream Internet URL associated with a different broadcaster). Thus, the event broadcaster information provides a seamless transition to a different broadcaster's commentary integrated with the audio/video of the live event. The viewer device may remain connected to the event socket to continue to receive the synchronized event information which is displayed together with the different broadcaster's commentary and the audio/video of the live event, as well as ongoing updates to event broadcaster information to keep abreast of different broadcasters that are providing video-based commentary about the event.

[0021] Thus, in various examples discussed in greater detail below, systems, apparatus, and methods are disclosed for obtaining, substantially in real time, via at least one communication interface over at least one network, an audio and/or visual feed generated by a broadcaster client device during at least one live event, wherein the audio and/or visual feed includes commentary associated with the at least one live event, and a separate event data feed including real time information associated with the at least one live event. The commentary and the real time information associated with the at least one live event are transmitted via at least one processor communicatively coupled to the at least one communication interface, so as to provide, substantially in real time, streaming content via the at least one communication interface over the at least one network to at least one display device for concurrent display of the commentary and a graphical ticker based on the real time information associated with the event. The disclosed systems, apparatus, and methods are enhanced tools for real-time broadcasting of user-generated content associated with one or more live events and community engagement that are unavailable from existing video hosting websites.

[0022] *Glossary*

[0023] USER: a person who interfaces, via a mobile app or web portal accessed on a client device communicatively coupled to the Internet, with one or more of the various servers and corresponding server functionality described herein.

[0024] REGISTERED USER: A user that provides profile information and validation credentials to establish a user account so as to access, via a login process using the validation credentials, the one or more of the various servers and corresponding server functionality described herein.

[0025] ANONYMOUS USER: A non-registered user that has access, without requiring a login process, to a limited feature set based on the server functionality described herein.

[0026] BROADCASTER: A registered user that creates/provides video and/or audio (also referred to herein in some instances as "video-based commentary") for consumption by one or more viewers.

[0027] EVENT: An activity about which a broadcaster may create/provide video and/or audio as the activity occurs (i.e., in "real-time"). Examples of activities constituting events according to the present disclosure include, but are not limited to, a variety of sports games (e.g., professional, semi-professional, intramural, community-oriented) or sporting activities (e.g., exercise-related activities, physical training activities, fishing, hunting), musical performances, theatrical performances, other artistic or entertainment-oriented activities, speeches or presentations, political activities (e.g., election-related activities, campaign-related activities, public or "town hall" meetings, public marches or demonstrations), military activities, professional activities (e.g., meetings or conferences), academic or educational activities (e.g., academic presentations or lectures, research activities, medical or scientific procedures, ceremonies), cooking or baking activities, competitive activities (e.g., racing activities), game-related activities (e.g., online gaming, board games, chess matches, role playing games), social activities, and news-related activities. Video and/or audio created/provided by a broadcaster about an event may be referred to herein as "video-based commentary." In some implementations, the video and/or audio created/provided by one or more broadcasters may relate to various types of news, other types of current, recent or past events, and various topics of interest about which a given broadcaster wishes to provide commentary (e.g., news about a bombing, a fire, an arrest, an economic development, a political or military development, or any of the other activities discussed above, healthy eating or dieting, gardening, religion, dating, politics, culture, art, music, playing a musical instrument, learning a language, auto repair, real

estate, business, economics, legal issues, global warming, space exploration, a particular TV program or series, a particular entertainment or sports personality, video games, hobbies, etc.).

[0028] VIEWER: A registered user or anonymous user that consumes video and/or audio created/provided by a broadcaster, via essentially real-time access to a live stream of digital content representing the video and/or audio, or via retrieval and playing of a recording of the live stream of digital content.

[0029] LIVE STREAM: Digital content (e.g., digital video and/or digital audio) that is transferred between at least two network-connected devices in real-time or essentially real-time as the corresponding video and/or audio codified as the digital content is created/provided by a broadcaster. Thus, a network-connected client device used by the broadcaster may generate a live stream of digital content corresponding to the video and/or audio created/provided by the broadcaster, and a viewer using a different network-connected client device may receive a copy of a live stream of the digital content as a real-time or essentially real-time consumer of the video and/or audio created/provided by the broadcaster. In some implementations, the video and/or audio created/provided by the broadcaster and represented in a live stream may be video-based commentary relating to an event. A live stream of digital content may have a variety of data formats (e.g., H.264 MPEG-4 Advanced Video Coding video compression; VP8 video compression) and transmission protocols, including persistent/continuous streaming transmission protocols (e.g., real time streaming protocol "RTSP;" real time messaging protocol "RTMP;" web real-time communication "WebRTC"), as well as segmented and/or adaptive bitrate (ABR) protocols (e.g., Apple's HTTP Live Streaming "HLS;" Microsoft's HTTP Smooth Streaming "MSS;" Adobe's HTTP Dynamic Streaming "HDS;" standards-based ABR protocol "MPEG-DASH").

[0030] FOLLOWER: A registered user who is notified when a particular broadcaster is online.

[0031] SUBSCRIBER: A follower of a particular broadcaster that has paid for access to additional features and/or content not available to a follower (e.g., subscriber-specific chat channels).

[0032] VIP MEMBER: an admin-designated registered user that has additional access rights and high priority access to live stream media servers.

[0033] MEDIA MEMBER: an admin-designated registered user that is a media professional. In some implementations, the media member designation is used during some live streams to facilitate filtering and prioritization of comments/chat message for response by the broadcaster of the live stream.

[0034] ADMIN USER: a staff account flagged with administrative powers.

[0035] PRIVATE PROFILE: a profile for a user that has designated their content as private, only allowing direct link access to live/replay streams and archive access to broadcasters that the user has followed.

[0036] RAW VIDEO: A recording made by a media server of a live stream generated by a broadcaster. In one example implementation in which a broadcaster client device generates a video stream in H.264/AAC format and the media server is a Real Time Messaging Protocol (RTMP) media server, the raw video is produced by the RTMP media server by recording the broadcaster's live stream directly (to provide a 720p high definition feed or even higher definition feed). In another example in which a broadcaster client device generates a video stream in VP8/WebRTC format and the media server is a WebRTC media server, the WebRTC media server first transcodes the live stream from the broadcaster into a H.264 720p high definition (or even higher definition feed) and then records the transcoded feed to provide the raw video.

[0037] APPENDIX A includes a YAML file associated with an Application Program Interface (API) employed in connection with at least some of the inventive implementations disclosed herein.

[0038] It should be appreciated that all combinations of the foregoing concepts and additional concepts discussed in greater detail below (provided such concepts are not mutually inconsistent) are contemplated as being part of the inventive subject matter disclosed herein. In particular, all combinations of any claimed subject matter appearing at the end of this disclosure are contemplated as being part of the inventive subject matter disclosed herein. It should also be appreciated that terminology explicitly employed herein that also may appear in any disclosure incorporated by reference should be accorded a meaning most consistent with the particular concepts disclosed herein.

[0039] Other systems, processes, and features will become apparent to those skilled in the art upon examination of the following drawings and detailed description. It is intended that all such additional systems, processes, and features be included within this description, be within the scope of the present invention, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0040] The skilled artisan will understand that the drawings primarily are for illustrative purposes and are not intended to limit the scope of the inventive subject matter described herein. The drawings are not necessarily to scale; in some instances, various aspects of the inventive subject matter disclosed herein may be shown exaggerated or enlarged in the drawings to facilitate an understanding of different features. In the drawings, like reference characters generally refer to like features (*e.g.*, functionally similar and/or structurally similar elements).

[0041] FIG. 1A is a block diagram showing respective elements of a system to facilitate live streaming of digital content (video and/or audio) from multiple broadcasters to multiple viewers, according to some inventive implementations.

[0042] FIG. 1B illustrates a display of an example client device in the system of FIG. 1A, showing various displayed content according to some inventive implementations.

[0043] FIG. 2 is a block diagram of the broadcast/viewing servers and memory storage devices shown in FIG. 1A according to some inventive implementations.

[0044] FIG. 3 is a block diagram showing additional details of the various interconnections between the respective components of the servers and memory storage devices shown in FIG. 2, according to some inventive implementations.

[0045] FIGS. 4A and 4B show a process flow diagram illustrating a broadcast media server selection algorithm according to one inventive implementation, which in some examples may be performed by one or more web servers shown in FIGS. 2 and 3.

[0046] FIGS. 5A through 5C show a process flow illustrating a media server process for the media servers shown in FIGS. 2 and 3, according to one inventive implementation.

[0047] FIG. 6 is a block diagram illustrating the selective coupling of an example viewer client device to one of the media sources of the servers and memory storage devices shown in FIGS. 2 and 3, according to some inventive implementations.

[0048] FIG. 7 is a process flow diagram illustrating a viewer stream source selection algorithm according to one inventive implementation, which in some examples may be performed by the one or more web servers shown in FIGS. 2, 3 and 6.

[0049] FIG. 8 is a block diagram showing additional details of the HLS server architecture of the servers and memory storage devices shown in FIGS. 2, 3 and 6, according to some inventive implementations.

[0050] FIGS. 9A through 9D show a process flow illustrating an HLS stream viewing process performed by the HLS server architecture shown in FIG. 8, according to one inventive implementation.

[0051] FIG. 10 illustrates some of the functionality (e.g., services and other processes) performed by the control server shown in FIGS. 2 and 3, according to one inventive implementation.

[0052] FIGS. 11A through 11C show a process flow diagram illustrating an RTMP media server scaling system service method performed by the control server of FIG. 10, according to one inventive implementation.

[0053] FIGS. 12A through 12C show a process flow diagram illustrating an RTMP CDN server scaling system service method performed by the control server of FIG. 10, according to one inventive implementation.

[0054] FIGS. 13A and 13B show a process flow diagram illustrating a stream and server watchdog service method performed by the control server of FIG. 10, according to one inventive implementation.

[0055] FIGS. 14A and 14B show a process flow diagram illustrating a check RTMP media/CDN server method performed by the control server of FIG. 10 (e.g., as part of the method shown in FIGS. 13A and 13B), according to one inventive implementation.

[0056] FIG. 15 shows a process flow diagram illustrating an event data ingress service method performed by the control server of FIG. 10, according to one inventive implementation.

[0057] FIGS. 16A and 16B show a process flow diagram illustrating a live event data monitor service method performed by the control server of FIG. 10, according to one inventive implementation.

[0058] FIGS. 17A and 17B show a process flow diagram illustrating an asynchronous task service method performed by the control server of FIG. 10, according to one inventive implementation.

[0059] FIGS. 18A and 18B show a process flow diagram illustrating a process for taking a screenshot (thumbnail) of a live stream, performed by the control server of FIG. 10, according to one inventive implementation.

[0060] FIGS. 19A and 19B show a process flow diagram illustrating a user login process according to one inventive implementation, which in some examples may be performed by a client device and facilitated by one or more web servers shown in FIGS. 2 and 3.

[0061] FIGS. 20A and 20B show a process flow diagram illustrating a mobile broadcaster stream create process according to one inventive implementation, which in some examples may be performed by a broadcaster client device shown in FIG. 1A and facilitated by one or more web servers shown in FIGS. 2 and 3.

[0062] FIGS. 21A, 21B, 21C, 21D, and 21E show a process flow illustrating a mobile broadcaster active stream process according to one inventive implementation, which in some examples may be performed at least in part by a broadcaster client device shown in FIG. 1A.

[0063] FIGS. 22A and 22B show a communication flow diagram illustrating process flow elements and the server and/or memory storage devices involved in the communication flow for the processes shown in FIGS 20A and 20B, and FIGS. 21A-21E, according to one inventive implementation.

[0064] FIGS. 23A and 23B show a communication flow diagram illustrating process flow elements and the server and/or memory storage devices involved in the communication flow for a live stream RTMP media server or RTMP CDN viewer, according to one inventive implementation.

[0065] FIGS. 24A and 24B show a communication flow diagram illustrating process flow elements and the server and/or memory storage devices involved in the communication flow for a live stream HLS viewer, according to one inventive implementation.

[0066] FIGS. 25A, 25B, and 25C show a process flow illustrating a mobile client live stream replay method, according to one inventive implementation.

[0067] FIGS. 26A, 26B, and 26C show a process flow illustrating an event data replay process called in the method of FIGS. 25A, 25B and 25C, according to one inventive implementation.

[0068] FIG. 27 shows a process flow illustrating a user input replay process called in the method of FIGS. 25A, 25B and 25C, according to one inventive implementation.

[0069] FIG. 28 illustrates a viewing display screen of broadcaster video-based commentary integrated with audio/video of a live event and event information (e.g., in the form of a scorebug) to provide a single screen experience for viewing the broadcaster video-based commentary together with video the live event, according to one inventive implementation.

[0070] FIG. 29 is a block diagram of the broadcast/viewing servers and memory storage devices and associated client devices, similar to that shown in FIG. 2, illustrating some of the particular features germane to one example of a single screen implementation.

[0071] FIG. 30 is a flow chart illustrating a process implemented by the various devices shown in FIG. 29, according to one inventive implementation.

[0072] FIGS. 31A and 31B show a process flow diagram, similar to that shown in FIGS. 16A and 16B, illustrating a modified live event data monitor service method performed by the control server of FIG. 29, according to one inventive implementation.

[0073] FIGS. 32A, 32B, 32C, 32D, 32E and 32F show a process flow, similar to that shown in FIGS. 21A, 21B, 21C, 21D, and 21E, illustrating a modified mobile broadcaster active stream process according to one inventive implementation relating to the single screen experience.

DETAILED DESCRIPTION

[0074] Following below are more detailed descriptions of various concepts related to, and implementations of, inventive systems, methods and apparatus for scalable low-latency viewing

of broadcast digital content streams of live events (including integrated broadcast commentary and event audio/video streams of the live event itself), and synchronization of event information with viewed streams, via multiple Internet channels. It should be appreciated that various concepts introduced above and discussed in greater detail below may be implemented in various manners, and that examples of specific implementations and applications are provided primarily for illustrative purposes.

[0075] I. Overview

[0076] The present disclosure describes inventive systems, apparatus, and methods for connecting followers of live events (e.g., sports, performances, speeches, etc.), including commentators, spectators, and/or participants in live events (e.g., athletes, performers, politicians, etc.). In some example implementations, the inventive systems, apparatus and methods further provide a social platform for sharing and contributing multimedia associated with live events.

[0077] Live streaming is used herein to refer to delivery and/or receipt of content in real-time, as events happen, or substantially in real time, as opposed to recording content to a file before being able to upload the file to a media server, or downloading the entire file to a device before being able to watch and/or listen to the content. Streaming media is used herein to refer to multimedia (e.g., digital video and/or audio media) that is delivered between two or more network-connected devices in real time or substantially in real time. Streaming may apply to continuously updated media content other than video and audio including, but not limited to, a live ticker, closed captioning, and real-time text. An end-user (e.g., a viewer) may watch and/or listen to media streamed over a network (e.g., the Internet) using a user output interface such as a display and/or over a speaker communicatively coupled with, for example, a desktop computer, notebook or laptop computer, smart television, set-top box, Blu-ray™ player, game console, digital media player, smartphone (e.g., iOS or Android), or another network-connected interactive device.

[0078] In some implementations, a network platform receives and provides multimedia (e.g., digital video content and/or digital audio content) associated with a live event. The multimedia may be captured by one or more broadcasters present at the live event. A broadcaster present at the live event may stream video and/or audio content to the network platform in real time or

substantially in real time during the live event. For example, a broadcaster may capture video of a sporting event, such as a local high school football game, using a video camera, smartphone camera, etc. The video may include audio and/or visual commentary from the broadcaster. One or more viewers (either present or not present at the event) may stream video and/or audio of the event to watch and/or listen in real time or substantially in real time during the live event to the broadcaster's commentary. Alternatively, a broadcaster present at the live event may record video and/or audio content for delayed streaming or uploading to the network platform during or after the live event, and a viewer may download the broadcaster's recording of the live event and the video and/or audio commentary for delayed viewing and/or listening.

[0079] In some implementations, a broadcaster may or may not be present at a live event to still generate multimedia content (broadcaster commentary) associated with the event during the event. For example, a broadcaster may generate audio or visual content about the event while simultaneously following the event via a live broadcast by a third party (e.g., television, radio, Internet, etc.). The multimedia content may or may not include or be integrated with video and/or audio from the event itself.

[0080] In some implementations, a network platform is capable of integrating user-generated (broadcaster-generated) multimedia with real-time data (e.g., "event information") collected by the user or a third party. For example, a live competitive event may be integrated with scores for the event. Other real-time data may include but is not limited to alerts, statistics, trivia, polls, news, broadcaster and/or viewer messages, and/or advertising associated with or relevant to the event, a participant in the event, a location of the event, a date/time of the event, etc. In one implementation, a network platform allows a user to select content, for example, news articles, and create onscreen elements for simultaneous viewing of the content.

[0081] Audio and/or visual indications and content may be integrated with user-generated multimedia for simultaneous presentation. The presentation may be in real-time or substantially in real-time. For example, audio indications may be presented with digital video media, and/or visual content may be presented with digital audio media. In some implementations, audio and/or visual indications and content are presented simultaneously with digital audio and/or video media using multiple tracks and/or display frames or overlays. For example, digital video media of a basketball game or of a broadcaster providing play-by-play audio commentary for the

game may be displayed with an overlay of a real-time scoreboard and/or ticker. Alternatively, the real-time scoreboard and/or ticker may be presented in a separate frame.

[0082] Audio and/or visual indications and content may be modifiable and/or interactive. For example, traditional news and sports broadcasting may insert audio and/or visual indications and content into an outgoing digital audio and/or video media stream. The receiving client devices have been assumed to be "dumb," that is, only capable of displaying the audio and/or video media as received. In contrast, in inventive implementations disclosed herein "smart" client devices allow audio and/or visual indications and content to be rendered on the client side, which allows for real-time modification and interaction with viewers and/or listeners. That is, client-side rendering allows for interactivity with elements and enhanced features not available to traditional broadcasting.

[0083] FIG. 1A is a block diagram of a system according to one inventive implementation, including multiple client devices (e.g., broadcaster client devices 100A and 100B, viewer client devices 200A, 200B, 200C and 200D), broadcast/viewing servers and memory storage devices 1000 (e.g., serving as the network platform noted above), an event information provider 55, one or more news feeds (RSS feeds) 65, and a digital distribution platform (app store) 75 all communicatively coupled via the Internet 50. Each of the client devices 100A, 100B, 200A, 200B, 200C, 200D may download from the digital distribution platform 75 an app or software program that becomes resident on the client device (i.e., a client app) and performs at least some of the various broadcaster and viewer functionality described herein in connection with broadcasting live streams of digital content and viewing copies of broadcasted live streams, exchanging chat messages amongst broadcasters and one or more viewers, logging system events and providing system event messages to broadcasters and viewers, collecting and maintaining/updating event information and providing event information to broadcasters and viewers in a synchronized manner, providing and updating various animation and special effects graphics, and replaying of recorded streams.

[0084] Although FIG. 1A illustrates two broadcaster client devices and four viewer client devices, it should be appreciated that various numbers of client devices (broadcaster client devices and viewer client devices) are contemplated by the systems, apparatus and methods disclosed herein, and those shown in FIG. 1A are for purposes of illustration. More specifically,

a given broadcaster may have virtually any number of viewers using respective viewer client devices to receive copies of the broadcaster's live stream of digital content via the servers and memory storage devices 1000; similarly, the system may accommodate virtually any number of broadcasters providing live streams of digital content to the servers and memory storage devices 1000, wherein each broadcaster has multiple viewers receiving copies of the broadcaster's live stream of digital content. In the example shown in FIG. 1A, a first broadcaster client device 100A provides a first live stream of digital content 102A, and a first plurality of viewer client devices 200A and 200B (grouped by a first bracket) receive respective copies 202A and 202B of the first broadcaster's live stream of digital content. Similarly, a second broadcaster client device 100B provides a second live stream of digital content 102B, and a second plurality of viewer client devices 200C and 200D (grouped by a second bracket) receive respective copies 202C and 202D of the second broadcaster's live stream of digital content. With respect to events or news that may be germane to a given broadcaster's live stream of digital content, the broadcast/viewing servers and memory storage devices 1000 may retrieve various event information from the event information provider 55 (e.g., STATS LLC), and various news from news feeds (RSS) 65, and in turn convey various event information and/or news to one or more client devices.

[0085] As discussed in further detail below, a variety of digital content format and transmission protocols are contemplated herein for the broadcaster live streams 102A and 102B output by the broadcaster client devices 100A and 100B respectively, as well as the copies of the live streams 202A, 202B, 202C and 202D received by respective viewer client devices 200A, 200B, 200C and 200D. For example, the first broadcaster client device 100A may be a mobile broadcaster client device (e.g., a smartphone) and output a live stream of digital content 102A having an H.264 MPEG-4 Advanced Video Coding (AVC) video compression standard format, via real time messaging protocol (RTMP) transport for continuous streaming over the Internet (e.g., via a persistent connection to a first media server of the servers and memory storage devices 1000). The second broadcaster client device 100B may be a web-based device (e.g., a desktop computer) and output a live stream of digital content 102B having a VP8 video compression format, transmitted via the web real-time communication (WebRTC) protocol for continuous streaming over the Internet (e.g., via a persistent connection to a second media server of the servers and memory storage devices 1000). The copies of the live streams 202A, 202B,

202C and 202D may be transmitted by the servers and memory storage devices 1000 as continuous streams using RTMP or WebRTC, or using segmented and/or adaptive bitrate (ABR) protocols (e.g., Apple's HTTP Live Streaming "HLS;" Microsoft's HTTP Smooth Streaming "MSS;" Adobe's HTTP Dynamic Streaming "HDS;" standards-based ABR protocol "MPEG-DASH").

[0086] FIG. 1B illustrates a display 250 of an example viewer client device 200A in the system of FIG. 1A, showing various displayed content according to some inventive implementations. It should be appreciated that one or more elements of the various content discussed in connection with FIG. 1B similarly may be provided on the display of a broadcaster client device. In the example of FIG. 1B, a broadcaster is providing video-based commentary relating to a live sporting event, and the display 250 of the viewer client device 200A includes various content elements including the broadcaster's video-based commentary 252, event information 254 relating to the live sporting event about which the broadcaster is providing the video-based commentary, chat messages 258 from one or more viewers consuming the broadcaster's video-based commentary, and various graphics, special effects and/or animation elements 256 (e.g., some of which are rendered in a "lower third" of the display 250).

[0087] More specifically, as shown in FIG. 1B, the client device 200A renders in the display 250 (pursuant to execution of a client app or software program) a first broadcaster's video-based commentary 252. As discussed above in connection with FIG. 1A, the first broadcaster's video-based commentary 252 is codified in a live stream of digital content 102A provided by the first broadcaster client device 100A to the servers and memory storage devices 1000, and a copy 202A of the first broadcaster's live stream is received by the viewer client device 200A from the servers and memory storage devices 1000. The display also includes event information 254 in the form of a "scorebug," wherein the scorebug includes indicators for the teams participating in the live sporting event, score information for the live sporting event, and event status (e.g., time clock, period or quarter, etc.). In various implementations discussed in further detail below, the scorebug may be animated, may include one or more special effects graphics elements, and/or may be interactive (e.g., the viewer may press or thumb-over one or more portions of the scorebug to launch further graphics or animations, receive additional information about the live sporting event, or navigate to another Internet location to receive additional information relating to the live sporting event).

[0088] The display 250 in FIG. 1B also includes lower-third content 256 comprising additional graphics, special effects and/or animation elements which similarly may be interactive; such elements may include a broadcaster-selected title for the broadcast, as well as text commentary from the broadcaster or event-related news. Additionally, as shown in the left portion of the display 250, the display may include one or more chat messages 258 from different viewers of the broadcaster's video-based commentary, including responses from the broadcaster themselves; as seen in FIG. 1B, the chat messages 258 may include the name of the viewer, a viewer photo, and the chat message content itself.

[0089] In some implementations, the network platform provided by the servers and memory storage devices 1000 maintains user profiles for broadcasters and viewers. Each user profile may be associated with, for example, a user email address, user device, or other unique identifier. Each user profile interface (e.g., "page" such as a webpage) may include and/or be customized with content (e.g., a profile photo, descriptive text, user-generated multimedia, favorite team imagery, etc.). In some implementations, the network platform further allows for the creation of "team" profiles; for example, event participants (e.g., individuals, groups, parties, teams, bands, schools, etc.) may share a "team" profile, wherein the team profile interface (e.g., "page" such as a webpage) may aggregate relevant content (e.g., news or current events about a particular event or team, such as polls, trivia, photo galleries, etc.) and provide further opportunities for users to contribute and connect with each other. The network platform may provide user preference options to further define a team profile interface with recommendations and/or alerts specific to a particular user (e.g., to prominently feature recent activity of a particular user).

[0090] With respect to social media-related features, as noted above the network platform provides chat capabilities such that users may engage in live public and/or private chat sessions. For example, in some implementations, users may request permission (or be allowed) to send each other private and/or public messages (e.g., direct messages). Furthermore, users may be able to purchase private and/or public virtual gifts (e.g., digital images of beers, penalty flags, etc., or profile/content enhancements like ticker tape) or provide "sponsorships" for other users. Public gifts received by a user may be displayed on the user's profile and/or with his or her content.

[0091] In some implementations, users are able to publicly and/or privately comment on, rate, "like," or otherwise indicate their opinions on live events, event-associated topics, user profiles, team profiles, and user-generated content. Users may be able to use # hashtags within their messages, chat sessions, comments, and/or other activity to link to messages, chat sessions, comments, and/or other activity happening among other users and/or teams. Users may be able to use @ symbols within their messages, chat sessions, comments, and/or other activity to tag other users, event participants, and teams.

[0092] In some implementations, a network platform provides a directory of live events. The directory interface may be presented as a listing, drop-down menu, keyword search bar, etc. The directory interface may include and/or distinguish between different categories of events. For example, the directory interface may include and/or distinguish between events that are scheduled, underway, and/or completed. The directory interface also may include and/or distinguish between different or particular types of events (e.g., live sports versus live music, baseball versus hockey, professional versus collegiate, National League versus American League, etc.); different or particular participants in the events (e.g., team, coach, athlete, owner, school, etc.); and/or different or particular locations of the events (e.g., country, region, state, county, town, district, etc.). As discussed in greater detail below, in one implementation a dedicated control server of the network platform periodically retrieves a variety of event information from one or more event information providers (e.g., for sports events, ESPN, STATS LLC), and populates a database of the network platform with information on available events so as to provide the directory of live events to a user.

[0093] In some implementations, the network platform may provide user preference options to further define an event directory interface with recommendations and/or alerts specific to a particular user. The network platform may request the location of a user or permission to access the geo-location of the user's device in order to recommend events nearby. The network platform may track and interpret patterns in the user's use of the platform to predict and recommend events specific to the user.

[0094] In some implementations, after a user selects an event, the network platform provides a directory of other users who are present at the event and/or generating media associated with the event. The directory interface may be presented as a listing, drop-down menu, keyword

search bar, etc. Selection of another user from the event-specific directory allows connection to, communication with, and/or access to media generated by that user. Thus, a user is able to discover and connect with similar users. The network platform may provide user preference options to further define a user directory interface with recommendations and/or alerts specific to a particular user. For example, in some implementations, users can discover other users based in part on one or more of the location of respective users, an event about which the broadcaster is providing commentary, a title of a broadcaster's live stream, and topics or other users that have been identified (e.g., in chat messages relating to a given broadcaster's live stream and/or a particular user's profile, using # hashtags or @ symbols).

[0095] In some implementations, the popularity of an event and/or broadcaster is monitored, displayed, and/or used in real-time or substantially in real-time. For example, a number of video servers may be scaled based on demand and/or usage by client devices, including broadcasters and/or viewers. Worker servers may be used for distributed monitoring and capturing screenshots/thumbnails of video streams. In another example, client media source selection of live stream copies, such as Real-Time Messaging Protocol (RTMP) versus HTTP Live Streaming (HLS), may be based on demand and/or usage levels (e.g., number of viewers requesting copies of a given broadcaster's live stream, capacity of media servers and/or content delivery network).

[0096] II. Servers and Memory Storage Devices

[0097] Having provided an overview of the information flow and general functionality enabled by the various elements shown in FIG. 1A, additional details of the servers and memory storage devices 1000 are now discussed, with reference initially to FIG. 2.

[0098] In particular, FIG.2 is a block diagram providing another perspective of the system shown in FIG. 1A, showing example communication connections between the broadcaster client devices 100A and 100B and the servers and memory storage devices 1000, example connections between the servers and memory storage devices 1000 and the viewer client devices 200A and 200C, and some structural details of the servers and memory storage devices 1000. Some of the broadcaster/viewer client devices that are mobile devices (e.g., smartphones) have downloaded a client app 5000 (e.g., from the digital distribution platform or app store 75 shown in FIG. 1A) which is resident in memory of the client device and executed by a processor of the client device.

For purposes of simplifying the illustration, only the viewer client devices 200A and 200C explicitly show the client app 5000 resident on the client devices; it should be appreciated, however, that one or more mobile broadcaster client devices also have the client app 5000 installed thereon.

[0099] As shown in FIG. 2, in one inventive implementation the servers/memory storage devices 1000 include one or more web servers 700 (also referred to herein as a "web server pool") that support an Applications Programming Interface (API) to facilitate communications between the servers/memory storage devices 1000 and one or more mobile broadcaster/viewer client device executing the client app 5000, and also facilitate communications to and from web-based client devices (that access the web server(s) via a web portal at a particular URL). In this role, as discussed in further detail below, much of the instructive communication between the client devices and the servers/memory storage devices 1000 occurs via the web server(s) 700. For example, it is via the web server(s) 700 that client devices create new live streams for broadcast and get access to media servers, receive access to view other broadcasters' live streams via one of multiple different media sources, receive event information associated with broadcasters' live streams and send and receive chat messages, log on and create or update user profiles (or other profiles such as team profiles), and access other social media-related functionality (e.g., digital gift giving) to interact with other users. The web server(s) 700 are communicatively coupled to a memory system 400 that includes a database 420, data storage 440, and one or more memory caches 460 to store various information (e.g., user profile information, stream information, event information, recorded live streams, etc.) germane to the operation of the servers and memory storage devices 1000 and the various client devices.

[0100] The servers/memory storage devices 1000 further comprise a plurality of media sources 300 (e.g., computer servers including one or more processors, memory, and one or more communication interfaces) that receive a live stream of video-based commentary from a given broadcaster client device, and provide copies of the live stream of video-based commentary to one or more viewer client devices. As shown in FIG. 2, in one implementation the media sources 300 are communicatively coupled to the memory system 400, and may comprise one or more Real Time Messaging Protocol (RTMP) media servers 320, an RTMP Content Delivery Network (CDN) 340 (which itself includes a plurality of content delivery network servers), one or more WebRTC media servers 360, and an inventive HTTP Live Streaming (HLS) caching and

amplifying server architecture 380. Additional details of the media sources 300 are discussed below in connection with FIGS. 3 through 6, and particular details of media server processes (performed by the RTMP media servers 320 and the WebRTC media servers 360) are discussed below in connection with FIGS. 5A, 5B and 5C. As also discussed below, in one implementation the web server(s) 700 select a particular media server of the media sources 300 to which a given broadcaster connects to provide the broadcaster's live stream of digital content, and the web server(s) 700 also select a particular media source of the media sources 300 to which a given viewer connects to receive a copy of a given broadcaster's live stream; further details of a broadcast media server selection algorithm and a viewer stream source selection algorithm implemented by the web server(s) 700 are provided below in connection with FIGS. 6 and 7.

[0101] The servers/memory storage devices 1000 shown in FIG. 2 further comprise a control server 500 coupled to the memory system 400, the event information provider 55, and the news feeds (RSS) 65 (e.g., via the Internet). In one aspect, the control server 500 periodically retrieves various event information from the event information provider 55 and/or news from the news feeds 65 that is germane to respective broadcasters' video-based commentary. In another aspect, the control system 500 may store at least some portion of retrieved event information and/or news in the memory system 400. More generally, as discussed below in connection with FIG. 10, the control server 500 implements a number of services/processes that govern functionality of other servers and devices in the servers/memory storage devices 1000; examples of such control system services/processes include, but are not limited to: an RTMP media server scaling process to add or remove servers from the one or more RTMP media servers 320 of the media sources 300 (see FIG. 11); an RTMP CDN server scaling process to add or remove servers from the RTMP CDN 340 of the media sources 300 (see FIG. 12); a live stream and media server watchdog process (see FIGS. 13-14); an event data ingress process (see FIG. 15); a live event data monitor process (see FIG. 16); an asynchronous task processor (see FIG. 17); and a live stream thumbnail/screenshot acquisition process (see FIG. 18).

[0102] With reference again to FIG. 2, the servers/memory storage devices 1000 further comprise one or more socket servers 600 communicatively coupled to the web server(s) 700 and the control server 500. In one aspect, the socket server(s) 600 facilitate communication, to one or more broadcaster client devices and one or more viewer client devices, of synchronized event

information retrieved by the control server 500 and associated with video-based commentary relating to a particular event. In particular, one or more sockets of the socket server(s) dedicated to the particular event allow respective client devices to establish an event information channel with the socket server(s), such that the event information (e.g., in the form of "event messages") is shared in a synchronized manner by all broadcasters/viewers following the particular event.

[0103] In FIG.2, the socket server(s) 600 also facilitate communication, between a given broadcaster of a live stream of video-based commentary and corresponding viewers of copies of the live stream, of chat messages and/or system event information (also referred to collectively simply as "chat information") relating to the broadcaster's live stream. In particular, one or more sockets of the socket server(s) 600 dedicated to the particular broadcaster's live stream allow respective client devices used by the broadcaster and their viewers to establish a chat/system event channel with the socket server(s), such that chat messages/system event information is shared in a synchronized manner by the broadcaster of the live stream and corresponding viewers of copies of the live stream. Chat messages sent on a given chat/system event channel may be displayed as text on all broadcaster/viewer client devices connected to the socket(s) dedicated to the particular broadcaster's live stream, whereas system event information may be received (but not necessarily displayed itself) by all client devices connected to the socket(s) dedicated to the particular broadcaster's live stream, and provide the client device with relevant data or instructions to take some action. As discussed further below, examples of the types of system event information or "system messages" that may be broadcast by the socket(s) dedicated to the particular broadcaster's live stream include, but are not limited to, indications of viewers joining or leaving a broadcast, an indication of a new follower of a broadcaster, indications relating to the purchase of digital gifts and types of digital gifts (which may cause some display or audio event on the client device), indications relating to "likes" (e.g., cheers, handclaps, or applause icons, or audio of crowds cheering), and other data/instructions relating to various social networking functionality.

[0104] In one aspect, connections between a given client device and a particular socket of a socket server are persistent authenticated connections (e.g., with IP-based fingerprint identifiers for anonymous users). The authenticated connection allows the servers and media storage devices 1000 to track how many users are connected to a particular socket at any given time (and hence how many users are viewing a copy of a particular broadcaster's live stream, and/or how

many users are viewing a copy of a live stream relating to a particular event). In another aspect, the various "messages" (e.g., event messages, chat messages, system messages) that are carried on the respective channels between a given client device and corresponding sockets of the socket server(s) are data packets including various event information, chat to be displayed, or system events (e.g., "new viewer," "disconnected viewer," "stream muted, "stream ended").

[0105] With reference again for the moment to FIG. 1A, recall that in the example arrangement depicted in FIG. 1A a first broadcaster client device 100A provides a first live stream of digital content 102A, and a first plurality of viewer client devices 200A and 200B (grouped by a first bracket) receive respective copies 202A and 202B of the first broadcaster's live stream of digital content. Similarly, a second broadcaster client device 100B provides a second live stream of digital content 102B, and a second plurality of viewer client devices 200C and 200D (grouped by a second bracket) receive respective copies 202C and 202D of the second broadcaster's live stream of digital content. Turning now again to FIG. 2, and taking only the viewer client devices 200A and 200C into consideration for purposes of illustration, the example implementation shown in FIG. 2 contemplates that the first broadcaster is providing video-based commentary about a first live sporting event, and the second broadcaster is providing video-based commentary about a second (different) live sporting event, such that the first viewer client device 200A receives the copy 202A of the first broadcaster's live stream of digital content 102A relating to the first sporting event (and provided by the first broadcaster client device 100A), and that the second viewer client device 200C receives the copy 202C of the second broadcaster's live stream of digital content 102B relating to the second sporting event (and provided by the second broadcaster client device 100B). Also, in the example of FIG. 2, the first broadcaster's live stream 102A is an RTMP stream received by the RTMP media server(s) 320, and the second broadcaster's live stream 102B is a WebRTC stream received by the WebRTC media server(s) 360. The media sources 300 provide the copy 202A of the first broadcaster's live stream 102A to the first viewer client device 200A via a first video Internet communication channel 204A, and provide the copy 202C of the second broadcaster's live stream 102B to the second viewer client device 200C via a second video Internet communication channel 204C (further details of the role of the web server(s) 700 in selecting a particular media source of the media sources 300 to which each viewer client device connects to establish a video Internet communication channel are discussed below in connection with FIGS. 6 and 7).

[0106] In the example of FIG. 2, as noted above the control server 500 periodically retrieves, via the Internet and from the event information provider 55, first event information 502A germane to the first live sporting event, wherein the first event information includes at least first score information 504A for the first live sporting event. The control server further retrieves second event information 502B germane to the second live sporting event, wherein the second event information includes at least second score information 504B for the second live sporting event. The control server passes at least the first score information 504A and the second score information 504B to the socket server(s) 600. In turn, the socket server(s) 600 establish one or more first event sockets 602A dedicated to the first event information and one or more second event sockets 602B dedicated to the second event information.

[0107] As discussed further below, the web server(s) 700 provide to the first viewer client device 200A a first event identifier (a first EventID) that corresponds to the first event socket 602A; the web server(s) 700 also provide to the second viewer client device 200C a second event identifier (a second EventID) that corresponds to the second event socket 602B. The first viewer client device 200A uses the first EventID to connect to the first event socket 602A (e.g., via a first URL including the first EventID in a path of the URL), and the second viewer client device 200C uses the second EventID to connect to the second event socket 602B (e.g., via a second URL including the second EventID in a path of the URL). The first score information 504A is then transmitted to the first viewer client device 200A via a first event information Internet communication channel 206A between the first event socket 602A and the first viewer client device 200A, and the second score information 504B is transmitted to the second viewer client device 200C via a second event information Internet communication channel 206C between the second event socket 602B and the second viewer client device 200C.

[0108] In a manner similar to that described above in connection with the first and second event information, in the example of FIG. 2 chat messages and other system event information ("chat information") may be distributed to viewers of each broadcaster via respective dedicated sockets of the socket server(s) 600. In particular, the socket server(s) 600 similarly establish one or more first chat/system event sockets 604A dedicated to the first broadcaster's live stream of digital content 102A and one or more second chat/system event sockets 642B dedicated to the second broadcaster's live stream of digital content 102B. The web server(s) 700 provide to the first viewer client device 200A a first stream identifier (a first StreamID) that corresponds to the

first chat/system event socket 604A; the web server(s) 700 also provide to the second viewer client device 200C a second stream identifier (a second StreamID) that corresponds to the second chat/system event socket 604B. The first viewer client device 200A uses the first StreamID to connect to the first chat/system event socket 604A (e.g., via a first URL including the first StreamID in a path of the URL), and the second viewer client device 200C uses the second StreamID to connect to the second chat/system event socket 604B (e.g., via a second URL including the second StreamID in a path of the URL). The first chat information 210A is then transmitted to the first viewer client device 200A via a first chat/system event Internet communication channel 208A between the first chat/system event socket 604A and the first viewer client device 200A, and the second chat information 210B is transmitted to the second viewer client device 200C via a second chat/system event Internet communication channel 208C between the second chat/system event socket 604B and the second viewer client device 200C.

[0109] For purposes of simplifying the illustration in FIG. 2, the broadcaster client devices 100A and 100B are shown only providing respective live streams 102A and 102B directly to different media servers 320 and 360; however, it should be appreciated that the broadcaster client devices 100A and 100B have additional communication connections to the socket server(s) 600 and the web server(s) 700, similar to those shown in FIG. 2 between the example viewer client devices 200A and 200C and the socket server(s) 600 and web server(s) 700, so that the broadcaster client devices may similarly receive event information and chat information on different communication channels respectively dedicated to the event information and chat information.

[0110] In view of the foregoing, it may be appreciated from FIG. 2 that, in one example implementation, there are three different communication channels between a given broadcaster/viewer client device and the broadcast/viewing servers and media storage devices 1000, namely: 1) a video communication channel (e.g., 204A, 204C) between the client device and the media sources 300 to receive a copy of a broadcaster's live stream of digital content; 2) an event information communication channel (e.g., 206A, 206C) between the client device and one or more particular sockets of the socket server(s) 600 dedicated to a particular event; and 3) a chat/system event communication channel (e.g., 208A, 208C) between the client device and one or more particular sockets of the socket server(s) 600 dedicated to a particular broadcaster's live stream of digital content.

[0111] In the example of FIG. 2, the first and second broadcasters provide to their respective viewing audiences video-based commentary regarding different live sporting events. However, as discussed elsewhere in this disclosure, it should be appreciated that the events about which the broadcasters provide video-based commentary are not limited to live sporting events, but may relate to a wide variety of other events, news, and/or particular topics of interest. Additionally, it should be appreciated that the first and second broadcasters (and additional broadcasters) may provide to their respective viewing audiences video-based commentary about the same live event; in this case, the servers and media storage devices 1000 provide the appropriate connectivity such that viewers of the same live event may effectively switch between different broadcasters' video-based commentary about the event, participate in different chat information exchanges associated with each broadcaster's live stream, and all share the same event information in a synchronized manner.

[0112] In particular, with reference again to the example of FIG. 2, consider an implementation in which both the first broadcaster's live stream of digital content 102A and the second broadcaster's live stream of digital content 102B include the broadcasters' respective video-based commentary about the first live sporting event. In this situation, the web server(s) 700 would provide to both the first viewer client device 200A and the second viewer client device 200C the first event identifier (the first EventID) that corresponds to the one or more first event sockets 602A of the socket server(s) 600, and both of the first viewer client device 200A and the second viewer client device 200B would use the first EventID to connect to the one or more first event sockets 602A (e.g., via a first URL including the first EventID in a path of the URL). In this manner, the first score information 504A would then be transmitted to both the first viewer client device 200A via the first event information Internet communication channel 206A between the one or more first event sockets 602A and the first viewer client device 200A, and to the second viewer client device 200C via a second event information Internet communication channel 206C between the one or more first event sockets 602A and the second viewer client device 200C. Thus, both of the viewer client devices in this scenario would receive the same event/score information for the first live sporting event in a synchronized manner from the socket server(s).

[0113] At the same time, however, the respective viewer client devices 200A and 200C would be connected to different chat/system event sockets of the socket server(s) corresponding to the

different broadcasters' live streams; in particular, the web server(s) 700 would provide to the first viewer client device 200A the first stream identifier (the first StreamID) that corresponds to the first chat/system event socket 604A and provide to the second viewer client device 200C the second stream identifier (the second StreamID) that corresponds to the second chat/system event socket 604B. As discussed in the previous example, the first viewer client device 200A would use the first StreamID to connect to the first chat/system event socket 604A (e.g., via a first URL including the first StreamID in a path of the URL), and the second viewer client device 200C would use the second StreamID to connect to the second chat/system event socket 604B (e.g., via a second URL including the second StreamID in a path of the URL). The first chat information 210A would then be transmitted to the first viewer client device 200A via a first chat/system event Internet communication channel 208A between the first chat/system event socket 604A and the first viewer client device 200A, and the second chat information 210B would be transmitted to the second viewer client device 200C via a second chat/system event Internet communication channel 208C between the second chat/system event socket 604B and the second viewer client device 200C.

[0114] FIG. 3 is a block diagram showing additional details of various interconnections between the respective components of the servers and memory storage devices 1000 shown in FIG. 2, according to some inventive implementations. In the example of FIG. 3, some of the components of the servers and memory storage devices (e.g., 1000A) are hosted by a first web hosting service (e.g., Amazon Web Services AWS), while one or more other components of the servers and memory storage devices (1000B) may be hosted by a different web hosting service and/or generally accessible via the Internet. In yet other implementations, a single web hosting service may host all of the servers and memory storage devices. In addition to the various components shown in the example of FIG. 2, FIG. 3 also shows that the servers and memory storage devices 1000 may further include a transcoder server pool 800 (e.g., that may be employed for transcoding of recordings of a given broadcaster's live stream of digital content, for later replay via adaptive bitrate protocols), an asynchronous queue 850 (e.g., for queuing of various messages and instructions to be acted upon by an asynchronous task processor implemented by the control server 500), and a gateway NAS server 870 (e.g., to facilitate communications between a WebRTC media server pool and other elements of the servers and memory storage devices 1000A that may be hosted by the first web hosting service).

Additionally, FIG. 3 illustrates that the database 420 may include a main database and multiple database shards, in which portions of data are placed in relatively smaller shards, and the main database acts as a directory for the database shards (in some implementations, the main database also stores some de-normalized data, for example, to facilitate cross-server searching).

[0115] III. Technological Solutions to Improve Computer Network Functionality, Increase Computer Processing Efficiency and Reduce Computer Memory Requirements

[0116] In developing the inventive systems, apparatus and methods disclosed herein, including the servers and memory storage devices 1000 shown in FIGS. 2 and 3 as well as the client app 5000 executed by mobile client devices, the Inventors recognized and appreciated multiple technological problems with conventional techniques for transmission of digital content via the Internet. As introduced above and discussed in further detail below, the Inventors have addressed and overcome these technological problems with innovative technological solutions to effectively realize the various technical features described herein. Examples of these technological solutions include, but are not limited to, improving computer network functionality (e.g., improving the speed of content transfer from broadcaster devices to viewer devices and synchronization of various content amongst multiple client devices), and improving processing efficiency of broadcaster and viewer client devices via execution of the client app 5000, while at the same time reducing memory storage requirements for the client app 5000 on the client devices.

[0117] More specifically, examples of the technological problems addressed by the inventive solutions provided by the servers and memory storage devices 1000 and client app 5000 include, but are not limited to: 1) how to provide relatively low latency copies of live streams of broadcaster digital content to multiple viewers of each of multiple broadcasters (e.g., broadcaster-to-viewer delay time on the order of ten seconds or less, or on the order of two-to-three seconds or less), and with relatively high quality and reliability (e.g., high definition HD and high bit rate, such as 2 to 5 megabits per second); 2) how to synchronize such low latency and high quality copies of broadcaster live streams of digital content with event information associated with the digital content (as well as chat information associated with a given broadcaster) amongst the multiple viewers of each broadcaster, irrespective of the number of viewers (e.g., 10 viewers, 1,000 viewers, or 10,000 viewers); 3) how to allow different

classes/types of viewers (e.g., VIP users, premium subscribers, media professionals, registered users, anonymous users, web/desktop users, mobile users), and increasing numbers of viewers, to flexibly access each broadcaster's content with different live streaming formats (e.g., continuous streaming protocols such as real time messaging protocol or "RTMP," web real-time communication or "WebRTC;" segmented protocols such as HTTP live streaming or "HLS," HTTP Smooth Streaming or "MSS," HTTP Dynamic Streaming or "HDS," standards-based ABR protocol "MPEG-DASH") and with different qualities of service; 4) how to effectively render "studio-quality" screen animations and special effects graphics (e.g., including "scorebugs" for sporting events) on displays of mobile client devices via a client app with a small memory footprint (e.g., less than 100 megabytes, such that the client app is downloadable via cellular networks); and 5) how to provide for viewing of a recording of a broadcaster's live stream as if the viewer was watching the live stream in essentially real-time (e.g., while recreating chat messages and event information updates). Various aspects of the technological solutions to these respective technological problems are discussed in turn below.

[0118] *1) Latency Considerations*

[0119] With respect to latency considerations, the inventive systems, methods and apparatus disclosed herein contemplate particular parameters for the generation of a live stream of digital content by a broadcaster client device so as to induce only relatively low "client side" latency. To this end, in example implementations the client app 5000 installed and executing on a given client device selects an appropriate keyframe interval (e.g., 30 frames) for generating a broadcaster's live stream of digital content to ensure relatively low client side-induced end-to-end digital content latency.

[0120] In other aspects relating to reducing latency, particular parameters and techniques for handling live streams are contemplated for the servers and memory storage devices 1000 disclosed herein (e.g., adjusting buffer sizes and transcoder settings in media servers; employing hardware-accelerated transcoding of broadcaster live streams via graphic card processing to provide for adaptive bitrate copies of live streams). Furthermore, in some example implementations, the RTMP CDN 340 shown in FIGS. 2 and 3 comprises an innovative auto-scaling RTMP CDN server pool, coupled to a media server pool that receives live streams from respective broadcasters (e.g., either RTMP or WebRTC), to facilitate delivery of low-latency live

streams to a larger number of multiple viewers. Additionally, for RTMP broadcasters, the RTMP media server(s) 320 in some implementations is/are on the same network as the RTMP CDN 340 (e.g., the RTMP media server(s) are communicatively coupled to the RMTP CDN servers as a virtual private network (VPN), see VPN 330 in FIG. 6) so as to facilitate low latency communications. For WebRTC broadcasters, although in some implementations the WebRTC media server(s) 360 may not be hosted by the same service as the RTMP CDN 340 (e.g., see FIG. 3), the WebRTC media server(s) are coupled to the RTMP CDN via high speed/low latency connections. The RTMP CDN servers essentially make further copies of transcoded live streams received from the media server (e.g., without any other processing or alteration) and pass on the respective further copies to multiple viewers ("direct pass-through amplification"). In this manner, the RTMP CDN servers introduce appreciably low latency (e.g., on the order of less than 150 milliseconds) and facilitate a significantly greater number of viewers than could be otherwise served by the media server itself. These exemplary aspects (as well as other aspects discussed in further detail below) provide for appreciably low latency introduced by the media servers and RTMP CDN (e.g., on the order of about 500 milliseconds or even less) and client-introduced digital content latency (e.g., on the order of about one-to-two seconds for continuous streaming consumers).

[0121] *2) Synchronization of Live Streams and Event Information*

[0122] Yet another technical implementation challenge overcome by the inventive concepts disclosed herein relates to the display of event information updates (if present, e.g., if the broadcast is associated with an event), as well as screen animations and other special effects graphics that may be generally associated with the video and/or audio associated with a live stream, in a manner that is synchronized across multiple live streams with appreciably low latency. This is a particularly relevant consideration given that the systems, apparatus and methods disclosed herein are contemplated in some implementations as supporting multiple broadcasters providing video-based commentary for the same event, and each of these broadcasters may have multiple viewers of their broadcast – and thus, the technical challenge is to provide the same event information, and periodic updates to this event information, in a synchronized and low-latency manner to all of these broadcasters and viewers interested in following the same event. In exemplary implementations (e.g., as discussed above in connection with FIG. 2), this technical challenge is overcome with technological solutions implemented on

both the client devices and the server architecture to which the client devices are communicatively coupled involving the use of multiple communication channels respectively dedicated to video/audio content from a given broadcaster, event information germane to an event about which any broadcaster may be providing video-based commentary, and chat information (chat messages and/or system event messages) shared amongst the broadcaster and their associated viewers.

[0123] In various inventive implementations disclosed herein (e.g., as introduced above in connection with FIG. 2), event information and updates to event information are provided to broadcaster client devices and viewer client devices via a socket-based "event information channel" dedicated to the event, and separate from the copy of the live stream of video-based commentary provided on a "video channel." Thus, all viewers (and broadcasters) of the event, regardless of which live stream they may be generating or watching, connect to one or more sockets of a socket server that is/are dedicated to the event, such that all live streams relating to the event are similarly synchronized to event information and updates to same. Notably, if a viewer switches amongst different broadcasters of the same event (the viewer originally watches a first live stream from a first broadcaster of the event, and later selects a second live stream from a second broadcaster of the same event), the event information and updates to same (and any screen animations and special effects graphics that incorporate the event information) remain synchronized with all live streams from the different broadcasters, providing for a smooth second-screen experience across multiple broadcasters and viewers.

[0124] The technical challenge of displaying event information and updates to same in a synchronized and low-latency manner amongst multiple viewers is also addressed in part by using a single control server 500 in the server and memory storage devices 500 to gather and parse live event information captured in real-time. For example, for sporting events, game information may be obtained by the single control server from a dedicated third-party provider (e.g., STATS LLC, which is a sports statistics, technology, data, and content company that provides content to multimedia platforms, television broadcasters, leagues and teams, fantasy providers, and players). This single point of entry of event information into the server architecture, as provided by the control server, prevents synchronization errors inherent in network communications. Once a change in event status has been detected (e.g., if a play clock updates), the control server provides these changes to the one or more sockets dedicated to the

event (to which all viewers and broadcasters of video-based commentary regarding the event are communicatively coupled), resulting in a single synchronized update to all client devices and thereby significantly mitigating client-by-client latency and/or synchronization issues.

[0125] *3) Flexible and Scalable Access to Broadcaster Content by Multiple Classes/Types of Viewers*

[0126] The inventive systems, methods and apparatus disclosed herein and shown in FIGS. 2 and 3 further contemplate the ability to flexibly select the source of a copy of a broadcaster's live stream to be provided to respective multiple viewers from one of a number of possible media sources 300, namely: 1) the media server receiving the live stream in the first instance from a broadcaster (e.g., an RMTP media server 320 or a WebRTC media server 360); 2) an auto-scaling RTMP CDN server pool 340; or 3) an innovative HTTP Live Streaming (HLS) server architecture 360. Thus, multiple live stream transmission formats, protocols, and access endpoints are contemplated for different types and numbers of viewers that may receive copies of broadcasters' live streams at different bitrates and with different qualities of service. As noted above, in some implementations the web server(s) 700 implement a viewer stream source selection algorithm which selects an appropriate media source for a given viewer based on, for example, the type of user (e.g., VIP users, premium subscribers, media professionals) and the number of viewers of a particular broadcaster's live stream. Further details of viewer stream source selection for respective viewer client devices are discussed further below in connection with FIGS. 6 and 7.

[0127] Another salient element of the flexibility and scale-ability provided by the media sources 300 of the servers and memory storage devices 1000 shown in FIGS. 2 and 3 relates to the HLS caching and amplifying server architecture 360. Conventionally, as would be readily appreciated by those of skill in the relevant arts, HLS is not designed to be cacheable at the server level, and hence synchronization issues arise in connection with providing multiple HLS copies of a live stream to respective viewers. In particular, in conventional implementations, each HLS copy of the live stream is somewhere in a "window" of time (an HLS "buffer length") relative to the original live stream (e.g., delayed from the original stream by some amount of time within an overall time window). This uncertainty results in the possibility of a first viewer of a first HLS copy of a live stream actually seeing the video content some time earlier than or

later than a second viewer receiving a second HLS copy of the live stream, i.e., the respective viewers are not synchronized.

[0128] In exemplary implementations described herein, this technical problem is solved by employing an inventive HLS caching and amplifying server architecture 360, which is discussed in further detail below in connection with FIGS. 8, 9A, 9B, 9C and 9D. The HLS server architecture includes a "mother" server and one or more "child" servers, disposed between a media server and a content delivery network (CDN), in which the HLS mother server acts as a single "virtual viewer" from a given media server's perspective. Based on a single copy of an HLS file suite for a given broadcaster's live stream as provided by a media server and received by a mother caching server of the HLS server architecture, the mother server caches and passes on copies of the elements of the file suite (as requested) to one or more child servers, which in turn cache and pass on copies of the elements of the file suite to one or more geographically-distributed servers of a conventional (e.g., global) CDN (serving as an HLS CDN in tandem with the mother-child server architecture). In this manner, the mother and child servers of the HLS architecture act as caching and amplifying servers, so that identical HLS streams may be served from the HLS CDN server pool to multiple viewers of a given broadcast in a significantly narrower synchronization window than conventionally possible. In particular, in one example implementation discussed in greater detail below in connection with FIGS. 6A, 6B, 6C, and 6D, all HLS viewers receiving a copy of a broadcaster's live stream via the HLS server architecture including a mother caching server and one or more child caching servers are at most less than one HLS file segment duration out of synchronization with each other; this phenomenon is referred to herein as "viewer segment concurrency." Based on the viewer segment concurrency provided by the inventive HLS server architecture, respective viewers of a given broadcast may be out of synchronization with one another by less than approximately one or two seconds at most.

[0129] *4) Client-side Rendering of On-screen Interactive Animations, Special Effects and/or Event Information*

[0130] By way of background, in conventional sports broadcasting, game information (also sometimes referred to as a "scorebug"), as well as screen animations and other special effects graphics, are hard-embedded into the live stream of the game broadcast itself that is received by

viewers. Unlike conventional scorebugs, screen animations, and/or other special effects graphics that are hard-embedded into live streams of a sports broadcast, in various inventive implementations disclosed herein graphics and effects are generated by the client device itself, separate from a given broadcaster's video-based commentary, and then integrated with (e.g., superimposed or overlaid on) the broadcaster's video-based commentary when rendered on the display of the client device. As shown for example in FIG. 1B, various graphics may be rendered on different portions of the display, for example, along a top or side of the display or in a "lower third" of the display.

[0131] For mobile client devices, the client app 5000 executing on the device is particularly configured to render a variety of "studio-quality" graphics while nonetheless maintaining a small file size for the client app (e.g., less than 100 megabytes, and in some instances from approximately 60-70 megabytes); this affords an exciting and dynamic broadcaster and viewer experience on mobile client devices, while still allowing the modestly-sized client app to be readily downloaded (e.g., from a digital distribution platform or "app store" 75) to a client device via a cellular network. In some implementations, maintaining a modest file size for the client app while providing high-quality graphics, animations and other special effects is accomplished in part by designing animated graphics and special effects as a series of individual frames (still-frame images) that are hard-coded in the client app, and rendering the series of individual frames on the display in a "stop-motion" style according to an animation timer set in the client device (e.g., 15 frames per second). In some implementations, "sprite sheets" may be used for graphics elements; in yet other implementations, the transparency of individual frames may be set on a pixel-by-pixel basis as may be required in some applications to provide for suitable overlay on the broadcaster's video-based commentary.

[0132] In another aspect, client-side rendering of screen animations and/or other special effects graphics allows such animations and graphics to be user-interactive; for example, a user (broadcaster or viewer) on a client device may "select" a screen animation/special effect graphic (e.g., via a touch-sensitive display screen of the client device) and launch additional graphics or initiate some other functionality on the client device.

[0133] For example, as discussed above with respect to live events about which a given broadcaster may be providing video-based commentary, event information and updates to event

information are provided to broadcaster client devices and viewer client devices via a socket-based "event information channel" dedicated to the event, and separate from the copy of the live stream of video-based commentary provided on a "video channel." Providing one or more sockets dedicated to the event information and separate from the live stream of video-based commentary provides for user-interactive features in connection with the event information, and/or the screen animations/special effects graphics incorporating the event information; for example, the user may select (e.g., thumb-over) the screen animation/special effect graphic including the event information and obtain access to additional (and in some cases more detailed) information relating to the event (e.g., a drill down on more granular event information, or a redirect to a web site or other app related to the particular event).

[0134] *5) Replay of Recorded Broadcaster Live Streams with Recreated Chat Messages and Event Information Updates*

[0135] Another technical implementation challenge addressed by the technological solutions disclosed herein relates to the ability of a viewer to watch a recording of a live stream generated by a broadcaster client device (also referred to herein as a "video replay" of the live stream, or simply "replay") as if the viewer was watching the live stream in essentially real-time (as it was being generated by the broadcaster client device), while also allowing the viewer to "seek" to different points in the video replay. In one aspect of video replay, the broadcaster themselves may assume the role of a post-broadcast viewer of the recorded broadcast.

[0136] In exemplary implementations, a technological solution for overcoming the technical implementation challenge of replaying a recorded live stream and also recreating various chat messages and event information updates (if present) as they occurred during the originally broadcast live stream is based, at least in part, on having the socket-based communication techniques act in a "fully-authenticated" fashion, for example, by dynamically creating "anonymous accounts" for non-registered or "anonymous" users. By creating such accounts for anonymous users, a replay log may be created that logs when any given viewer (as a registered user or anonymous user) joins and leaves a particular broadcast. Additionally, the replay log may include additional information, such as user-generated chat information, system messages, and event information updates, respectively synchronized with timestamps associated with the live stream as originally generated by the broadcaster client device.

[0137] During replay of a recording of the live stream, the viewer client device requests a segment of this replay log and, using the timestamps in the recording of the live stream, replays not only the digital content in the live stream but also recreates chat messages, system-related messages and event information updates (if present) in the same order and relative time of occurrence as if the viewer were watching the live stream in essentially real-time when originally broadcasted by the broadcaster. As the replay advances, the viewer client device requests additional segments of the log, keeping an in-memory buffer to smooth out any possible Internet connectivity issues. Such a replay log also allows for "seeking," i.e., when a viewer fast forwards or rewinds; under these seeking circumstances, the viewer client device may retrieve the appropriate segment(s) of the replay log for the new viewing point, and continue to not only replay the recording of the live stream from the new viewing point but also recreate (in the same order and relative time) chat messages, system-related messages and event information updates (if present) as if the viewer were watching the live stream in essentially real-time.

[0138] Having outlined some of the various technological solutions provided by the inventive systems, apparatus and methods disclosed herein to technological problems with conventional approaches to live streaming of digital content, the discussion now turns to additional details of respective components of the servers and memory storage devices 1000 shown in FIGS. 1A, 2 and 3, as well as the functionality of the client app 5000 executed by client devices.

[0139] IV. Broadcaster Media Server Selection

[0140] FIGS. 4A and 4B show a process flow diagram 450A and 450B illustrating a broadcast media server selection algorithm according to one inventive implementation, which in some examples may be performed by the web server(s) 700 shown in FIGS. 2 and 3. As noted above, in one implementation a mobile broadcaster client device (e.g., a smartphone) outputs a live stream of digital content having an H.264 MPEG-4 Advanced Video Coding (AVC) video compression standard format, via real time messaging protocol (RTMP) transport for continuous streaming over the Internet, whereas a web-based broadcaster client device (e.g., a desktop computer) outputs a live stream of digital content 102B having a VP8 video compression format, transmitted via the web real-time communication (WebRTC) protocol for continuous streaming over the Internet.

[0141] In the process shown in FIGS. 4A and 4B, the web server(s) 700 know whether the broadcaster client device requesting access to a media server is a mobile client (H.264/RTMP) or a web-based client (VP8/WebRTC) based on header information in the communications to the web server from the client device. For mobile clients, the web server provides access to (e.g., provides the address of an endpoint for) one of the RTMP media servers 320 of the media sources 300, and for web-based clients generating VP8/WebRTC live streams of digital content, the web server provides access to one of the WebRTC media servers 360 of the media sources 300. If a web-based client is connecting via Adobe Flash or other external software, the client may be treated similarly to the process for mobile clients.

[0142] In some implementations, multiple media servers of the RTMP media servers 320 are segregated into at least one VIP media server and at least one non-VIP media server; similarly, some of the WebRTC media servers 360 are segregated into at least one VIP media server and at least one non-VIP media server. A given broadcaster may be directed to a VIP or non-VIP media server based on their user status (e.g., as a VIP user), and/or the availability of a particular server (e.g., based on available server capacity, in terms of total utilized connection bandwidth to the media server). In one aspect, to allow for some headroom in media server capacity, the "ideal capacity" of the server may be taken as approximately 60% of the true maximum capacity of the media server. If all non-VIP media servers exceed ideal capacity (but are at less than true maximum capacity), the process may send an internal administrative message (e.g., via SMS or email) to a system administrator to warn of a significant broadcaster load. In the event that no non-VIP servers are available to a given broadcaster (because all non-VIP servers are at true maximum capacity), the process displays "No Available Server" as an error message on the display of the broadcaster client device.

[0143] V. Media Server Process

[0144] FIGS. 5A through 5C show a process flow 550A, 550B, 550C, and 550D illustrating a media server process for the RTMP and WebRTC media servers 320 and 360 shown in FIGS. 2 and 3, according to one inventive implementation. These process flows include a "server monitor" process and a "video uploader" process that each of the RTMP and WebRTC media servers implements as they receive and process live streams from various broadcasters.

[0145] Regarding the "server monitor" process, a given media server periodically reports server statistics to be stored in the database 420, and queries the database to obtain a list of broadcaster streams that have been assigned to, and are connected to, the media server. For newly connected streams, the media server validates the stream information (e.g., StreamID), with the database, and if the stream is valid the media server starts a live transcoding process to provide different resolution copies of the live stream (e.g., 720p, 360p and 240p transcoded copies); in the case of a WebRTC media server, the media server also transcodes the VP8/WebRTC live stream to H.264 before providing the different resolution transcoded copies. In some implementations, the media server employs hardware-accelerated transcoding of the broadcaster's live stream (e.g., via graphic card processing) to ensure low latency of viewed transcoded copies of the live stream. The media then starts recording the highest resolution transcoded copy (e.g., 720p in the illustrated example) to provide a "raw video" recording, and notifies the database that the live stream has started and is available for viewing. Thereafter, the media server queues a first screenshot (thumbnail) for the live stream in the asynchronous queue (e.g., see 850 in FIG. 3) for processing by the control server 500 (see FIGS. 18A and 18B), and also queues push notifications to notify subscribers and followers of the broadcaster that the broadcaster is online with a live stream (e.g., by providing a StreamID to the followers/subscribers).

[0146] Thereafter, while the broadcaster continues to provide a live stream, and if there are any HLS viewers (discussed further below in connection with FIGS. 8 and 9A through 9D), the media server begins an HLS segmentation process to create and update an HLS file suite comprising an HLS playlist, HLS chunklists, and HLS file segments for each of the transcoded different resolution copies of the broadcaster's live stream. The media server process also periodically queues in the asynchronous queue (e.g., every five seconds or so) additional screenshots/thumbnails of the live stream. Once the broadcaster has ended the live stream, the media server process stops the recording of the highest resolution transcoded copy, sends out a system message on the chat/system event socket(s) corresponding to the broadcaster's live stream that the stream has ended, stops the live transcoding process, and stores the stream end time in the database 420. The media server process then also queues the upload of the "raw video" recording (the recording of the highest resolution transcoded copy) to the media server upload queue.

[0147] The video uploader process shown in FIG. 5A reads from the media server upload queue and, if there are any entries in the queue, uploads the corresponding raw video recording of the broadcaster's live stream to data storage 440 (e.g., Amazon S3) and stores the upload time to the database 420. The video uploader process also may notify a third-party transcoding service (e.g., see the transcoding server pool 800 in FIG. 3) to provide transcoded different resolution copies of the recorded video to facilitate adaptive bitrate replay for one or more viewers.

[0148] VI. Viewer Stream Source Selection

[0149] FIG. 6 is a block diagram illustrating the media sources 300 and the web server(s) 700 of the servers and memory storage devices 1000 shown in FIGS. 2 and 3, as well as the first and second broadcaster client devices 100A and 100B and one of the viewer client devices 200A, to facilitate a discussion of the selective coupling of an example viewer client device to one of the media sources, according to some inventive implementations. In tandem with FIG. 6, FIG. 7 is a process flow diagram illustrating a viewer stream source selection algorithm 702 according to one inventive implementation, which in some examples may be performed by the web server(s) 700.

[0150] As depicted representationally in FIG. 6, in one aspect the web server(s) 700 essentially serve as a controllable switch to couple the viewer client device 200A to one of an RTMP media server 320, the RTMP CDN 340 (which is communicatively coupled to the RTMP media server(s) in a virtual private network 330), a WebRTC media server 360 and the HLS serve architecture 360 to receive a copy of broadcaster's live stream of digital content. In the example of FIG. 6, the web server(s) 700 has facilitated a connection between the viewer client device 200A and the RTMP CDN 340 (as shown by the dashed line in FIG. 6). However, as discussed below, the web server(s) 700 may facilitate a connection between the viewer client device 200A and any one of the media sources 300 based at least in part on a number of viewers already receiving copies of the broadcaster's live stream. In one implementation, the database 420 stores user profiles for broadcasters and viewers, in which the user profile may include a user type (e.g., registered user, anonymous user, subscriber of one or more broadcasters, VIP user, media professional or media member, etc.); in this instance, the web server(s) 700 may facilitate a connection between the viewer client device 200A and one of the media servers 300

based at least in part on a type or status of a user of the viewer client device 200A and/or the number of viewers already receiving copies of the live stream.

[0151] More specifically, as shown in the process of FIG. 7, if the viewer client device sends a request to the web server(s) 700 to view a copy of a given broadcaster's live stream (e.g., based on a StreamID for the live stream that the viewer client device received in a push notification), and the web server(s) 700 determine that there are fewer than a first number (e.g., 10) of viewers already receiving copies of the live stream (e.g., based on a viewing count for the stream maintained in the database 420), the web server(s) provide to the viewer client device an address to connect directly to one of the RTMP media servers 320 or one of the WebRTC media servers 360 that is processing the broadcaster's live stream (depending on whether the broadcaster client device is a mobile H.264 or web-based VP8 client device). Irrespective of the number of viewers, the web server(s) 700 also provide an address to the viewer client device to connect directly to one of the media servers if a user of the viewer client device is a VIP subscriber or media professional. If however the user is not a VIP subscriber or media professional, and there are more than a first number of viewers already receiving copies of the live stream, the web server(s) provide to the viewer client device an address to connect to one of the CDN servers of the RTMP CDN 340. However, if all CDN servers of the RTMP CDN 340 are at their maximum capacity (e.g., as reflected in server statistics stored in the database), the web server(s) 700 provide an address to the viewer client device to connect to the HLS server architecture 360.

[0152] VII. HTTP Live Streaming (HLS) Server Architecture

[0153] FIG. 8 is a block diagram showing additional details of the HLS server architecture 380 of the servers and memory storage devices 1000 shown in FIGS. 2, 3 and 6, according to some inventive implementations. FIGS. 9A through 9D show a process flow illustrating an HLS stream viewing process 902A, 902B, 902C and 902D performed by the HLS server architecture 380 shown in FIG. 8, according to one inventive implementation. As some of the discussion of the HLS server architecture 380 relates to processing of a live stream at a media server, reference is made again to the media server process discussed above in connection with FIGS. 5A, 5B, and 5C.

[0154] HTTP Live Streaming (HLS) is a conventional HTTP-based media streaming communications protocol, in which a live media stream (e.g., video and accompanying audio) is

divided up or "segmented" by an HLS media server into a sequence of small files that may be downloaded to a viewer client device via HTTP communications with the HLS media server, wherein each downloaded file represents one short segment or "chunk" of a copy of the live stream. As respective chunks of the copy of the live stream are downloaded and played by the viewer client device, the client device may select from multiple different alternate streams containing the same video/audio material transcoded by the media server at a variety of data rates (e.g., at different resolutions), allowing the HLS streaming session to adapt to the available data bit rate/bandwidth of the client device's connection to the HLS server. HLS connections are, by definition, not persistent connections between the HLS media server and the viewer client device, since requests for and delivery of HLS content uses only standard HTTP transactions. This also allows HLS content to be delivered to multiple viewer client devices over widely available HTTP-based content delivery networks (CDNs).

[0155] With reference again to the media server process in FIGS. 5A, 5B, and 5C, as a broadcaster's live stream is received by a media server it is cached for some amount of time (e.g., 10 to 30 seconds). The broadcaster's live stream typically includes a succession of frames at some frame rate (e.g., 30 frames/sec), and the succession of frames includes multiple "keyframes" associated with video encoding/compression. Such keyframes include the "full" content of an instant of the video, and these keyframes reset the basis of calculation (compression/estimation) for ensuing video information; in conventional video encoding/compression techniques, compressed frames between keyframes essentially include only information representing what has changed in the content between respective frames, and not the entire visual content for corresponding instants of the video. Increasing the frequency of keyframes in the stream of video frames reduces any errors that may be introduced in the compression process, as such errors would have a shorter lifespan (there would be fewer numbers of compressed frames between keyframes).

[0156] As indicated in FIG. 5B, an incoming live stream from a broadcaster and received by a media server (e.g., incoming H.264 from an RTMP broadcaster client, or VP8 from a WebRTC broadcaster client that has been transcoded to H.264) is transcoded (e.g., by the media server) to provide different resolution copies of the live stream at corresponding different bitrates (e.g., to facilitate adaptive bitrate streaming, as noted above). For example, the broadcaster's live stream may be transcoded to provide 720p, 360p and 240p different resolution copies of the live stream.

As part of the transcoding process, the media server may be configured such that the keyframe interval for each transcoded copy is a predetermined value, and the keyframe interval for the transcoded copies may be the same as or different than a keyframe interval associated with the broadcaster's incoming live stream. Conventional examples of keyframe intervals that may be configured at a media server for transcoded copies of the live stream range from about 60 frames to 300 frames of video, and in some instances as high as 600 frames (at an exemplary frame rate of 30 frames/second, the associated time durations for such keyframe intervals range from two seconds for a keyframe interval of 60 frames to 10 seconds for a keyframe interval of 300 frames, and in some instances as high as 20 seconds for a keyframe interval of 600 frames).

[0157] As discussed above in connection with FIG. 5C, to implement HLS each of these different resolution copies is divided into small segments of video based in part on the keyframe interval of the copies. More specifically, the media server may be configured to set a target segment length (duration) of each segment into which the transcoded copy of the live stream is divided. An example of a conventional target segment duration for HLS is 10 seconds; however, as discussed below, in some implementations the media server is particular configured to have a significantly lower target segment duration to facilitate the functionality of the HLS server architecture 380 in processing copies of segmented live streams.

[0158] With reference again to FIG. 5C, the media server ultimately divides each copy of the live stream into respective video segments having a duration that is as close as possible to the target segment duration, with the proviso that a segment must start on and include a keyframe but may include one or more keyframes (i.e., the segment duration in practice is based on the target duration configured in the media server, some multiple of keyframes, and the frame rate of the transcoded copy). For purposes of illustration, and taking a conventional target segment duration of 10 seconds, a frame rate of 30 frames/second, and a keyframe interval of from 60 to 300 frames, each conventional 10 second HLS segment may have 1 keyframe (given a keyframe interval of 300 frames) or up to 5 keyframes (given a keyframe interval of 60 frames).

[0159] For each transcoded different resolution copy of the broadcaster's live stream, the HLS segments of the copy are stored as small files (referred to in HLS as .ts files). Thus, in an example in which there are 720p, 360p and 240p transcoded copies of the live stream, there are three sets of .ts files being generated and stored in memory at the media server as each of the

copies are segmented by the media server. For each set of .ts files corresponding to a different resolution copy of the live stream, a "chunklist" is created and maintained by the media server that includes a list of pointers (e.g., relative URLs) to corresponding .ts files stored in memory; accordingly, in the example of three different resolution copies, there would be three different corresponding chunklists.

[0160] The number of pointers in a given chunklist may be referred to as the "HLS window" or "HLS buffer length," and this HLS window/buffer length may be set as a configuration parameter for the media server. One conventional example of an HLS window/buffer length is 10 pointers to corresponding .ts files. The number of pointers in the chunklist multiplied by the duration of the HLS segment represented by each .ts file is referred to as the "HLS latency," because a viewing client that requests an HLS copy (i.e., succession of .ts files) typically does not start downloading a first .ts file representing a video segment until the chunklist is completely populated with the set number of pointers to corresponding .ts files (the HLS window/buffer length). Given the example above of a conventional target segment duration of 10 seconds, this results in a conventional HLS latency on the order of 100 seconds. This HLS latency also may be viewed as a "buffer time" that provides for stability of the HLS stream in the event of communications issues or interruptions in network connectivity; the latency arising from the segment duration and HLS window/buffer length provides for the overall download and playback time of the .ts file segments before another chunklist is downloaded by a viewer client device, thereby mitigating potential connectivity issues that may occur between the client device and a CDN server during this buffer time (presuming that, under normal circumstances, it is quicker for the client to download a .ts file segment than it is for the client to play the segment). As new .ts files get created in the segmenting process for a given resolution copy of the live stream, the media server puts a new pointer to the newest .ts file into the corresponding chunklist and, once the chunklist is filled the first time with the set number of pointers corresponding to the buffer length, the oldest pointer gets "bumped out" of the chunklist when a new segment/pointer is generated, in a first-in-first-out (FIFO) manner.

[0161] Below is an example of a chunklist that includes six pointers to corresponding .ts files representing HLS video segments:

==> curl –v https://we109.media.castr.live/t1/ngrp:397965_all/chunklist_w1844413579_b2096000.m3u8

* Trying 198.204.252.202...

```
*  TCP_NODELAY set
*  Connected to we109.media.castr.live (198.204.252.202) port 443 (#0)
*  TLS 1.2 connection using TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
*  Server certificate: *.media.castr.live
*  Server certificate: Go Daddy Secure Certificate Authority – G2
*  Server certificate: Go Daddy Root Certificate Authority – G2
>  Get /t1/ngrp:397965_all/chunklist_w1844413579_b2096000.m3u8 HTTP/1.1
>  Host: we109.media.castr.live
>  User-Agent: curl/7.51.0
>  Accept: */*
>
<  HTTP/1.1 200 OK
<  Accept-Ranges: bytes
<  Server: WowzaStreaming Engine/4.7.0.01
<  Cache-Control: no-cache
<  Access-Control-Allow-Origin: *
<  Access-Control-allow-Credentials: true
<  Access-Control-Allow-Methods: OPTIONS, GET, POST HEAD
<  Access-Control-Allow-Headers: Content-Type, User-Agent, If-Modified-Since, Cache-Control, Range
<  Date: Thu, 08 Jun 207 21:10:47 GMT
<  Content-Type: application/vnd.apple.mpegurl
<  Content-Length: 368
<
#EXTM3U
#EXT-X-VERSION:3
#EXT-X-TARGETDURATION: 4
#EXT-X-MEDIA-SEQUENCE:349
#EXTINF:2.352,
media_w1844413579_b2096000_349.ts
#EXTINF:2.04,
media_w1844413579_b2096000_350.ts
#EXTINF:2.002,
media_w1844413579_b2096000_351.ts
#EXTINF:2.001,
media_w1844413579_b2096000_352.ts
#EXTINF:2.001,
media_w1844413579_b2096000_353.ts
```

#EXTINF:2.001,
media_w1844413579_b2096000_354.ts

[0162] In addition to a chunklist for every different resolution copy of the broadcaster's live stream, the media server also creates an HLS "playlist" file (e.g., having a file extension .m3u8) corresponding to the broadcaster's live stream. The HLS playlist includes a list of the transcoded different resolution copies of the live stream, and for each item in the list the playlist also includes a corresponding bandwidth/bitrate, one or more codecs for encoding the copy of the stream, and a pointer (e.g., relative address or URL) to the corresponding chunklist:

- 720p copy – bitrate – codec(s) – relative URL1 for chunklist1
- 360p copy – bitrate – codec(s) – relative URL2 for chunklist2
- 240p copy – bitrate – codec(s) – relative URL3 for chunklist3

An example of an HLS playlist file is provided below:

```
==> curl –v https://we109.media.castr.live/t1/ngrp:397965_all/playlist.m3u8
* Trying 198.204.252.202...
* TCP_NODELAY set
* Connected to we109.media.castr.live (198.204.252.202) port 443 (#0)
* TLS 1.2 connection using TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
* Server certificate : *.media.castr.live
* Server certificate: Go Daddy Secure Certificate Authority – G2
* Server certificate: Go Daddy Root Certificate Authority – G2
> Get /t1/ngrp:397965_all/playlist.m3u8 HTTP/1.1
> Host: we109.media.castr.live
> User-Agent: curl/7.51.0
> Accept: */*
>
< HTTP/1.1 200 OK
< Accept-Ranges: bytes
< Access-Control-Expose-Headers: Date, Server, Content-Type, Content-Length
< Server: WowzaStreaming Engine/4.7.0.01
< Cache-Control: no-cache
< Access-Control-Allow-Origin: *
< Access-Control-allow-Credentials: true
```

< Access-Control-Allow-Methods: OPTIONS, GET, POST, HEAD
< Access-Control-Allow-Headers: Content-Type, User-Agent, If-Modified-Since, Cache-Control, Range
< Date: Thu, 08 Jun 207 21:07:51 GMT
< Content-Type: application/vnd.apple.mpegurl
< Content-Length: 368
<
#EXTM3U
#EXT-X-VERSION:3
#EXT-X-STREAM-INF:BANDWIDTH=2296000,CODECS="avc1.77.41,mp4a.40.2",RESOLUTION=1280x720
chunklist_w1844413579_b2096000.m3u8
#EXT-X-STREAM-INF:BANDWIDTH=1031000,CODECS="avc1.77.31,mp4a.40.2",RESOLUTION=640x360
chunklist_w1844413579_b946000.m3u8
#EXT-X-STREAM-INF:BANDWIDTH=449000,CODECS="avc1.66.30,mp4a.40.2",RESOLUTION=426x240
chunklist_w1844413579_b414000.m3u8
* Curl_http_done: called premature == 0
* Connection #0 to host we109.media.castr.live left intact

[0163] Thus, the HLS "file suite" corresponding to a broadcaster's live stream includes:

- A playlist of different resolution copies with corresponding pointers to chunklists
- The chunklists, each containing a set of pointers to corresponding .ts files
- The .ts files pointed to in the chunklist for each different resolution copy

[0164] To play an HLS copy of a live stream, the viewer client device first requests a copy of the corresponding HLS playlist file from the media server. Based on the available bandwidth between the viewer client device and the media server at any given time, once the playlist is received the viewer client device selects the most appropriate resolution copy from the playlist having a bit rate that may be accommodated by the available bandwidth; this provides for adaptive bit rate streaming in that, from time to time, the viewer client device may select a different resolution/different bitrate copy of the live stream from the list of copies in the HLS playlist based on changes in the available bandwidth (e.g., quality of connection) between the viewer client device and the media server. Once the desired copy is selected from the playlist based on available bandwidth, the viewer client device then requests from the media server the current chunklist associated with the selected copy of the live stream, based on the corresponding

pointer to the chunklist that is present in the playlist. As noted above, the chunklist for each copy of the live stream is continuously updated by the media server (FIFO) as new .ts files are created by the media server. Once the viewer client device retrieves the chunklist, it can then in turn begin retrieving the respective .ts files pointed to in the chunklist (e.g., via corresponding relative URLs) and playing the video segments represented in the .ts files. The viewer client device repeatedly requests the appropriate chunklist from the media server (e.g., after every video segment is played) to retrieve a current version of the chunklist. In the foregoing manner, as noted earlier, data/files are transmitted from the media server to the viewer client device upon request pursuant to HTTP, as opposed to streaming data continuously between the media server and the viewer client device via a persistent data connection.

[0165] Conventionally, for every request from a viewer that a media server receives for an HLS copy of a live stream, the media server creates a new HLS file suite for the requester, including an HLS playlist, associated chunklists, and sets of .ts files. Typically, such requests for an HLS copy of a live stream would arrive at the media server from respective (e.g., geographically distributed) servers of a CDN that are in turn communicating with respective (e.g., geographically distributed) viewer client devices. As HLS viewer demand increases for copies of a particular broadcaster's live stream, the load (e.g., CPU demand) on the media server increases based on the media server's process for generating a new HLS file suite for each new HLS requester.

[0166] Moreover, given that different viewer client devices may be requesting (via corresponding different CDN servers) an HLS copy of the live stream at different points in time, the Inventors have recognized and appreciated that significant synchronization issues arise amongst respective viewers based at least in part on the media server's process for generating a new HLS file suite for each new request. More specifically, because the media server creates different HLS file suites at different times for different requesters, a first requester viewing a first copy of the live stream likely sees the video content some time earlier than or later than a second requester viewing a second copy of the live stream, because at any given time the respective requesters may be downloading and playing different video segments from their respective chunklists. For conventional HLS applications, this lack of synchronization amongst respective viewers typically would not pose any problems in viewer experience.

[0167] However, the Inventors have recognized and appreciated that in the example context of multiple viewers viewing respective copies of a broadcaster's live stream of video-based commentary regarding a live event, and also receiving and displaying event information as real-time updates about the event, this lack of synchronization amongst respective HLS viewers may significantly and adversely impact viewer experience. For example, particularly in the context of a "second screen experience," two different HLS viewers watching the same event on a first screen and watching the same broadcaster's live video-based commentary on a second screen may see the broadcaster's video-based commentary significantly out of synchronization with the live event on the first screen, and may receive and display event information (e.g., event score updates) on the second screen that are noticeably out of synchronization with the live event and/or the broadcaster's video-based commentary. Furthermore, if both of the viewers happen to be watching the same event together at the event venue on the same first screen (e.g., together in the same room at a gathering or party), they may find that their respective copies of the broadcaster's video-based commentary are noticeably out of synchronization on their respective viewer client devices.

[0168] In view of the foregoing technical problems relating to HLS viewer synchronization and media server loading, the Inventors have implemented an inventive technical solution via an HLS server architecture 380 that provides caching and amplifying functionality to address the above-noted technical problems. An example of such an HLS server architecture is shown in FIG. 8 and discussed in detail below, and FIGS. 9A through 9D illustrate flow diagrams that outline the process by which a given viewer client device requests and receives an HLS copy of a broadcaster's live stream via the HLS server architecture shown in FIG. 8.

[0169] In considering the various HLS multiple-viewer synchronization issues that are addressed by the HLS server architecture shown in FIG. 8 and the processes outlined in FIGS. 9A through 9D, the Inventors also have considered and addressed the overall latency implications of conventional HLS stream delivery in light of the inventive HLS server architecture disclosed herein. To this end, the Inventors have considered unconventional settings (e.g., at the media server) for various parameters relating to HLS streams such as keyframe interval, target segment duration, and HLS window/buffer length for chunklists. Recall in the discussion above that conventional examples of these parameters respectively include a keyframe interval of from 60 to 300 frames, a target segment duration of 10 seconds, and an

HLS window/buffer length of 10 .ts files or "chunks," giving rise to a conventional HLS latency on the order of 100 seconds. Such a latency is practically untenable in the example context of multiple viewers viewing the live event itself in person or on a first screen, viewing respective HLS copies of a broadcaster's live stream of video-based commentary regarding the live event as a second screen experience (which would be 100 seconds out of synchronization with the live event/first screen), and also receiving and displaying on the second screen event information as real-time updates about the event (which would be 100 seconds out of synchronization with the video-based commentary on the second screen).

[0170] The Inventors have recognized and appreciated that the above-mentioned parameters may be specifically selected (e.g., via configuration of the media server) to significantly reduce latency while sufficiently maintaining stability of HLS content delivery. To this end, in one example inventive implementation, the keyframe interval for transcoded copies of the live stream may be set to 30 frames (i.e., significantly fewer than 60 to 300 frames), the target video segment duration may be set to two seconds (i.e., significantly lower than 10 seconds, and such that the succession of HLS segments respectively have two keyframes each at a frame rate of 30 frames/second), and the HLS window/buffer length may be set to from four to six segments in a chunklist (as opposed to 10 chunks in a chunklist as suggested conventionally). These parameters result in a significantly reduced HLS latency of approximately 8 to 12 seconds, as compared to a conventional HLS latency on the order of 100 seconds

[0171] As shown in FIG. 8, in one implementation an HLS caching and amplifying server architecture 380 includes a "mother" server 382 and may also include one or more "child" servers 384A through 384D, disposed between a media server and an HLS CDN server pool 388, in which the HLS mother server acts as a single "virtual viewer" from a given media server's perspective. While FIG. 8 shows multiple child servers, it should be appreciated that in various inventive implementations the HLS server architecture need not have any child servers, or may only have one child server; however, the inclusion of one or more child servers in the inventive HLS server architecture facilitates enhanced scaling and reduced loading (e.g., CPU usage/bandwidth) on the mother server.

[0172] In example implementations, the HLS mother server, as well as one or more child servers, may be implemented as a customized NGINX-based caching server. Based on a single

copy of an HLS file suite 375A (e.g., single playlist, associated chunklist(s), and associated .ts file segments) for a given broadcaster's live stream as provided by a media server 320/360 and received by the mother server 382 of the HLS server architecture, the mother server caches and passes on copies 375B of the elements of the file suite (as requested) to one or more child servers, which in turn cache and pass on copies 375C of the elements of the file suite to one or more geographically-distributed servers of a conventional (e.g., global) CDN (serving as an HLS CDN in tandem with the mother-child server architecture). In this manner, the mother and child servers of the HLS architecture act as caching and amplifying servers, so that identical HLS streams may be served from the HLS CDN server pool to multiple viewers of a given broadcast in a significantly narrower synchronization window than conventionally possible. In particular, in one example implementation, all HLS viewers receiving a copy of a broadcaster's live stream via the HLS server architecture shown in FIG. 8 are at most less than one HLS file segment duration out of synchronization with each other (referred to herein as "viewer segment concurrency").

[0173] As noted above, in conventional HLS, a viewer client device does not maintain a persistent connection with an HLS media server; similarly, by default, HLS media servers do not allow caching of HLS files (e.g., playlists, chunklists and .ts files). In particular, as illustrated above in the examples of a conventional HLS chunklist and a playlist, these files respectively include an explicit instruction that prevents caching (i.e., "Cache-control: no-cache"). For different types of files, cache-control conventionally may be set for some time period that allows a file to be temporarily stored (i.e., cached) by a requesting server, after which a fresh copy of the file needs to be requested from its origin server by the requesting server; as noted above, however, caching is conventionally prohibited for HLS files by an explicit instruction in the files.

[0174] Unlike conventional HLS, in inventive implementations of the HLS server architecture shown in FIG. 8, when a first requester requests a copy of a given broadcaster's live stream the HLS mother server establishes and maintains a persistent connection to the media server (e.g., the RTMP or WebRTC media server receiving the broadcaster's incoming live stream). In this manner, as long as the broadcaster is generating the live stream, at least one requester is requesting a copy of the live stream, and no matter how many requests may be made by globally-distributed CDN servers for copies of the live stream on behalf of requesting viewer client devices, the media server only sees the load of one requester (i.e., the HLS mother server). In

this capacity, the HLS media server does not have to make copies of the HLS file suite to provide for additional requesters of the broadcaster's live stream as would be required in conventional HLS; instead, the HLS mother server requests and receives a single copy of the playlist file from the media server. As discussed further below in connection with FIGS. 9A through 9D, the HLS mother server requests the single copy of the playlist file from the media server in response to a request for the playlist file made by one of the HLS child servers to the mother server. The HLS child server makes such a request to the mother server in response to a request for the playlist file made by a CDN server to the child server on behalf of a requesting viewer client device. In a manner similar to that noted above, an HLS child also may open up and maintain a persistent connection with the HLS mother.

[0175] In an example implementation, when the HLS mother server requests and receives the HLS playlist file from the media server, the HLS mother server re-writes the caching rule in the received playlist file to allow the playlist to be cached for some period of time for which a broadcaster may be expected to provide the live stream (e.g., some number of hours up to 24 hours or 86,400 seconds); in particular, the HLS mother server strips the "Cache-control: no-cache" setting from the received playlist file and replaces it with a new cache-control command having some duration of caching time. The HLS mother server then caches the revised playlist file (for the duration of the new caching time) and typically the playlist file need not be requested again from the media server. A copy of this revised playlist file with a re-written caching rule in turn is provided upon request to one or more of the HLS child servers, which in turn cached the revised playlist file and pass additional copies of the revised playlist file to one or more CDN servers so that the playlist file is ultimately provided to one or more requesting viewer client devices. Based on the re-written caching rule, each of the involved servers may store a copy of the revised playlist file for the duration of the broadcaster's live stream and need not request it again; and again, as noted above, the media server only "sees" one requesting viewer and provides one playlist, no matter how many actual viewers may be requesting a copy of the broadcaster's live stream.

[0176] More specifically, as shown in FIG. 9A, when a given viewing client device wishes to receive a copy of a broadcaster's live stream, the client device first queries a CDN server for a copy of the HLS playlist file corresponding to the broadcaster's live stream. If the CDN server has a copy of the playlist (e.g., based on a previous request from another viewer client device),

the CDN server returns the playlist to the currently requesting client device. If however the CDN server does not have a copy of the revised playlist, the CDN server connects to a CDN load balancer 386 and in turn requests a copy of the revised playlist from one of the HLS child servers as determined by the load balancer.

[0177] If the HLS child server has a copy of the revised playlist (e.g., based on a previous request from a CDN server), the HLS child server returns the revised playlist to the currently requesting CDN server (which in turn passes the playlist on to the requesting viewer client device). If however the HLS child server does not have a copy of the revised playlist, the HLS child server requests a copy of the revised playlist from the HLS mother server.

[0178] If the HLS mother has a copy of the revised playlist (e.g., based on a previous request from one of the HLS child servers), the HLS mother server returns the revised playlist to the currently requesting HLS child server. If however the HLS mother server does not have a copy of the playlist (e.g., because this is the first request for a copy of the broadcaster's live stream), the HLS mother server establishes a persistent connection with the appropriate media server (e.g., based on the relative URL for the HLS copy of the stream at a given media server), requests a copy of the playlist, and re-writes the caching rule for the playlist as discussed above. The HLS mother then caches the revised playlist, returns the revised playlist to the currently requesting HLS child server. The child server in turn caches the revised playlist and passes the revised playlist on to the requesting CDN server, which in turn also caches the revised playlist and passes the revised playlist on to the requesting viewer client device.

[0179] As shown in FIGS 9A through 9D, once the viewer client device has the playlist, it selects from the playlist the appropriate resolution copy of the live stream based on the associated bitrate of the copy and the available bandwidth between the viewer client device and the CDN server. Based on the selected copy of the live stream, the viewer client device then requests from the CDN server the corresponding chunklist. In a manner similar to the request for the HLS playlist, each of the CDN server, an HLS child server, and the HLS mother server may be queried in turn for a copy of the corresponding chunklist.

[0180] However, an important distinction between the playlist and a requested chunklist relates to the "freshness" of the chunklist and the re-writing of the chunklist's caching rule by the HLS mother server. In particular, whenever the HLS mother server requests a given chunklist

from the media server, the mother server re-writes the caching rule in the received chunklist file to allow the chunklist to be cached for some period of time, for example, the segment duration corresponding to a single .ts file (e.g., two seconds). In particular, the HLS mother server strips the "Cache-control: no-cache" setting from the chunklist file and replaces it with a new cache-control command having some duration of caching time (e.g., corresponding to a segment duration). In one aspect, a caching time corresponding to a segment duration is contemplated given that the chunklist does not change during this duration (and thus, any requests for the chunklist during this duration are generally unnecessary). The HLS mother server then caches the revised chunklist file (for the duration of the new caching time) and a copy of this revised chunklist file with a re-written caching rule in turn is provided upon request to one of the HLS child servers, which in turn also caches the revised chunklist and passes a copy of the revised chunklist file to a CDN server so that the chunklist file is ultimately provided to the requesting viewer client devices. Based on the re-written caching rule, each of the involved servers may cache a copy of the updated chunklist file for up to but no more than the specified caching time, which ensures that each copy of the chunklist stored on a given server is "fresh" (e.g., within one segment duration) for downloading to the requesting viewer client device, while also mitigating unnecessary resources spent on attending to requests for chunklists during a time period in which there are no changes to the chunklist. In an alternate implementation, a given child server may again re-write the caching rule for a chunklist file to prevent caching of the chunklist by a requesting CDN server (and thereby cause the CDN server to request the chunklist from the child server every time the chunklist is requested from the CDN server by a viewer client device, even if respective requests come from one or more viewer client devices within a segment duration).

[0181] Referring again to FIGS. 9A through 9D, and considering a non-limiting example implementation in which the segment duration corresponding to a .ts file is two seconds and the CDN servers maintain the same revised caching rules as the HLS mother and child servers, FIGS. 9A through 9D illustrates that when a requesting viewer client device does not have a chunklist, it requests the chunklist from a CDN server. If the CDN server does not have the chunklist, or if the chunklist cached on the CDN server is more than two seconds old (i.e., exceeds the cache time), the CDN server requests the chunklist from an HLS child server; otherwise, the CDN server returns a "fresh copy" of the chunklist to the requesting client. A similar process is repeated for the HLS child server and the HLS mother server, i.e., if the HLS

child server does not have the chunklist, or if the chunklist cached on the child server is more than two second old, the child server requests the chunklist from the mother server; otherwise the child server returns a fresh copy of the chunklist to the requesting CDN server. If the HLS mother server does not have the chunklist, or if the chunklist cached on the mother server is more than two seconds old, the mother server requests the chunklist from the media server, re-writes the caching rule in the chunklist file, caches the revised chunklist file, and returns a fresh copy of the chunklist to the requesting child server (which in turn passes the fresh copy of the chunklist to the requesting CDN server and the requesting client device).

[0182] Once the requesting viewer client device has a fresh copy of the chunklist, the viewer client device begins requesting the respective .ts files or "chunks" pointed to in the chunklist. In some respects, as shown in FIGS. 9A through 9D, this process is similar to the processes outlined above for requesting the playlist and requesting one of the chunklists pointed to in the playlist. For example, the requesting viewer client device requests a chunk from a CDN server and, if the CDN server has the requested chunk (e.g., because another requesting viewer previously requested the same chunk from the same CDN server and the CDN server already has the chunk cached), the CDN server returns the chunk to the client device for playing the video segment represented in the chunk. If however the CDN server does not have the chunk cached, it requests the chunk from an HLS child server (e.g., via the CDN load balancer). A similar process is repeated for the HLS child server and the HLS mother server. If ultimately the mother server does not have the chunk cached and needs to request the chunk from the media server (e.g., because this is the first viewer request for this chunk), the mother server requests the chunk from the media server, re-writes the caching rule in the chunk file (e.g., to change the caching rule from "no-cache" to some period of time, for example one hour), caches the revised chunk, and returns a copy of the chunk to the requesting child server (which in turn passes the copy of the chunk to the requesting CDN server and the requesting client device).

[0183] Once the viewer client device has downloaded all chunks pointed to in the chunklist, it plays them in turn, deletes the current copy of the chunklist that the viewer client device has cached, and then again determines the appropriate resolution copy of the live stream to request based on the associated bitrates of the different resolution copies and the available bandwidth between the viewer client device and the CDN server. Typically, it takes less time for a client to download a chunk then to play it; accordingly, if there are network issues, the copy of the stream

can keep playing on the viewer client device while it downloads new chunks. For example, if the client successfully downloaded three chunks (six seconds of video) in two seconds of wall clock time, there remains a four second buffer of video at the client device in case the fourth chunk has a delay in retrieval.

[0184] The foregoing process of requesting and receiving an appropriate fresh chunklist based on available bandwidth, and downloading and playing the chunks pointed to in the chunklist, is repeated for the duration of the broadcaster's live stream. For example, if the media server stops receiving the broadcaster's live stream, the media server may provide a message to the HLS mother server (e.g., in response to a request from the mother server for a fresh chunklist) that the live stream has been terminated; alternatively, the media server may provide an empty chunklist to the HLS media server, which essentially would ultimately terminate the iterative requesting process and the connection between the media server and the mother server would time out.

[0185] In other aspects, the HLS mother server shown in FIG. 8 monitors the current pool of media servers that may be servicing different broadcasters' live streams (e.g., as indicated in the database of the servers/memory storage devices 1000), and self-configures to provide for custom routing (e.g., via relative URLs) between a requesting CDN server and a particular media server to appropriately retrieve a requested HLS copy of a given broadcaster's live stream (i.e., via the appropriate playlist and associated chunklists and .ts files). For example, custom routing functionality of the mother server may allow the targeting of specific media servers via a single entry URL (e.g., https://hls.media.castr.live/we90/t1/ngrp:123456_all/playlist.m3u8 requests retrieval of the adaptive HLS playlist from server "we90" for stream 123456, which the mother server internally translates to https://we90.media.castr.live/t1/mgrp:123456_all/playlist.m3u8 and thereby requests the playlist from the appropriate server, for which, when received, the mother server re-writes the caching rule, caches the revised playlist, and passes on the revised playlist to a requesting child server).

[0186] As noted earlier, in some implementations the HLS CDN shown in FIG. 8 that makes requests to one or more HLS child servers may be provided as the Amazon Cloudfront CDN. In any event, the geographically-distributed servers of the CDN cache to the various elements of the HLS file suite and can serve these from a variety of geographic locations to provide a virtually infinite number of HLS viewers using only a relatively small HLS CDN pool; and, irrespective

of the number of CDN servers requesting content on behalf of respective viewers, the CDN serves the content quickly, and the media server sees only a single virtual viewer as the HLS mother server. In one aspect, the different "layers" of servers in the HLS server architecture introduce some degree of latency between a given broadcaster's live stream and the viewer client devices; however, as noted above, all viewer client devices have "viewer segment concurrency," and the overall average latency for all viewers is nonetheless significantly reduced (e.g., as compared to conventional HLS). For example, given an example chunk segment duration of two seconds, and an example HLS window/buffer length of four segments, there may be up to eight seconds of latency introduced by the HLS segmenting process and another approximately two seconds of latency introduced by the transfer of files through the HLS server architecture.

[0187] It should be appreciated that the various concepts discussed herein relating to the HLS server architecture are similarly applicable to other segmented live video streaming protocols (e.g., MSS, HDS, MPEG-DASH) for which inventive server architectures are contemplated by the present disclosure.

[0188] VIII. Control Server and Associated Services/Processes

[0189] FIG. 10 illustrates some of the functionality (e.g., services and other processes) performed by the control server 500 shown in FIGS. 2 and 3, according to one inventive implementation. As noted above, the control server 500 is coupled to the memory system 400, one or more event information providers 55, one or more news feeds (RSS) 65 or other news sources, and the socket server(s) 600. In one aspect, the control server 500 periodically retrieves various event information from the event information provider 55 and/or news from the news feeds 65 that is germane to respective broadcasters' video-based commentary. In another aspect, the control system 500 may store at least some portion of retrieved event information and/or news in the memory system 400. More generally, the control server 500 implements a number of services/processes that govern functionality of other servers and devices in the servers/memory storage devices 1000; examples of such control system services/processes include, but are not limited to: an RTMP media server scaling process to add or remove servers from the one or more RTMP media servers 320 of the media sources 300 (see FIG. 11); an RTMP CDN server scaling process to add or remove servers from the RTMP CDN 340 of the media sources 300 (see FIG. 12); a live stream and media server watchdog process (see FIGS.

13-14); an event data ingress process (see FIG. 15); a live event data monitor process (see FIG. 16); an asynchronous task processor (see FIG. 17); and a live stream thumbnail/screenshot acquisition process (see FIG. 18).

[0190] *1) Server Auto-scaling Systems and Watchdogs*

[0191] FIGS. 11A through 11C show a process flow diagram illustrating an RTMP media server scaling system service method 1102A, 1102B and 1102C performed by the control server of FIG. 10, according to one inventive implementation. In the method shown in these figures, the control servers automatically scale the number of RTMP media servers 320 of the media sources that are available for broadcasters based in part on the capacity demand for the servers (e.g., number of broadcasters providing live streams). The control server monitors various media server statistics that are maintained in the database 420 (e.g., number of active servers in the RTMP media server pool; servers marked for shutdown; individual server information such as server status active/shutdown, numbers of active connections to live streams, current capacity, date/time of when server first came online for availability, etc.) and brings servers in and out of the RTMP media server pool based at least in part on the server statistics. In various aspects, the control server maintains a minimum number of servers (e.g., at least two, or a minimum capacity corresponding to approximately double the cumulative traffic at a particular time) in the RTMP media server pool to allow for spikes in stream creation, and also provides for various buffering times to allow new servers to come online. FIGS. 12A through 12C show a process flow diagram illustrating an RTMP CDN server scaling system service method 1202A, 1202B, and 1202C performed by the control server of FIG. 10, according to one inventive implementation, that is similar in many respects to the method 1102A, 1102B and 1102C performed for the media server scaling service.

[0192] FIGS. 13A and 13B show a process flow diagram illustrating a stream and server watchdog service method 1302A, 1302B performed by the control server of FIG. 10, according to one inventive implementation. The stream watchdog performed by the control server essentially ensures that new streams created by broadcasters are valid and deletes streams that were created but not started, or that have been inactive for some period of time (e.g., 30 seconds). When streams are ended, the method generates final viewer statistics (e.g., stream duration, average number of viewers, maximum number of viewers, number of simultaneous

viewers, viewers added, viewers left, etc.), broadcasts a "stream ended" system event message to the chat/system event socket(s) of the socket server(s) dedicated to the broadcaster's live stream, ends the recording of the live stream by the media server, and queues the recording to the video uploader queue of the media server process. The server watchdog portion of the method 1302A, 1302B monitors the RTMP media servers and the servers of the RTMP CDN and invokes the check RTMP Media/CDN server method 1402A, 1402B shown in FIGS. 14A and 14B. As part of the server watchdog process, for new servers the control server determines a capacity of the server (e.g., based on server type), and updates the database 420 with the capacity of respective servers, server class, launch time, status update (e.g., active and available for connections) and determines a total user/streamer capacity based on newly added servers. For servers that are already online, the server watchdog ensures that servers remain active for certain intervals (e.g., 30 second intervals), automatically removes inactive servers from the pool, and reports active server status back to the database. If servers are marked for shutdown, the server watchdog archives server statistics, removes the server from the active server list stored in the database, and determines an updated total user/streamer capacity based on the removal of the server from the active list.

[0193] *2) Event Information Ingress and Live Event Monitoring*

[0194] In some inventive implementations, another significant role of the control server 500 shown in FIGS. 2, 3 and 10 relates to collecting of event information and/or news (e.g., from external Internet providers), maintaining relevant event information and/or news in the database 420 (e.g., to facilitate selection of broadcasters to follow, and/or particular broadcaster live streams to view), and distributing the collected information to multiple broadcaster and viewer client devices in a relatively low-latency and synchronized manner with respect to broadcasters' video-based commentary.

[0195] In some implementations, the technical challenge of displaying event information and updates to same in a synchronized and low-latency manner amongst multiple client devices is addressed in part by using a single control server 500 to gather and parse live event information captured in real-time. For example, for sporting events, game information may be obtained by the single control server from a dedicated third-party provider (e.g., STATS LLC). This single point of entry of event information prevents synchronization errors inherent in network

communications. Once a change in event status has been detected (e.g., if a play clock updates), the control server provides these changes to the one or more sockets dedicated to the event (to which all viewers and broadcasters of video-based commentary regarding the event are communicatively coupled), resulting in a single synchronized update to all client devices and thereby significantly mitigating client-by-client latency and/or synchronization issues.

[0196] In some example implementations, the control server 500 implements two service methods relating to event information, namely, an event data ingress service and a live event data monitor service. The event data ingress service is performed with a first periodicity (e.g., once or twice a day) to maintain and update an event list in the database 420. The live event data monitor service is performed with a second and more frequent periodicity (e.g., once a minute) to check for any events that are in progress and, if found, to retrieve fresh data about an in-progress event from the event information provider (e.g., at an even greater frequency, for example once a second). Similar services may be implemented by the control server 500 to ingest news on particular topics, trending threads, etc.

[0197] FIG. 15 shows a process flow diagram illustrating an event data ingress service method 1502 performed by the control server of FIG. 10, according to one inventive implementation, and FIGS. 16A and 16B show a process flow diagram illustrating a live event data monitor service method 1602A, 1602B performed by the control server of FIG. 10, according to one inventive implementation. In these methods, an event information provider is contemplated as supporting multiple different types of events for furnishing information (various types of sporting events such as basketball, football, baseball, hockey, etc.), and providing information for each instance of an event of a given event type (e.g., information for each of multiple basketball games, each of multiple football games, each of multiple baseball games).

[0198] For each event, the control server retrieves the raw information provided by the event information provider, and in some instances converts and/or compresses the raw information to provide a standardized format of essential data elements for storing in the database 420 and/or distribution to client devices (e.g., via broadcast of event messages having the standardized format to one or more dedicated sockets of the socket server(s) 600). Examples of data elements for event information include, but are not limited to, a type of the event, an identifier for the event (EventID), a status of the event (e.g., pre-game, in-progress, final), score information for

the event, team information for the event, a progress indicator or progress details for the event (e.g., quarter, period, inning, half-time; for baseball – balls, strikes, base information; for football – possession, down, yards to go; for basketball – timeouts, fouls), an event date and/or time of the event (e.g., actual or elapsed time information), and event participant data regarding participants in the event. In some examples, the control server further normalizes the event date and/or time to a particular reference frame (e.g., converting from UTC to EST/EDT).

[0199] In the process 1602A and 1602B shown in FIGS. 16A and 16B, the control server particularly queries the event information provider for a list of all events in a particular window around the current time (e.g., a 48 hour window, for events with start times 24 hours in the past through 24 hours in the future), to allow tracking of in-progress events (or identify any events that had inconsistent or incorrect start times or late modifications to event information). For each in-progress event, an event clock and other event information (e.g., score information, other more detailed information about the event) are updated frequently (e.g., once a second) to provide regular updates of event information messages that are broadcast to one or more dedicated event information sockets of the socket server(s) 600.

[0200] *3) Asynchronous Task Processing*

[0201] FIGS. 17A and 17B show a process flow diagram illustrating an asynchronous task service method 1702A, 1702B performed by the control server of FIG. 10, according to one inventive implementation. The control server periodically reads a task or task bundle from the asynchronous queue to initiate various other actions or processes in connection with the serves and memory storage devices 1000. A number of different asynchronous system events may be implemented by this process, only some examples of which are illustrated in FIGS. 17A and 17B. For example, if an entry in the queue relates to a "Stream Started" system event, the asynchronous task processing sends out push notifications (including a StreamID) to followers and subscribers of the stream's broadcaster. Another system event processed by the asynchronous task process is when there is a new follower of a broadcaster's stream ("newFollowingStream"), for which the process loads user data and stream data, and attends to various user notifications as appropriate (e.g., email notifications, web push notifications). The asynchronous task processor is also responsible, in some implementations, for taking periodic

screenshots/thumbnails of a live stream (as discussed below in connection with FIGS. 18A and 18B).

[0202] With respect to various push notifications handled by the control server 500 and/or the web server(s) 700 (or other servers of the architecture 1000), it should be appreciated that specific apps on mobile client devices need not be open for a push notification to be received on the client device. Thus the client device may receive and display social media or text message alerts even when the device's screen is locked, and/or when the app pushing the notification is closed. For iOS devices, for example, the Apple Push Notification Service API may be employed to enable the client app 5000 to receive various push notifications.

[0203] With reference again to FIG. 10, the async queue monitoring is an application that runs on the control server and that looks at the current size of the asynchronous queue and will notify an administrator. Typically, the queue of tasks to process is small (e.g., at any given second it may be between 0-10 items), and if the queue grows to a larger size (e.g., 1000 items) the async queue monitor indicates to a system administrator that there is a problem in the asynchronous task processing (e.g., additional processing resources are required, or a looping event is getting processed and re-added to the queue instead of being removed).

[0204] *4) Acquiring Screenshots/Thumbnails*

[0205] FIGS. 18A and 18B show a process flow diagram illustrating a process 1802A, 1802B for taking a screenshot (thumbnail) of a live stream, performed by the control server of FIG. 10, according to one inventive implementation (in other implementations, the web server(s) 700 of other servers of the architecture 1000 may perform the process of taking thumbnails of live streams pursuant to the general technique outlined in FIGS. 18A and 18B).

[0206] With reference again to FIG. 5C and the media server process, the media server process queues to the asynchronous queue a first screenshot for a new live stream, and periodic updates to screenshots (e.g., every five seconds or so) during the duration of the live stream. These screenshot tasks are read by the asynchronous task process 1702A and 1702B discussed above in connection with FIGS. 17A and 17B and implemented by the process shown in FIGS. 18A and 18B.

[0207] In the process 1802A, 1802B, in one implementation screenshots are taken based on a broadcaster's live stream in H.264 (or transcoded to H.284 if the live stream is VP8/WebRTC from a web broadcaster). Screenshots are taken on the next available keyframe after the process is invoked. If the screenshot is not the first one taken, the stream information (e.g., in the database 420) is updated with information relating to the newest screenshot, and the screenshot is added to archived screenshots (e.g., in the data storage 440). The screenshot is then broadcast to the chat/system event socket of the socket server(s) 600 dedicated to the broadcaster's live stream.

[0208] Whenever a screenshot is taken of the broadcaster's live stream (particularly if it is the first screenshot), it may be resized for social media network requirements, and overlaid with graphics, watermarks, or promotional material. If the broadcaster requested for social share in creating the new stream (see discussion below regarding creation of new broadcaster streams), the process submits a link to the resized screenshot (e.g., an address or URL) to the indicated social network platform (e.g., Facebook, Instagram, Twitter, etc.), in some instances together with a "share graphic." In any case, the process determines the list of users that follow/subscribe to the broadcaster, and queues a system event message (e.g., "new FollowingStream") event for each subscriber to broadcast the first screenshot of the new live stream. As above, the stream information (e.g., in the database 420) is updated with information relating to the screenshot, and the screenshot is archived (e.g., in the data storage 440) and broadcast to the chat/system event socket of the socket server(s) 600 dedicated to the broadcaster's live stream.

[0209] With respect to sharing screenshots with social networks if elected by the broadcaster, in another implementation (not shown in FIGS. 18A and 18B), all screenshots of the broadcaster's live stream that are taken as of a given time are processed by a facial recognition algorithm to provide one of multiple options (e.g., the best of three screenshots) for selection by the broadcaster. For example, the process acquires a screenshot at 1, 3 and 5 seconds, and then every 5 seconds thereafter. The facial recognition algorithm detects candidate screenshots on rolling basis based on, for example, the clarity of the image, the quality of the face that is visible, and if the user is smiling. More specifically, every acquired screenshot is analyzed and then the "best three" are selected and presented as options to the broadcaster/viewer during social share. The broadcaster/viewer selects their preferred image, and the social share endpoint that is

ultimately provided by the process to the selected social media platform(s) includes a link (e.g., address or URL) to the screenshot selected by the broadcaster.

[0210] IX. Client-side Features (e.g., functionality of the Client App)

[0211] Having provided various details of the servers and memory storage devices 1000 shown in FIGS. 2 and 3, attention now turns to the functionality of the client devices relating to establishing user profiles (e.g., upon login), creating broadcaster stream sessions and providing live streams from broadcaster client devices to a media server, receiving copies of a live stream at a viewer client device (e.g., from a media server, the RTMP CDN, or the HLS server architecture), providing special effects graphics and animations (including animated real-time "scorebugs") on displays of client devices, and replaying copies of a recorded live stream from a broadcaster.

[0212] As noted earlier, unlike conventional scorebugs, screen animations, and/or other special effects graphics that are hard-embedded into live streams of a sports broadcast, in various inventive implementations disclosed herein graphics and effects are generated by the client device itself, separate from a given broadcaster's video-based commentary, and then integrated with (e.g., superimposed or overlaid on) the broadcaster's video-based commentary when rendered on the display of the client device. For mobile client devices, the client app 5000 executing on the device is particularly configured to render a variety of "studio-quality" graphics while nonetheless maintaining a small file size for the client app (e.g., less than 100 megabytes, and in some instances from approximately 60-70 megabytes); this allows the modestly-sized client app to be readily downloaded to a client device via a cellular network. In other aspects, client-side rendering of screen animations and/or other special effects graphics allows such animations and graphics to be user-interactive and/or user-customizable.

[0213] FIGS. 19A and 19B show a process flow diagram illustrating a user login process according to one inventive implementation, which in some examples may be performed by a client device and facilitated by one or more web servers 700 shown in FIGS. 2 and 3. As illustrated, a login process may be implemented by phone (via SMS message with code sent to phone, and code validation), of via a social media network platform login process (e.g., Facebook, Twitter, Instagram). For new user accounts, a user may establish a user profile that is stored in the database 420 and that may be referenced by a UserID after creation, and include a

user name, profile picture, and a user status or user "type" for the user (e.g., a VIP user or member, a media professional or member of the media).

[0214] *1) Broadcaster processes*

[0215] FIGS. 20A and 20B show a process flow diagram illustrating a mobile broadcaster stream create process according to one inventive implementation, which in some examples may be performed by a broadcaster client device (pursuant to execution of the client app 5000) and facilitated by one or more web servers (700) shown in FIGS. 2 and 3. While much of the discussion above relates to an example in which a broadcaster wishes to provide a live stream of digital content including video-based commentary about a particular event, in other implementations the broadcaster may desire to create a live stream about a particular topic of interest (e.g., "anything"), or a news story, for example. For each of these options, the broadcaster may enter a title for the live stream, and the client device may request (e.g., from the web server(s) 700) a list of events or news items for selection by the broadcaster, as well as a pre-populated list of tags (as noted above, event information and/or news may be ingressed by the control server 500, and some event information and/or news may already be cached in the data cache 460 or stored in the database 420).

[0216] The broadcaster may also enter tags to be associated with the live stream to facilitate searching and various social media functionality (e.g., to allow other users to search for and find the live stream based on various criteria represented by the tags). The broadcaster may also elect other options in the stream creation process, examples of which include, but are not limited to, sharing an announcement of the stream starting on a social network platform, and enabling sharing of their location to other users (e.g., to facilitate viewing of the broadcaster's live stream by viewers based on the location of the broadcaster).

[0217] The broadcaster stream create process then submits a "stream create" request to the web server(s) 700. If the broadcaster selected a particular event from the list of events about which to broadcast, an EventID associated with the event is included in the stream create request. Other contents of the stream create request includes, but is not limited to, an API key (to authenticate the user), the title of the stream, any tags selected, newsID (if news was selected), the broadcasters social network sharing options, and broadcaster location data (if permitted by the broadcaster). The web server(s) 700 in turn validates the API key, assigns a StreamID to the

newly created live stream, runs the broadcast media server selection algorithm (e.g., see FIGS. 4A and 4B) to select a media server to which the broadcaster client device connects, and returns to the broadcaster client device the StreamID and the host name ("hostname") for the selected media server. The web server(s) 700 store in the database 420 a variety of stream information for the new live stream, which may include, but is not limited to, the StreamID, the UserID, the EventID, the DBshard, type of stream (RTMP/WebRTC), create time, hostname, title, tags, social notify options and social media platforms, location share option, location (if selected as an option) and, if the stream is associated with an EventID, an archived copy of event information at the stream create time.

[0218] FIGS. 21A, 21B, 21C, 21D, and 21E show a process flow illustrating a mobile broadcaster active stream process 2102A, 2102B, 2102C, 2102D and 2102E according to one inventive implementation, which in some examples may be performed at least in part by a broadcaster client device. In particular, the broadcaster client device accesses the media server selected by the web server(s) 700 via a particular URL (e.g., including the hostname in a path of the URL), as discussed below in connection with FIGS. 21A through 21E. The broadcaster client device then connects to a particular socket of the socket servers dedicated to the broadcaster's live stream, based in part on the StreamID provided by the web server(s), to establish a chat/system event channel. As noted above, in one aspect connections between client devices and a particular socket of a socket server are persistent authenticated connections, so that the number of users (broadcasters and viewers) connected to a particular socket (e.g., and currently watching a particular live stream and/or particular event) may be tracked. If the broadcaster's live stream is about an event, the broadcaster's client device also connects to a particular socket of the socket servers dedicated to the event, based on the EventID, to establish an event information channel.

[0219] In a "main loop" of the broadcaster client device stream active process (which for mobile clients is executed by the client app 5000), an internal frame and time clock is periodically updated, and is used for animations and special effects graphics and synchronizing of some system messages that are received via the chat/system event socket (e.g., a default chat message displayed on the client device at the beginning of each new stream that says "keep it family friendly!"). The client device then checks to see if any further system messages or chat messages are received on the chat/system event channel, and displays chat messages and/or takes

other actions in response to system messages such as "member_added" (increase viewing count), "member_removed" (decrease viewing count), "new follower" (add notice to chat). Although only three system messages and corresponding actions are shown in FIG. 21B, it should be appreciated that additional and/or other types of system messages may be received on the chat/system event channel (e.g., relating to other social networking functionality, and/or digital gifts) and initiate corresponding actions as part of the stream active process.

[0220] The client device next checks to see if any event messages or data is received on the event information channel (e.g., updates to event status, event score information, event clock, other event information). The client device then captures a camera frame for the live stream and sends the frame to the media server. The client device then checks the internal frame and time clock to see if any updates are needed to animations or special effects graphics (e.g., scorebugs) to be rendered on the display of the client device ("graphics/animation layers"). In some implementations, graphics and animations are updated at a rate of between 15-25 frames/second based on the internal frame and time clock. As noted above, in some implementations for mobile client devices, animated graphics and special effects are hard-coded in the client app as a series of individual frames (still-frame images), and rendered on the display in a "stop-motion" style according to the internal frame and time clock.

[0221] In the stream active process shown in FIG. 21C, the process further queries for broadcaster input, examples of which include a request to end the stream, a request to share the stream, a request to view a list of viewers of copies of the live stream, interaction with the graphics/animations (e.g., "bottom third"), and a request to flip the camera. As also noted above, rendering graphics and animation layers on the client-side provides for user-interaction with the displayed graphics and animation layers. While not shown explicitly in FIG. 21C, as discussed above interactions with graphics/animations ("set animation state to transition to open") may in some implementations launch a variety of other processes including, but not limited to, launching further graphics or animations, receiving additional information about the live sporting event (e.g., by thumbing-over a scorebug), or navigating to another Internet location to receive additional information relating to a live event.

[0222] In FIG. 21D, the stream active process then queries if the stream state is set to close (e.g., in response to a broadcaster's request to end the stream, discussed immediately above). If

not, the process returns to updating the internal frame and time clock. If the stream state is set to close, the client device disconnects from the media server, requests final stream statistics from the chat/system event channel, and displays an end of stream screen on the display of the client device.

[0223] FIGS. 22A and 22B show a communication flow diagram illustrating process flow elements and the server and/or memory storage devices involved in the communication flow for the processes shown in FIGS 20A and 20B, and FIGS. 21A-21E, as well as the media server processes shown in FIGS. 5A, 5B and 5C, according to one inventive implementation. In essence, FIGS. 22A and 22B provide another perspective and summarize the various process flows and corresponding devices involved in the creation and provision of a live stream of digital content by a broadcaster to a media server, and the processing of the live stream by the media server. Although FIGS. 22A and 22B are directed primarily to the overall process flow for a mobile broadcaster, the functionality and devices shown in these figures applies similarly to web-based broadcasters as well.

[0224] *2) Viewer processes*

[0225] FIGS. 23A and 23B show a communication flow diagram illustrating process flow elements and the server and/or memory storage devices involved in the communication flow for a live stream RTMP media server or RTMP CDN viewer, according to one inventive implementation. A viewer who is a registered or anonymous user, but has received a StreamID for a particular broadcaster's live stream (e.g., via a push notification) to their viewer client device, may send a request to the web server(s) 700 (via the API) to receive a copy of the broadcaster's live stream. The web server(s) first checks the memory cache 460 for, or requests from the database 420, various stream information corresponding to the StreamID provided by the requesting viewer. The web server(s) then perform(s) the viewer stream source selection algorithm discussed above in connection with FIG. 7 to provide an endpoint to the viewer client device for the appropriate media source from which to obtain a copy of the live stream. In the process shown in FIGS. 23A and 23B, the viewer stream source selection algorithm provides an endpoint (e.g., address or URL) to the viewer client device to establish a video communication channel with either a particular media server of the RTMP media server pool 320, or a particular server of the RTMP CDN 340.

[0226] The viewer client device also connects to the appropriate socket of the socket server(s) dedicated to the live stream to establish a chat/system event channel and thereby receive chat messages and system messages. If the live stream relates to an event, the viewer client device also connects to the appropriate socket of the socket server(s) dedicated to the event to establish an event information channel and thereby receive event messages containing various event information. The viewer using the viewer client device also may send chat messages to the web server API, which the web server directs to the appropriate socket of the socket server(s) dedicated to the live stream for broadcast to other viewers connected to the socket as well as the broadcaster. The web server also updates a replay log with the chat message from the viewer, so that the chat may be recreated if a recording of the broadcaster's live stream is replayed by a viewer at a later time (discussed further below).

[0227] FIGS. 24A and 24B show a communication flow diagram illustrating process flow elements and the server and/or memory storage devices involved in the communication flow for a live stream HLS viewer, according to one inventive implementation. The process shown in these figures is substantially similar to that outlined above in connection with FIGS. 23A and 23B; the primary difference is that, as a result of the web server(s) performing the viewer stream source selection algorithm (see FIG. 7), the web server(s) return(s) to the viewer client device an endpoint (e.g., address or URL) to establish a video channel with the HLS server architecture 380 rather than a server of the RTMP media server pool 320 or the RTMP CDN 340.

[0228] FIGS. 25A, 25B, and 25C show a process flow illustrating a mobile client live stream replay method, according to one inventive implementation. For replay of a recording of a broadcaster's live stream, the servers and memory storage devices 1000 log all events that occur in connection with a live stream (e.g., chat messages and system event messages, as well as event message) and tie them to a timestamp. This allows synchronization of all events to the replay in the same order that the events occurred during the live stream, as if the viewer were not watching a recording of the live stream but actually watching a copy of the live stream in real time.

[0229] As shown in the figures, the viewer client device couples to the web server(s) via the API to request stream information and, if the stream recording is ready, loads the initial replay data from the API and then loads the media file of the recording. The viewer client device also connects to the chat/system event socket corresponding to the live stream (via a persistent

authenticated connection), not to receive chat messages or system event messages (these messages are not present on replay), but rather so that the system knows of the viewer's presence and connection. Playback of the video is then started, and then the internal clock and the current video time clock are updated to provide for appropriate buffering of the video data. As the recording is played back, event data (e.g., chat messages, system messages, event information messages) is processed in one implementation according to FIGS. 26A and 26B, and user inputs are processed in one implementation according to FIG. 27.

[0230] X. Single Screen Experience

[0231] The inventive HLS server architecture 380 discussed above (e.g., in connection with FIGS. 8, 9A, 9B, 9C and 9D) also may be effectively employed to implement a "single screen experience" in which a broadcaster's video-based commentary about an event may be integrated with audio and/or video of the event itself. Synchronized event information also may be displayed together with the broadcaster's video-based commentary and the audio/video of the event itself on respective viewing devices of multiple viewers.

[0232] For example, in a manner similar to that shown in FIG. 1B and discussed above in connection with same, FIG. 28 illustrates a display 250A of an example client device, in which a first broadcaster is providing video-based commentary 252A about a live event (e.g., a sports game such as a basketball match), and a video 255 of the live event itself is also shown in the display of the client device to provide a single screen experience (integrated event video and broadcaster commentary). Additionally, chat messages 258A from one or more viewers, event information 254A about the live event, and other graphics and/or animations 258A are displayed together with the broadcaster's video-based commentary 252A and the video 255 of the live event itself. As also shown along the right hand side of FIG. 28, multiple broadcasters may be providing respective video-based commentaries regarding the same live event, and any one of the available commentaries from different broadcasters may be selected at will by a given viewer. As discussed above in connection with FIG. 1B, it should be appreciated that one or more elements of the various content discussed in connection with FIG. 28 similarly may be provided on the display of a given broadcaster client device and a given viewer client device.

[0233] One technological problem that is addressed by inventive methods, apparatus and systems for single screen implementations is that different broadcaster's video-based

commentaries relating to the same event all need to be synchronized with an audio/video feed of the live event. Because a given viewer is seeing both the audio/video of the event and a given broadcaster's video-based commentary at the same time on their viewer client device, the latency of the broadcaster's video-based commentary relative to the live event itself is less of a consideration; instead, the salient technical considerations to address include: 1) the synchronization of a given broadcaster's video-based commentary with an audio/video feed of the live event or a copy of the audio/video feed (rather than the live event itself); 2) the synchronization of one viewer of a first copy of a given broadcaster's integrated live stream of the event with another viewer of a second copy of the given broadcaster's integrated live stream of the event; and 3) the appropriate synchronization of event information and real-time updates to event information for all viewers of copies of any broadcaster's integrated live stream of the live event.

[0234] In view of the foregoing, to achieve appropriate synchronization of the broadcaster's video-based commentary and the audio/video of the live event in one inventive implementation, each broadcaster's client device first ingests a copy of an audio/video feed of the live event and displays the live event to the broadcaster on their client device based on the audio/video feed. As the broadcaster watches the displayed video of the live event on their client device, they provide their video-based commentary based on the video of the live event as displayed on their device. The broadcaster's client device creates a composite outgoing stream of the audio/video feed of the live event and the broadcaster's video-based commentary (an "integrated live event and commentary stream"), and transmits this integrated live event and commentary stream to a media server. The media server (or other constituent of the media sources 300) in turn provides one or more copies of the integrated live event and commentary stream for distribution to one or more viewer client devices. In one example implementation in which the audio/video feed of the live event already includes commentary (e.g., from a network source) and/or other undesirable audio content, the original event audio may be filtered or omitted from the integrated live event and commentary stream (e.g., only the video portion of the copy of the audio/video feed of the live event is utilized) to mitigate or significantly reduce undesirable audio content that may otherwise obfuscate or interfere with the broadcaster's commentary.

[0235] In one aspect, a quality of the video that a viewer sees (both of the event and the broadcaster's commentary) based on a copy of the integrated live event and commentary stream

is dependent at least in part on the quality of the broadcaster's network connection (e.g., if the broadcaster is on a low bandwidth connection, the resulting footage as seen by the viewer will be relatively low quality, irrespective of a quality of the original audio/video feed of the live event). Additionally, another technical consideration is that the effective network bandwidth required by the broadcaster is significantly increased (e.g., doubled), as not only is the broadcaster client device outputting a live stream to a media server for distribution, but it is also ingesting the original audio/video feed of the live event to provide a basis for the broadcaster's video-based commentary.

[0236] In some inventive embodiments, to mitigate potential broadcaster network connection issues (e.g., resulting in poor viewer video quality), the copy of the audio/video feed for the live event is provided to broadcaster client devices by one of the media sources 300 in the servers and memory storage devices 1000 shown in FIGS. 2 and 3. More specifically, in one implementation, an audio/video feed of a live event from a broadcast source is input to one of the RTMP media servers 320, a first HLS copy of the audio/video feed is provided by the RTMP media server 320 to the HLS server architecture 380, and then one or more additional copies of the audio/video feed for the live event are provided to respective broadcaster client devices by the HLS server architecture 380. As mentioned above, the latency between the actual live event and the broadcaster commentary isn't necessarily a salient consideration, since any viewer of a copy of the broadcaster's integrated live event and commentary stream views both the live event and the broadcaster's commentary from the single copy of the integrated stream. Accordingly, any latency arising from the HLS server architecture 380 does not give rise to adverse consequences on viewer experience in single screen implementations.

[0237] FIG. 29 is a block diagram of the broadcast/viewing servers and memory storage devices 1000 and associated client devices, similar to that shown in FIG. 2, illustrating some of the particular features germane to one example of a single screen implementation involving the RTMP media servers 320 and the HLS server architecture 380 of media sources 300 to process an audio/video feed of a live event. As shown in FIG. 29, a designated one of the RTMP media servers 320 receives an audio/video feed 2000 for a live event (e.g., as provided by Leaguepass, MLB networks, EPL live feeds, etc.), and provides a first HLS copy 2001 of the audio/video feed to the HLS server architecture 380 (see "HLS Segmentation" shown in FIG. 5C and discussed above in connection with same). The HLS server architecture then provides one or more

additional HLS copies 2002 of the first copy 2001 of the audio/video feed to one or more broadcaster client devices (e.g., see the broadcaster client device 100A in FIG. 29); to this end, the HLS server architecture 380 may implement, at least in part, the process discussed above in connection with FIGS. 8 and 9A through 9D. As discussed further below, a given broadcaster client device then combines the HLS copy 2002 of the audio/video feed received from the HLS server architecture 380 with video-based commentary provided by the broadcaster to generate an integrated live event and commentary stream 1002A, which is transmitted to one or more of the media sources 300 (e.g., RTMP media server 320 or WebRTC media server 360).

[0238] FIG. 30 is a flow chart illustrating a process implemented by the various devices discussed above in connection with FIG. 29. In block 2012 of FIG. 30, the audio/video feed 2000 for the live event is input to the RTMP media server 320. A first HLS copy of the audio/video feed is provided by the RTMP server to the HLS server architecture 380. In block 2013, the server architecture 380 provides a second HLS copy of the audio/video feed as input to a given broadcaster client device. In block 2016, the broadcaster client device displays the live event based on the HLS copy of the audio/video feed received from the HLS server architecture. In block 2018, the broadcaster provides video-based commentary for the live event based on the video rendered in the display of the client device, and in block 2020 the broadcaster client device generates the integrated live event and commentary stream 1002A. In block 2022, the client device transmits the integrated live event and commentary stream 1002A to a media server of the media sources 300, and one or more of the media sources 300 provide one or more copies of the integrated live event and commentary stream for distribution to one or more viewer client devices (e.g., via a content delivery network that accesses the integrated live stream from a first media server endpoint according to a first live stream Internet URL corresponding to the integrated live stream).

[0239] With reference again to FIG. 29, and in a manner similar to that discussed above in connection with FIG. 2, respective viewer devices (e.g., 200A, 200C) receiving copies of a given broadcaster's integrated live event and commentator stream 1002A also connect to an event socket of a socket server 600 (e.g., according to a first event socket Internet URL) to receive synchronized event information (e.g., real time scores) relating to the event. Based on the received copy of the integrated live event and commentator stream and the synchronized event information, a given viewer device displays the broadcaster's video-based commentary together

with the audio/video of the live event itself as well as the event information (e.g., as a "scorebug").

[0240] Although the context and use-case for the concepts outlined in FIGS. 29 and 30 are directed generally to live events, it should be appreciated that, in other use-cases, these concepts similarly may be applied to rebroadcast or timeshifted events (e.g, for which the source audio/video feed 2000 for the event is not necessarily contemporaneous with the live event itself, but delayed in time by some amount with respect to the live event, or is a rebroadcasting of a previously recorded event).

[0241] In one aspect of single screen implementations, the event socket corresponding to a particular live event also may provide event broadcaster information relating to different broadcasters offering video-based commentary about the same live event. In this manner, a given viewer of the live event may select amongst different broadcasters for the same live event, based on the event broadcaster information provided by the event socket, to access a different but synchronized integrated live event and commentator stream (e.g., according to a second live stream Internet URL associated with a different broadcaster). Thus, a seamless transition is provided to a different broadcaster's commentary integrated with the audio/video of the live event. The viewer device may remain connected to the event socket to continue to receive the synchronized event information which is displayed together with the different broadcaster's commentary and the audio/video of the live event, as well as ongoing updates to event broadcaster information to keep abreast of different broadcasters that are providing video-based commentary about the event.

[0242] The innovative HLS server architecture 380 ensures that all broadcasters providing commentary on the same live event are synchronized to each other. More specifically, respective copies of the audio/video feed of the live event provided by the HLS server architecture 380 to multiple broadcaster client devices fall within a single HLS segment length of synchronization – this single HLS segment length of synchronization of copies of the audio/video feed of the live event is referred to herein as "broadcaster segment concurrency," akin to the viewer segment concurrency discussed above in connection with the HLS server architecture 380.

[0243] More specifically, and with reference again to section VII of this document (i.e., in connection with FIG. 8), HLS copies of a live stream of digital content include a number of

segments, each containing a short segment of video (encoded as a .ts file). An HLS buffer (also referred to as a window or "chunklist") contains a list of some number of pointers to the .ts files that represent respective segments. The media source providing the HLS files typically does not make the HLS copy of the live stream available to a viewer until the HLS buffer is full of pointers. When a client device receives an HLS copy of a live stream, the client device begins displaying the video segment (the .ts file) at the start of the HLS buffer (the first pointer in the chunklist); thus, the viewer of the HLS copy is "behind real time" (offset in time from the original video source that is being segmented) by the length of the buffer. In one inventive implementation discussed above, the HLS buffer includes 4-6 pointers to .ts files of video segments, wherein each segment includes 2 seconds of video (accordingly, the offset in time between the original video source and a viewer's HLS copy is 8 seconds for a 4 pointer HLS buffer and 12 seconds for a 6 pointer HLS buffer).

[0244] According to the HLS caching server architecture 380 shown in FIG. 8, all viewers of HLS copies of live streams are known to be inside the same single segment, with an effective maximum desynchronization between respective viewers of the HLS copies of the same live stream being the duration of a single HLS video segment; this maximum desynchronization was referred to herein earlier in connection with HLS viewers as "viewer segment concurrency" (e.g., 2 seconds in the example described above). However, in the context of the HLS server architecture providing copies of audio/video feeds of live events to broadcaster client devices to facilitate single screen experience implementations, this concept in this context also may be referred to as "broadcaster segment concurrency."

[0245] The broadcaster segment concurrency provide by the HLS server architecture in single screen experience implementations thereby allows for a given viewer of a copy of a first broadcaster's integrated live event and commentary stream to smoothly transition to a copy of a second broadcaster's integrated live event and commentary stream relating to the same event, without any significant interruption of the displayed live event as part of the viewer's single screen experience. Generally speaking, in single-screen experience implementations, all broadcasters providing video-based commentary on a particular event provide respective integrated live event and commentary streams that are substantially synchronized (e.g., with a delay relative to the original audio/video feed of the live event of approximately one HLS window/buffer length, e.g., 8 to 12 seconds for 4 or 6 pointers, respectively), and all viewers of a

given broadcaster receive respective copies of the integrated live event and commentary stream from the broadcaster that are substantially synchronized (e.g., with a delay relative to the original audio/video feed of the live event of approximately two HLS windows/buffer lengths, e.g., 16 to 24 seconds for 4 or 6 pointers, respectively).

[0246] Another technological problem that is addressed in the inventive solutions provided herein for the single-screen experience takes into account the HLS-induced latency with respect to the synchronized event information that is provided to all viewers of broadcasters relating to the same event (via a dedicated event socket of the socket server(s) 600), as well as chat messages and system event messages (provided via a dedicated chat/system event socket of the socket server(s) 600).

[0247] Recall that, in connection with implementations relating to a second screen experience, the socket server(s) 600 provide event information updates in essentially real-time and simultaneously to all broadcasters commenting about the same live event, and all viewers that are viewing broadcaster commentary about the same live event. The essentially real-time and simultaneous delivery of event information (and updates to same) to all broadcasters and viewers concerned with the same event is a salient consideration for the second screen experience, as both the broadcaster(s) and viewer(s) likely are viewing the event either live or on a primary screen in essentially real time with the live event (so it is important to the viewer experience to receive event information updates as they occur).

[0248] In alternative implementations relating to a single screen experience, however, event information updates are synchronized not to the live event itself, but rather to the broadcaster's integrated live event and commentary stream (which is delayed relative to the original audio/video feed of the live event due to the HLS techniques employed). In some examples, this alternative synchronization is achieved via event buffering and clock synchronization techniques involving a privatized Network Time Protocol (NTP) (for which a synchronized time for all client devices may be acquired via additional socket connections).

[0249] Regarding chat messages and system event messages (conveyed to client devices via a dedicated chat/system event socket of the socket server(s)), in single screen experience implementations these messages are "double delayed" relative to the original audio/video feed 2000 of the live event to which they pertain. In particular, as noted above, viewers in the single

screen experience implementations are seeing the audio/video related to a live event (as part of the integrated broadcaster commentary and audio/video of the live event) with a delay relative to the original audio/video feed 2000 of the live event of two times the HLS window/buffer length. Thus, the broadcaster of the integrated live stream sees chat messages that are responding to audio/video that occurred one HLS window in the past. However, because the broadcaster does not necessarily participate in chat messages in some implementations, this broadcaster-perceived delay generally is of no significant consequence; from the viewers' perspective, all viewers are experiencing chat messages in a synchronized manner, irrespective of delays arising from the HLS techniques employed.

[0250] For example, assume the HLS window is 12 seconds (e.g., six pointers to respective segments each having two seconds in duration). The broadcaster receives their copy of the audio/video feed of the live event from the HLS server architecture 380 with a 12 second delay relative to the original audio/video feed 2000 of the live event. Also assume that one or more viewers have connected to the HLS server architecture 380 as soon as copies of the broadcaster's integrated live event and commentary stream are made available at the HLS server (i.e., after two HLS windows or 24 seconds delayed from the original audio/video feed 2000 of the live event. If the viewers begin chatting immediately about what they are viewing in their copies of the integrated live event and commentary stream, this chat relates to what the broadcaster was viewing and commenting on 12 seconds prior; i.e., the broadcaster will see this viewer chat on the broadcaster client device with a 12 second delay relative to the content they generated (any chat messages that are displayed on the broadcaster's screen are in response to what the broadcaster did 12 seconds ago).

[0251] With reference again to FIG. 29, in single screen experience implementations, the control server 500 of the server and memory storage architecture 1000 implements additional functionality to monitor for live events and audio/video feeds relating to these live events from a variety of available Internet sources (e.g., Leaguepass, MLB networks, EPL live feeds, etc.). The control server 500 then stores access endpoints (source URLs) for respective audio/video feeds of live events in the database 420 of the server and memory storage architecture 1000. In one implementation, with reference again to FIG. 10 and FIGS. 16A and 16B, the live event data monitor service implemented by the control server 500 is modified for these purposes.

[0252] More specifically, FIGS. 31A and 31B show a process flow diagram, similar to that shown in FIGS. 16A and 16B, illustrating a modified live event data monitor service method performed by the control server of FIG. 29, according to one inventive implementation. In one example relating to sporting events, via the modified live event data monitor service method, the control server may monitor existing game data retrieved from event information provider 55 (e.g., STATS) to detect "start of game" events, determine the Internet resources corresponding to audio/video feeds 2000 for such events, and store the URLs for these Internet resources in the database 420.

[0253] Once an audio/video feed 2000 relating to an event is identified (and is about to commence), the control server assigns a media server of the media sources 300 (e.g., the HLS mother 382 of the HLS server architecture 380 to process the audio/video feed 2000 to create an HLS copy 2002 of the audio/video feed, that is in turn passed on to one or more broadcaster client devices. In particular, the control server 500 may signal to the assigned media server that a new game is started, and provide the URL for the audio/video feed 2000 of the game, pursuant to which the server connects to the source of the audio/video feed 20000 (e.g., Leaguepass, MLB networks, EPL live feeds, etc.).

[0254] After the HLS window time has been reached (e.g., 12 seconds) the control server "unlocks" the HLS copy 2002 corresponding to the live event and allows broadcaster devices to begin accessing the HLS copy 2002 from the HLS server architecture 380. In one aspect, the HLS CDN 388 (see FIG. 8) may provide a relay point that a broadcaster client device connects to (in some implementations this may be an obfuscated/encrypted endpoint provided to valid broadcasters to prevent non-broadcasters from accessing the copy of the audio/video feed of the live event).

[0255] The broadcaster client device in turn combines broadcaster video-based commentary with the HLS copy 2002 of the audio/video feed of the live event and, as shown in FIG 29, provides to a media server of the media source 300 (as selected by the Web Server 700) an RTMP H.264 integrated live event and commentator stream 1002A. The media server processes this incoming stream from the broadcaster client device (as discussed earlier in this disclosure) to provide at least one copy of the incoming integrated live event and commentary stream from the broadcaster to at least one viewer client device (via the media sources 300). In one

implementation in which viewers access copies of the broadcaster's integrated stream from the HLS server architecture, the control server 500 unlocks the viewer copies after twice the HLS window time has been reached (e.g., at least 24 seconds after the audio/video feed 2000 of the live event commences, and 12 seconds after the broadcaster begins broadcasting).

[0256] With respect to the functionality of the broadcaster client device to create an integrated live event and commentary stream 1002A, the processes previously outlined above in connection with FIGS. 20A and 20B, as well as FIGS. 21A, 21B, 21D, and 21E, are modified in some respects to accommodate the inclusion of the HLS copy 2002 of the audio/video feed of the live event.

[0257] In connection with the mobile broadcaster stream create process outlined in FIGS. 20A and 20B, during stream creation the broadcaster client device may synchronize an application timer via an NTP system (e.g., private NTP pool) that may be accessed via a designated socket of the socket server(s) 600. For example, in the penultimate block of FIG. 20B, the "Stream Created" portion of the process may be modified in that the web server 700 may provide a designated socket as part of the validation process for the broadcaster client device to synchronize an application timer, referred to hereafter as "server_time." Alternatively, in another implementation, the broadcaster client device need not access an NTP system directly, but rather may synchronize its application timer "server_time" via an initial timestamp generated and provided by the web server 700 (via a private NTP pool); in this manner, the broadcaster client device may use its internal clock and a calculated offset based on the initial syncing timestamp provided by the web server 700 (e.g., with a granularity of about one second provided via the timestamps). In any event, it should be appreciated that given the delay time corresponding to an HLS window between the original audio/video feed of the live event and the HLS copy of the audio/video feed, a portion of the live event displayed on the broadcaster client device at "server_time" actually appeared in the original audio/video feed of the live event approximately one HLS window earlier.

[0258] FIGS. 32A, 32B, 32C, 32D, 32E and 32F show a process flow, similar to that shown in FIGS. 21A, 21B, 21C, 21D, and 21E, illustrating a modified mobile broadcaster active stream process according to one inventive implementation relating to the single screen experience, following creation of the broadcaster stream (e.g., pursuant to FIGS. 20A and 20B and

appropriate modifications thereto relating to the application timer "server_time"). As shown in FIG. 32A, if the stream relates to an event, the broadcast client device not only connects to the appropriate socket of the socket server(s) for the event information channel based on the appropriate EventID, but also connects to the appropriate endpoint of the HLS server architecture 380 to access an HLS copy 2002 of the audio/video feed of the live event. As discussed above relating to broadcaster segment concurrency, any broadcaster client device is within a segment duration (e.g., 2 seconds) upon connection to the HLS server architecture endpoint to receive the HLS copy.

[0259] In the modified broadcaster active stream process, a second timer, referred to as "game_time," is created (see FIG. 32A) according to server_time - the max latency of the HLS stream (i.e., the duration of the HLS window) + 1.5 seconds**.** This second timer "game_time" approximately represents the actual time in the original audio/video feed of the live event the portions of the live event displayed on the broadcaster client device pursuant to the HLS copy actually occurred in the original audio/video feed. By including a 1.5 second offset in the game_time calculation relative to server_time (given the 2 second segment length), the game_time is on average accurate (again, since the broadcaster is somewhere in the 2 second window of a segement when it connects). By linking game_time to the upper bound of the HLS window duration, event information updates (e.g., scorebug updates) will display anywhere from 0.5 seconds early (if they are at the end of the HLS window) to 1.5 seconds late (if they are at the start of the HLS window; and practically speaking 1.5 seconds is a negligible delay).

[0260] When new data is received by the broadcaster client device on the event information channel (e.g., a score update), instead of instantly being displayed, the broadcaster client device adds the new event data into an event buffer with the timestamp server_time (which is ahead of game_time by approximately the length of the HLS window; see FIG. 32A). Since game_time is behind server_time, the event information updates need to be delayed until the game_time timer has "caught up" to the server_time; stated differently, any updated new event data present in the event buffer is only used to update the displayed event information on the broadcaster client device when the current value of game_timer matches the timestamp of the new event data (see FIG. 32B). In this manner, a broadcaster sees the event information displayed on their device update in synchronization with the portion of the live event being displayed on the client device (i.e., both delayed approximately by the duration of an HLS window).

[0261] At this point in the process, as shown in FIG. 32C, an optional augmented reality (AR) process is invoked by passing a captured camera frame to an AR API to facilitate face detection of the broadcaster and render a modified video frame. Also, after a camera frame of the broadcaster is captured, a concurrent frame of the live event from the HLS copy of the audio/video feed is captured, an overly is rendered on the frame of the live event from the captured camera frame of the broadcaster, and a composite frame is thereby generated for display on the broadcaster client device and transmission to the designated media server. The latency introduced in this step is negligible (e.g., approximately 1/20th of a second).

[0262] In a manner similar to the broadcaster viewing device, a viewer client device creates an internal timer server_time (e.g., using a private NTP pool). Unlike the broadcaster client device, however, the viewer client device synchronizes its timer server_time at the start of consuming a copy of the broadcaster's integrated live event and commentator stream. This allows a given viewer client device's server_time to be accurate despite any network latency issues. When a viewer client device begins watching the copy of a broadcaster's integrated live event and commentator stream, the viewer client device creates a second internal timer that is equal to the server_time - 2x the HLS window + 3 seconds, referred to as "broadcast_time." As with the broadcaster client device, any incoming new event data on the event information channel to which the viewer client device is coupled is placed in an event buffer with a timestamp equal to server_time. The viewer client device experiences event information updates that are within -0.5 seconds to 1.5 seconds relative to the integrated live event and commentary displayed on the viewer client device. The viewer client device compares the timestamp of buffered new event data (which was recorded in server_time , which will be roughly 2xHLS Window ahead of the broadcast_time) against the current broadcast_time, and if there is a match, then the new event data will be displayed on the viewer client device at that point.

[0263] As noted above, one salient feature of the single screen experience implementations is the ability to switch between different broadcasters during a live event. Because all broadcaster client devices ingesting respective HLS copies of the audio/video feed for the same live event are within the same HLS segment time ("broadcaster segment concurrency"), when a viewer client device switches between different broadcasters integrated live event and commentary streams, the viewer client device will display a stream that is within a single HLS segment of where it was just before the switch, resulting in effectively no perceptible loss or repeat of displayed live event

coverage. The existing buffer of new event data that was generated during the viewer client device displaying the previous broadcaster's integrated stream is preserved. Because a new server_time is requested on connection, and the broadcast_time is adjusted to account for network latency in connecting to the new video stream, the new broadcast will be able to reuse the previously buffered events and there will be no invalidation of previous new event data updates.

[0264] If the network latency in connecting to the new stream exceeds 1 second, there will be a gap in the buffered new event data and the viewer client device will request the missing events from the API directly. Due to the fact that the broadcast_time is two HLS windows in the past, even if there is a multisecond gap in buffered new event data, the event buffer is more than large enough to allow the viewer client device to request the missing events without there ever being a period of time in which the displayed event information is not accurate to the displayed portion of the live event.

[0265] In some implementations, the audio and/or video feed of the live sporting event may be provided with just the "game audio," e.g., background and foreground sound from the venue of the event itself (crowd cheering, local announcers at the venue over loudspeaker, etc.), and without any native commercial/network broadcaster commentary. For example, in one implementation, the video of the live sporting event and background/foreground sound from the event venue itself may be provided, and the event video and audio may be integrated with (mixed with) the broadcaster's video and audio. In another implementation, just the audio from the live sporting event may be provided and mixed with the broadcaster's video and audio. In yet another implementation, just the video from the live sporting event may be provided and mixed with the broadcaster's video and audio. More specifically, in implementations in which the audio/video feed of the live event already includes significant commentary (e.g., from a network source) and/or other undesirable audio content, the original event audio may be filtered or omitted from the integrated live event and commentary stream (e.g., only the video portion of the copy of the audio/video feed of the live event is utilized) to mitigate or significantly reduce undesirable audio content that may otherwise obfuscate or interfere with the broadcaster's commentary.

[0266] To make use of the native game audio if desired, the "broadcaster stream active" process may be modified as shown in FIG. 32A to use a virtual mixer, "pipe audio from game footage into mixer" and "pipe audio from broadcaster side into mixer." In FIG. 32C, after the composite final frame is generated, the outgoing audio may be set to use the combined mixer as the audio source instead of the broadcasters "raw" audio source. In this manner, the addition of a virtual "mixer" allows the audio from the game itself to be piped into and combined with the audio from the broadcaster microphone to create a mixed combined audio track that is attached to the outgoing video stream to the media server.

[0267] ***Conclusion***

[0268] While various inventive implementations have been described and illustrated herein, those of ordinary skill in the art will readily envision a variety of other means and/or structures for performing the function and/or obtaining the results and/or one or more of the advantages described herein, and each of such variations and/or modifications is deemed to be within the scope of the inventive implementations described herein. More generally, those skilled in the art will readily appreciate that all parameters and configurations described herein are meant to be exemplary inventive features and that other equivalents to the specific inventive implementations described herein may be realized. It is, therefore, to be understood that the foregoing implementations are presented by way of example and that, within the scope of the appended claims and equivalents thereto, inventive implementations may be practiced otherwise than as specifically described and claimed. Inventive implementations of the present disclosure are directed to each individual feature, system, article, and/or method described herein. In addition, any combination of two or more such features, systems, articles, and/or methods, if such features, systems, articles, and/or methods are not mutually inconsistent, is included within the inventive scope of the present disclosure.

[0269] The above-described implementations can be implemented in multiple ways. For example, implementations may be implemented using hardware, software or a combination thereof. When implemented in software, the software code can be executed on any suitable processor or collection of processors, whether provided in a single computer or distributed among multiple computers. Further, it should be appreciated that a computer may be embodied in any of a number of forms, such as a rack-mounted computer, a desktop computer, a laptop

computer, or a tablet computer. Additionally, a computer may be embedded in a device not generally regarded as a computer but with suitable processing capabilities, including a Personal Digital Assistant (PDA), a smart phone or any other suitable portable or fixed electronic device.

[0270] Also, a computer may have one or more input and output devices. These devices can be used, among other things, to present a user interface. Examples of output devices that can be used to provide a user interface include printers or display screens for visual presentation of output and speakers or other sound generating devices for audible presentation of output. Examples of input devices that can be used for a user interface include keyboards, and pointing devices, such as mice, touch pads, and digitizing tablets. As another example, a computer may receive input information through speech recognition or in other audible format. Such computers may be interconnected by one or more networks such as Internet. The various methods or processes outlined herein may be coded as software that is executable on one or more processors that employ any one of a variety of operating systems or platforms. Additionally, such software may be written using any of a number of suitable programming languages and/or programming or scripting tools, and also may be compiled as executable machine language code or intermediate code that is executed on a framework or virtual machine.

[0271] In this respect, various inventive concepts may be embodied as a computer readable memory or storage medium (or multiple computer readable storage media) (e.g., a computer memory, one or more floppy discs, compact discs, optical discs, magnetic tapes, flash memories, circuit configurations in Field Programmable Gate Arrays or other semiconductor devices, or other non-transitory medium or tangible computer storage medium) encoded with one or more programs that, when executed on one or more computers or other processors, perform methods that implement the various implementations of the invention discussed above. The computer readable medium or media can be transportable, such that the program or programs stored thereon can be loaded onto one or more different computers or other processors to implement various aspects of the present invention as discussed above.

[0272] Unless otherwise indicated, the terms “program” or “software” are used herein in a generic sense to refer to any type of computer code or set of computer-executable instructions that can be employed to program a computer or other processor to implement various aspects of implementations as discussed above. Additionally, it should be appreciated that according to one

aspect, one or more computer programs that when executed perform methods of the present invention need not reside on a single computer or processor, but may be distributed in a modular fashion amongst a number of different computers or processors to implement various aspects of the present invention.

[0273] Computer-executable instructions may be in many forms, such as program modules, executed by one or more computers or other devices. Generally, program modules include routines, programs, objects, components, data structures, etc., that perform particular tasks or implement particular abstract data types. Typically the functionality of the program modules may be combined or distributed as desired in various implementations.

[0274] Also, data structures may be stored in computer-readable media in any suitable form. For simplicity of illustration, data structures may be shown to have fields that are related through location in the data structure. Such relationships may likewise be achieved by assigning storage for the fields with locations in a computer-readable medium that convey relationship between the fields. However, any suitable mechanism may be used to establish a relationship between information in fields of a data structure, including through the use of pointers, tags or other mechanisms that establish relationship between data elements. In some implementations, a schema-minimal storage system may be implemented in a relational database environment using key-value storage versus defined data structures.

[0275] With the foregoing in mind, each of the client devices described herein, as well as various servers and other computing devices of the broadcast/viewing servers and memory storage devices shown for example in FIGS. 2 and 3, may comprise one or more processors, one or more memory devices or systems communicatively coupled to the one or more processors (e.g., to store software code and other data), and one or more communication interfaces communicatively coupled to the one or more processors so as to implement the various specific and inventive functionality described herein.

[0276] Also, various inventive concepts may be embodied as one or more methods, of which an example has been provided. The acts performed as part of the method may be ordered in any suitable way. Accordingly, implementations may be constructed in which acts are performed in an order different than illustrated, which may include performing some acts simultaneously, even though shown as sequential acts in illustrative implementations.

[0277] All publications, patent applications, patents, and other references mentioned herein are incorporated by reference in their entirety.

[0278] All definitions, as defined and used herein, should be understood to control over dictionary definitions, definitions in documents incorporated by reference, and/or ordinary meanings of the defined terms.

[0279] The indefinite articles "a" and "an," as used herein in the specification and in the claims, unless clearly indicated to the contrary, should be understood to mean "at least one."

[0280] The phrase "and/or," as used herein in the specification and in the claims, should be understood to mean "either or both" of the elements so conjoined, *i.e.*, elements that are conjunctively present in some cases and disjunctively present in other cases. Multiple elements listed with "and/or" should be construed in the same fashion, *i.e.*, "one or more" of the elements so conjoined. Other elements may optionally be present other than the elements specifically identified by the "and/or" clause, whether related or unrelated to those elements specifically identified. Thus, as a non-limiting example, a reference to "A and/or B", when used in conjunction with open-ended language such as "comprising" can refer, in one implementation, to A only (optionally including elements other than B); in another implementation, to B only (optionally including elements other than A); in yet another implementation, to both A and B (optionally including other elements); etc.

[0281] As used herein in the specification and in the claims, "or" should be understood to have the same meaning as "and/or" as defined above. For example, when separating items in a list, "or" or "and/or" shall be interpreted as being inclusive, *i.e.*, the inclusion of at least one, but also including more than one, of a number or list of elements, and, optionally, additional unlisted items. Only terms clearly indicated to the contrary, such as "only one of" or "exactly one of," or, when used in the claims, "consisting of," will refer to the inclusion of exactly one element of a number or list of elements. In general, the term "or" as used herein shall only be interpreted as indicating exclusive alternatives (*i.e.* "one or the other but not both") when preceded by terms of exclusivity, such as "either," "one of," "only one of," or "exactly one of." "Consisting essentially of," when used in the claims, shall have its ordinary meaning as used in the field of patent law.

[0282] As used herein in the specification and in the claims, the phrase "at least one," in reference to a list of one or more elements, should be understood to mean at least one element selected from any one or more of the elements in the list of elements, but not necessarily including at least one of each and every element specifically listed within the list of elements and not excluding any combinations of elements in the list of elements. This definition also allows that elements may optionally be present other than the elements specifically identified within the list of elements to which the phrase "at least one" refers, whether related or unrelated to those elements specifically identified. Thus, as a non-limiting example, "at least one of A and B" (or, equivalently, "at least one of A or B," or, equivalently "at least one of A and/or B") can refer, in one implementation, to at least one, optionally including more than one, A, with no B present (and optionally including elements other than B); in another implementation, to at least one, optionally including more than one, B, with no A present (and optionally including elements other than A); in yet another implementation, to at least one, optionally including more than one, A, and at least one, optionally including more than one, B (and optionally including other elements); etc.

[0283] In the claims, as well as in the specification above, all transitional phrases such as "comprising," "including," "carrying," "having," "containing," "involving," "holding," "composed of," and the like are to be understood to be open-ended, *i.e.*, to mean including but not limited to. Only the transitional phrases "consisting of" and "consisting essentially of" shall be closed or semi-closed transitional phrases, respectively, as set forth in the United States Patent Office Manual of Patent Examining Procedures, Section 2111.03.

CLAIMS

1. A system for providing a first plurality of copies of a first broadcaster's live stream of digital content including first live sporting event video-based commentary and integrated audio and/or video of a first live sporting event, from a first broadcaster client device to a first plurality of viewer client devices, the system comprising:

A) at least one media source to:

provide the audio and/or video of the first live sporting event to the first broadcaster client device;

receive the first broadcaster's live stream of digital content including the first live sporting event video-based commentary and the integrated audio and/or video of the first live sporting event;

provide a first copy of the first plurality of copies to a first viewer client device of the first plurality of viewer client devices via a first video communication channel between the plurality of media sources and the first viewer client device of the first plurality of viewer client devices; and

B) a control server to periodically retrieve, from an event information provider, first event information germane to a first live sporting event, wherein the first event information includes first score information for the first live sporting event; and

C) at least one socket server communicatively coupled to the control server to:

receive from the control server at least the first score information; and

transmit the first score information to at least the first viewer client device of the first plurality of viewer client devices via a first event information Internet communication channel between at least one first event socket of the at least one socket server and the first viewer client device of the first plurality of viewer devices, wherein the at least one first event socket corresponds to the first event information germane to the first live sporting event,

wherein the first copy of the first broadcaster's live stream of digital content provided by the first video communication channel does not include a digital reference to the first score information provided by the first event information channel.

ABSTRACT

A broadcaster device generates a live stream including video-based commentary regarding a live event combined with an audio and/or video feed of the live event itself. A viewer device receives a copy of the integrated live event and commentator stream and synchronized event information (e.g., real-time scores), and displays the integrated stream and the event information (e.g., as a "scorebug"). Viewers of a given live event may seamlessly select amongst different broadcasters for the same live event to access different integrated live event and commentator streams respectively synchronized with the event information. A social media platform is provided in tandem with live streaming of digital content relating to live events to allow a given broadcaster and their associated viewers to communicate with one another, comment on the event and/or the broadcaster's live stream, and send digital gifts.

```
swagger: '2.0'
info:
  version: v1
  title: SportsCastr API
  description: >
    Welcome to the SportsCastr API.

    This first version of the API is designed to allow mobile apps to access our

    content and created streams.

    ## Deleting Objects

    We do our best to have all our URLs be

    [RESTful](http://en.wikipedia.org/wiki/Representational_state_transfer).

    Every endpoint (URL) may support one of four different http verbs. GET

    requests fetch information about an object, POST requests create objects,

    PUT requests update objects, and finally DELETE requests will delete

    objects.

    Since many old browsers don't support PUT or DELETE, we've made it easy to

    fake PUTs and DELETEs. All you have to do is do a POST with _method=PUT or

    _method=DELETE as a parameter and we will treat it as if you used PUT or

    DELETE respectively.

    ## HTTP Response Codes

    The API responds both with HTTP status codes AND the status code in the

    meta key.

    If you want to force the API to always return a 200 HTTP status code and

    parse the meta block yourself for the true response code, include _200=1

    in the query string.

    ## Structure

    ### The Envelope

    Every response is contained by an envelope. That is, each response has a

    predictable set of keys with which you can expect to interact:

    ```json

    {
        "meta": {
            "code": 200
        },
        "data": {
            ...
        },
        "pagination": {
            "nextUrl": "...",
            "currentPage": int,
            "totalPages": int
        }
    }

    ```
```

META

The meta key is used to communicate extra information about the response to the developer. If all goes well, you'll only ever see a code key with value 200.

However, sometimes things go wrong, and in that case you might see a response like:

```json
{
    "meta": {
        "errorType": "systemKeyFailure",
        "code": 400,
        "error_message": "..."
    }
}
```

DATA

The data key is the meat of the response. It may be a list or dictionary, but either way this is where you'll find the data you requested.

PAGINATION

Some operations (like listing followers or following) have response count limits.

In cases like these, there will be an additional block passed OUTSIDE the *data* container that will have the next url **stub* , currentPage , and totalPages

```json
{
    ...
    "pagination": {
        "nextUrl": "/me/following/2",
        "currentPage": 1,
        "totalPages": 3
        "totalItemss": 30
    }
}
```

Push notifications

Once push notifications have been authorized, you should subscribe to the following interests:

(https://pusher.com/docs/push_notifications/ios/client for documentation)

* user.[USERID]

* topic.[TOPIC_ID]

* focus.[TOPIC_ID].[FOCUS_ID]

```
### Testing


Point your web browser at http://www.scdev.live/push/[USERID] and it will
send a standard

alert notification


### Notification types


#### Stream Started


```json
  "aps": {
    "alert": {
      "body": "Tanya Sanchez has started streaming!"
    },
    "streamId": 18884
  }
```


When a stream is started, a notification comes in and the streamId should be
passed to the app if the user clicks "view"

New Follower


```json
  "apns": {
    "aps": {
      "alert": {
        "body": "Paul Jones has become your fan!"
      },
      "userId": 11362
    }
  }
```


When a user has been followed, notification comes in and the userId should
be passed to the app if the user clicks "view"

Streams

Below is the information you need for accessing the various subfunctions (
broadcast and chat)

Chat

Once a stream has been created or joined, you must connect to the **Pusher
PRESENCE channel** stream.

Channel name: **presence-streamSTREAMID** (ie presence-stream9999)

Library at: https://github.com/pusher/pusher-websocket-swift


```swift
  import PusherSwift

  let pusher = Pusher(key: "PROVIDED_BY_SPORTSCASTR")
```
```

That is the key you want to use.

The authentication endpoint for your program is
http://api.scdev.live/v1/stream/{streamId}/chat/auth?apiKey={apiKey} (
documented below)

The messages are sent in the following format

The event name is: **newMessage**

```json
{
  "text": "test",
  "user": {
      "id": 173,
      "username": "pete",
      "fullName": "Peter Azuolas",
      "profilePicture": "...",
      "streaming": false,
      "streamId": null
  }
}
```

Event: **subscription_succeeded**

Bind this event.

Once you connect successfully, Pusher will respond with a data packet.

```json
  {
      "event": "pusher_internal:subscription_succeeded",
      "data": {
          "presence": {
              "count": 1,
              "ids": ["173"],
              "hash": {
                  "173": {
                      "userClass": "user",
                      "id": 173,
                      "username": "pete",
                      "fullName": "Peter Azuolas",
                      "profilePicture": "https://castr.imgix.net/SportsCastr/profilePic/173/
profilePic_173_1476224013.png?w=200&h=200&fit=crop",
                      "streaming": false,
                      "streamId": null
                  }
              }
          }
      },
      "channel": "presence-stream9999"
  }
```

The most important part is **count**, this lets you know the current number
of people watching the stream.

You need to setup an internal variable to track the number of people
watching

the video. Seed this with the count value.

```
-------

Event: **member_added**

```json
{
    "event": "pusher_internal:member_added",
    "data": {
        "user_id": "anon18786",
        "user_info": {
            "userClass": "anonymous",
            "id": 18786,
            "shard": 1,
            "info": {
                "id": 18786,
                "network": "SportsCastr",
                "created": 1477507775,
                "shard": 1,
                "lastActive": null
            },
            "properties": {
                "counts": [],
                "topicInfo": [],
                "firstName": null,
                "lastName": null,
                "profilePicture": null,
                "bio": null
            }
        }
    },
    "channel": "presence-stream9999"
}
```

When a new viewer connects to the room, you will receive this event.

You need to update your internal variable and the UI.

Event: **member_removed**

```json
{
    "event": "pusher_internal:member_removed",
    "data": {
        "user_id": "anon18786"
    },
    "channel": "presence-stream9999"
}
```

When a viewer leaves the video, you will receive this event.

Update your internal variable and the UI.

Realtime event data

Once a stream has been created or joined that has a EVENT TYPE, you must connect to the **Pusher PRESENCE channel** for said event.

Channel name: **presence-eventEVENTID** (ie presence-event38352)
```

```
    Library at: https://github.com/pusher/pusher-websocket-swift


    ```swift
      import PusherSwift

      let pusher = Pusher(key: "REQUEST_FROM_PETE")
    ```


    That is the key you want to use.

    The authentication endpoint for your program is
    http://api.scdev.live/v1/stream/event/{eventId}/auth?apiKey={apiKey} (
    documented below)

    The messages are sent in the following format

    The event name is: **eventUpdate**


    ```json

    {
      "data" : {
        "event" : [ see the event in definitions ]
      }
    }

    ```


     ### Broadcast

    Once you have created the chat via endpoint (ie /stream/create/basic) you
    must connect your RTMP broadcast.

    The URL is: **rtmp://[RETURNED_STREAM_HOSTNAME]/t1**

    The StreamName/ChannelName: [RETURNED_STREAM_ID]
host: api.scdev.live
basePath: /v1
schemes:
  - http
  - https
produces:
  - application/json
consumes:
  - application/json
tags:
  - name: System
    description: |
      System operations (user join/login) are operations that may only
      be carried out by *authorized app developers* and require use of a
      systemKey

      If you would like to become an authorized app delevoper, please contact
      engineering@sportscastr.live
  - name: User
    description: |
      Access information about a single user, requires apiKey
  - name: Search
    description: |
      Search various aspects of the system (such as username based lookup)
  - name: Me
    description: |
      Access information and manipulate the current user authorized by the
      apiKey. Some operations (such as /me/following) are aliases of
      the corrosponding User endpoints (/user/MyUserId/following)
```

```
  - name: Stream
    description: |
      Stream methods to create, broadcast, view, and chat
securityDefinitions:
  apiKey:
    type: apiKey
    in: query
    name: apiKey
    description: |
      The current user API key, retrieved during the login operation.
  systemKey:
    type: apiKey
    in: query
    name: systemKey
    description: |
      The SportsCastr.live provided system key to access system level functions.
security:
  - systemKey: []
  - apiKey: []
parameters:
  userId:
    name: userId
    in: path
    description: The user identifier number
    type: number
    required: true
  streamId:
    name: streamId
    in: path
    description: The stream ID number
    type: number
    required: true
  endStream:
    name: endStream
    in: query
    description: Mark a stream as ended
    type: boolean
    required: false
  currentStreamId:
    name: currentStreamId
    in: query
    description: The stream being watched when a follow occurs
    type: number
    required: false
  eventId:
    name: eventId
    in: path
    description: The event ID number
    type: number
    required: true
  feedId:
    name: feedId
    in: path
    description: The id number of the feed to get news from
    type: number
    required: true
  username:
    name: username
    in: path
    description: Username associated with a user account
    type: string
    required: true
  pageNumber:
    name: pageNumber
    in: query
    description: The page of results to retrieve
    type: number
    required: false
  startTime:
    name: startTime
    in: query
    description: The timestamp to retrieve replayEvents ( startTime -> startTime+9)
    type: number
    required: false
  "timestamp":
    name: timestamp
    in: path
    description: The timestamp to retrieve viewers at
    type: number
    required: true
```

```
  allTime:
    name: allTime
    in: query
    description: Get all the viewers ever
    type: boolean
    required: false
  doNotMarkRead:
    name: doNotMarkRead
    in: query
    description: Do not mark the notifications as read
    type: boolean
    required: false
  phoneNumber:
    name: phoneNumber
    in: path
    type: string
    required: true
    description: phone number of user trying to login
  smsCode:
    name: smsCode
    in: path
    type: number
    required: true
    description: The challenge respose code for phonenumber based logins
  category:
    name: category
    in: path
    type: string
    required: true
    description: The category to pull events from
  date:
    name: date
    in: query
    type: string
    required: false
    description: The date to pull events from, in YYYY-MM-DD format
  emails:
    name: emails
    in: formData
    type: string
    required: true
    description: the emails to share the stream with
  shortLinkId:
    name: shortLinkId
    in: path
    type: string
    required: true
    description: short link code
paths:
  /system/login/social:
    post:
      tags:
        - System
      operationId: Login/Create Account via Social
      summary: Login/Create Account via Social
      security:
        - systemKey: []
      consumes:
        - application/json
      parameters:
        - in: body
          name: SystemLoginSocialBody
          description: 'The Social Data [ Facebook, Instagram, Twitter ]'
          required: true
          schema:
            properties:
              socialId:
                type: string
                description: The id number provided by the social network
              socialType:
                type: string
                description: >-
                  Contains name of social network used [
                  facebook/instagram/twitter ]
              socialInfo:
                description: all the data given back from the api as key pairs
                type: array
                items:
                  $ref: '#/definitions/KeyPair'
      description: >
```

```
      Create a new account with one of the various social types ( Facebook,
      Instagram, Twitter )


      If it is a new account, you will be provided with a boolean to indicate
      that you should
      trigger the onboarding
    responses:
      '200':
        description: The user object
        schema:
          $ref: '#/definitions/SystemLoginResponse'
      '400':
        description: |
          Input validation failed.

          The field name will be in errorType and reason in errorMessage
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
'/system/login/phone/{phoneNumber}':
  post:
    tags:
      - System
    description: >
      Login/Create a user account using a phone number.


      Submission of this will result in the SMS challenge response system
      getting triggered


      On success ( 200 ), the challenge/response screen should be shown
    operationId: Create Phone Account
    summary: Create Phone Account
    security:
      - systemKey: []
    parameters:
      - $ref: '#/parameters/phoneNumber'
    responses:
      '200':
        description: |
          Returns the userId of the account associated with the phone number.

          **At this point the challenge response screen should be displayed**
        schema:
          $ref: '#/definitions/SystemLoginPhoneNumberResponse'
      '400':
        description: Phone number appears to be invalid / not supported
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '406':
        description: >-
          Challenge response system failed to send a SMS indicating number
          that can't be used.
        schema:
          properties:
            meta:
```

```
              $ref: '#/definitions/GeneralError'
'/system/login/phone/{phoneNumber}/{smsCode}':
  post:
    summary: Login/Create account with verified number
    operationId: Login/Create Created With verified Number
    parameters:
      - $ref: '#/parameters/phoneNumber'
      - $ref: '#/parameters/smsCode'
    security:
      - systemKey: []
    tags:
      - System
    description: >
      The information from which to create the user account via a phone
      number.


      This method is called after receiving a response from the user via the
      challege response system


      **NOTE: You want to send in the phoneNumber returned in the previous
      step.  It has been formatted correctly for our system**
    responses:
      '200':
        description: >
          Returns the currentUser object associated with the phone number.


          If it is a new account, you will be provided with a boolean to
          indicate that you should

          trigger the onboarding
        schema:
          $ref: '#/definitions/SystemLoginResponse'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: No user found with that phone number
        schema:
          $ref: '#/definitions/GeneralError'
      '406':
        description: Response code was incorrect
        schema:
          $ref: '#/definitions/GeneralError'
/system/terms:
  get:
    operationId: Get the terms and conditions
    summary: Get the terms and conditions
    security:
      - systemKey: []
    tags:
      - System
    responses:
      '200':
        description: The terms and conditions as a string.
        schema:
          $ref: '#/definitions/SystemTermsResponse'
      '401':
        description: System Key Invald
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
/system/privacy:
  get:
    operationId: Get the privacy policy
    summary: Get the current privacy policy
    security:
      - systemKey: []
    tags:
      - System
    responses:
```

```
      '200':
        description: The privacy policy as a string.
        schema:
          $ref: '#/definitions/SystemPrivacyResponse'
      '401':
        description: System Key Invald
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
/system/topics:
  get:
    operationId: Get an array of the topics and focuses
    summary: Get an array of the topics and focusus
    security:
      - systemKey: []
    tags:
      - System
    responses:
      '200':
        description: The topics and focuses
        schema:
          $ref: '#/definitions/SystemTopicsResponse'
      '401':
        description: System Key Invald
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'

/system/tags:
  get:
    operationId: Get an array of the tag for anything streams
    summary: Get an array of the tag for anything streams
    security:
      - systemKey: []
    tags:
      - System
    responses:
      '200':
        description: The topics and focuses
        schema:
          $ref: '#/definitions/SystemTagsResponse'
      '401':
        description: System Key Invald
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
'/system/shortLink/{shortLinkId}':
  get:
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/shortLinkId'
    operationId: Get the url that a short link translates to
    summary: Get the url that a short link translates to
    security:
      - systemKey: []
    tags:
      - System
    responses:
      '200':
        description: The url the shortlink translates to
        schema:
          $ref: '#/definitions/SystemShortLinkResponse'
      '401':
        description: System Key Invald
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
/me:
  get:
    tags:
      - Me
    operationId: Get the current user information
    summary: Get the current user information
    security:
      - apiKey: []
```

```
  responses:
    '200':
      description: User Information
      schema:
        $ref: '#/definitions/CurrentUserResponse'
    '401':
      description: Current User not found - **SEND THEM TO LOGIN**
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '403':
      description: |
        Current User has been *SUSPENDED*

        Will contain the reason in the "errorMessage"
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
post:
  tags:
    - Me
  operationId: Update Account
  summary: Update Account
  security:
    - apiKey: []
  parameters:
    - in: body
      name: MeBodyPOST
      description: The user object to update
      required: true
      schema:
        properties:
          currentUser:
            $ref: '#/definitions/User'
  responses:
    '200':
      description: Update successful
      schema:
        $ref: '#/definitions/CurrentUserResponse'
    '400':
      description: |
        Input validation failed.

        The field name will be in errorType and reason in errorMessage
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '401':
      description: Current User not found - **SEND THEM TO LOGIN**
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '403':
      description: |
        Current User has been *SUSPENDED*

        Will contain the reason in the "errorMessage"
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
delete:
  tags:
    - Me
  operationId: Delete the current user
  summary: Delete the current user
  security:
    - apiKey: []
  responses:
    '200':
      description: Current User has been deleted
      schema:
        $ref: '#/definitions/MeResponseDELETE'
    '401':
      description: Current User not found - **SEND THEM TO LOGIN**
      schema:
```

```
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
/me/profilePic:
  post:
    tags:
      - Me
    operationId: Upload New Profile Picture
    summary: Upload New Profile Picture
    description: >
      Upload a new profile picture to the users account.


      This will replace the existing profile picture.  It is recommended that
      post

      you swap out the current user image displayed with the new one.
    consumes:
      - multipart/form-data
    parameters:
      - name: file
        in: formData
        description: The uploaded file data
        required: true
        type: file
    security:
      - apiKey: []
    responses:
      '200':
        description: Update successful
        schema:
          $ref: '#/definitions/CurrentUserResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'

/me/media:
  parameters:
    - $ref: '#/parameters/pageNumber'
  get:
    tags:
      - Me
    operationId: Get the media ( streams ) of the current user
    summary: Get the media ( streams ) of the current user
    security:
      - apiKey: []
    responses:
      '200':
        description: User Information and media
        schema:
          $ref: '#/definitions/CurrentUserResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
```

```
          Current User has been *SUSPENDED* APPENDIX A

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'

/me/following:
  parameters:
    - $ref: '#/parameters/pageNumber'
  get:
    operationId: List Current User Following
    summary: List Current User Following
    security:
      - apiKey: []
    tags:
      - Me
    description: Get a array of users that the current user is following
    responses:
      '200':
        description: A collection of user items
        schema:
          $ref: '#/definitions/MeFollowingResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
/me/followers:
  parameters:
    - $ref: '#/parameters/pageNumber'
  get:
    operationId: List Current User Followers
    summary: List Current User Followers
    security:
      - apiKey: []
    tags:
      - Me
    description: Get a array of users that the follow the currentUser
    responses:
      '200':
        description: A collection of user items
        schema:
          $ref: '#/definitions/MeFollowersResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
'/me/follow/{userId}':
  get:
    operationId: Check if following
    summary: Check if following
    parameters:
      - $ref: '#/parameters/userId'
    security:
      - apiKey: []
    tags:
      - Me
```

```
  description: Check if currently following the user
  responses:
    '200':
      description: User following status returned
      schema:
        $ref: '#/definitions/MeFollowUserIdResponse'
    '400':
      description: Tried to lookup/follow the currentUser
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '401':
      description: Current User not found - **SEND THEM TO LOGIN**
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '403':
      description: |
        Current User has been *SUSPENDED*

        Will contain the reason in the "errorMessage"
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '404':
      description: Target User not found
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
post:
  operationId: Follow User
  summary: Follow User
  parameters:
    - $ref: '#/parameters/userId'
    - $ref: '#/parameters/currentStreamId'
  security:
    - apiKey: []
  tags:
    - Me
  description: Follow a user
  responses:
    '200':
      description: User was successfully followed
      schema:
        $ref: '#/definitions/MeFollowUserIdResponse'
    '400':
      description: Tried to lookup/follow the currentUser
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '401':
      description: Current User not found - **SEND THEM TO LOGIN**
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '403':
      description: |
        Current User has been *SUSPENDED*

        Will contain the reason in the "errorMessage"
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '404':
      description: Target User not found
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
delete:
  parameters:
    - $ref: '#/parameters/userId'
  security:
```

```
      - apiKey: []
    tags:
      - Me
    operationId: UNFOLLOW a user
    summary: UNFOLLOW a user
    description: UNFOLLOW a user
    responses:
      '200':
        description: User was successfully unfollowed
        schema:
          $ref: '#/definitions/MeFollowUserIdResponse'
      '400':
        description: Tried to lookup/follow the currentUser
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: Target User not found
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
  /me/notifications:
    get:
      parameters:
        - in: query
          name: beforeId
          type: integer
          required: false
          description: >
            The last ID seen for pagination, will return the next page of
            results before this

            id number
        - $ref: '#/parameters/doNotMarkRead'
      operationId: Notification List for Current User
      summary: Notification List for Current User
      security:
        - apiKey: []
      tags:
        - Me
      description: |
        Get a array of notifications for the current user

        **Notification types:**

          *newFollower*: notifications about a new follower

          *newFollowingStream*: notification about a new stream.  If the stream has no endTime, then it
should be considered live

      responses:
        '200':
          description: A collection of notifications
          schema:
            $ref: '#/definitions/MeNotificationsResponse'
        '401':
          description: Current User not found - **SEND THEM TO LOGIN**
          schema:
            properties:
              meta:
                $ref: '#/definitions/GeneralError'
        '403':
          description: |
```

```
          Current User has been *SUSPENDED* APPENDIX A

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
/me/feedback:
  post:
    operationId: Send Feedback
    summary: Send Feedback
    parameters:
      - name: MeFeedbackBody
        in: body
        required: true
        description: the feedback being submitted
        schema:
          properties:
            feedback:
              type: string
            feedbackReason:
              type: string
            rating:
              type: integer
    security:
      - apiKey: []
    tags:
      - Me
    description: Send feedback to the staff
    responses:
      '200':
        description: Feedback was successfully sent
        schema:
          $ref: '#/definitions/MeFeedbackResponse'
      '400':
        description: |
          Input validation failed.

          The field name will be in errorType and reason in errorMessage
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
/me/logout:
  get:
    operationId: Logout the current user
    summary: Logout the current user
    security:
      - apiKey: []
    tags:
      - Me
    description: >
      Touch this endpoint if the user logs out of the app via the settings
      page.


      For security reasons, the apiKey will be regenerated once you do.
    responses:
      '200':
        description: User has been logged out
        schema:
          $ref: '#/definitions/MeLogoutResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
```

```
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
'/search/username/{username}':
  parameters:
    - $ref: '#/parameters/username'
  get:
    operationId: Find user by username
    summary: Find user by username
    description: |
      Retrieve a user by their username.  This is mostly here for checking if
      of a username that has already been used
    security:
      - apiKey: []
    tags:
      - Search
    responses:
      '200':
        description: >-
          The user object.  Note, the API key will not be sent like it is for
          login or /me actions
        schema:
          $ref: '#/definitions/UserResponse'
      '302':
        description: |
          Username is reserved by the system and can not be used
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: User not found
        schema:
          $ref: '#/definitions/GeneralError'
'/user/{userId}':
  parameters:
    - $ref: '#/parameters/userId'
  get:
    operationId: Lookup User
    summary: Lookup User
    security:
      - apiKey: []
    tags:
      - User
    description: Get basic information about a user.  Also includes recent media
    responses:
      '200':
        description: >-
          The user object.  Note, the API key will not be sent like it is for
          login or /me actions
        schema:
          $ref: '#/definitions/UserResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
```

```
          Current User has been *SUSPENDED* APPENDIX A

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: User not found
        schema:
          $ref: '#/definitions/GeneralError'
/user/{userId}/media:
  parameters:
    - $ref: '#/parameters/pageNumber'
    - $ref: '#/parameters/userId'
  get:
    tags:
      - User
    operationId: Get the media ( streams ) of the provided user
    summary: Get the media ( streams ) of the provided user
    security:
      - apiKey: []
    responses:
      '200':
        description: User Information and media
        schema:
          $ref: '#/definitions/UserResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
'/user/{userId}/following':
  parameters:
    - $ref: '#/parameters/pageNumber'
    - $ref: '#/parameters/userId'
  get:
    operationId: List User Following
    summary: List User Following
    security:
      - apiKey: []
    tags:
      - User
    description: Get an array of users that the provided userId is following
    responses:
      '200':
        description: A collection of user items
        schema:
          $ref: '#/definitions/UserUserIdFollowingResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: User Not Found
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
```

```
'/user/{userId}/followers':
  parameters:
    - $ref: '#/parameters/pageNumber'
    - $ref: '#/parameters/userId'
  get:
    operationId: List User Followers
    summary: List User Followers
    security:
      - apiKey: []
    tags:
      - User
    description: Get a array of users that the follow the provided id
    responses:
      '200':
        description: A collection of user items
        schema:
          $ref: '#/definitions/UserUserIdFollowersResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: User ID not found
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'

'/stream/event/{eventId}/auth':
  post:
    operationId: Auth for Pusher Presence Channel for an event
    summary: Auth for Pusher Presence Channel for an event
    description: >
      This is the authorization endpoint that pusher uses.


      **NOTE THIS DOES NOT RESPOND IN STANDARD FORMAT**


      **There is no reason to request this URL directly, you must define it in
      your Pusher Presence Channel Config for the event**
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/eventId'
    security:
      - apiKey: []
    tags:
      - Stream
    responses:
      '200':
        description: Successful Auth
      '403':
        description: Authentication Failed

'/stream/events/{category}':
  parameters:
    - $ref: '#/parameters/category'
    - $ref: '#/parameters/date'
  get:
    operationId: Get the events in a category
    summary: Get the events in a category
    description: |
      Valid categories:
      ```json
        CBK
        CFB
        EPL
        MLB
```
```

```
        NBA
        NFL
        NHL
        WNBA
      ```
      Grab the events for a specific category. If date
      is not provided, it will return the next 5 events in the future and in the past
    security:
      - apiKey: []
    tags:
      - stream
    responses:
      '200':
        description: The news items
        schema:
          $ref: '#/definitions/StreamNewsResponse'
      '400':
        description: |
          Date format was bad
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: |
          Feed was not found to pull event items from
'/stream/news/{feedId}':
  parameters:
    - $ref: '#/parameters/feedId'
  get:
    operationId: Get the recent news items in a feed
    summary: Get the recent news items in a feed
    description: |
      ```json
        [{
            "category": "Top Stories - NBA",
            "id": 4
        }, {
            "category": "Top Stories - NFL",
            "id": 2
        }, {
            "category": "Top Stories - MLB",
            "id": 1
        }, {
            "category": "Top Stories - NHL",
            "id": 5
        }, {
            "category": "Top Stories - NCAA FB",
            "id": 3
        }, {
            "category": "Top Stories - NCAA BK",
            "id": 6
        }, {
            "category": "Top Stories - Soccer",
            "id": 11
        }, {
            "category": "Top Stories - Tennis",
            "id": 12
        }, {
            "category": "Top Stories - UFC",
            "id": 8
        }, {
            "category": "Top Stories - NASCAR",
            "id": 7
        }, {
            "category": "Top Stories - Golf",
            "id": 10
        }, {
            "category": "Top Stories - WNBA",
```

```
            "id": 14
        }, {
            "category": "Top Stories - WCBK",
            "id": 15
        }, {
            "category": "Top Stories - Horseracing",
            "id": 13
        }]
    ```
    Grab the news items from the feed
  security:
    - apiKey: []
  tags:
    - stream
  responses:
    '200':
      description: The news items
      schema:
        $ref: '#/definitions/StreamNewsResponse'
    '401':
      description: Current User not found - **SEND THEM TO LOGIN**
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '403':
      description: |
        Current User has been *SUSPENDED*

        Will contain the reason in the "errorMessage"
      schema:
        properties:
          meta:
            $ref: '#/definitions/GeneralError'
    '404':
      description: |
        Feed was not found to pull news items from
/stream/create/basic:
  post:
    operationId: Create a "Basic/Topic" stream
    summary: Create a "Basic/Topic" stream
    consumes:
      - application/json
    parameters:
      - in: body
        name: StreamCreateBody
        description: Basic Stream Object
        required: true
        schema:
          $ref: '#/definitions/StreamCreate'
    security:
      - apiKey: []
    tags:
      - Stream
    description: >
      Used to create a basic/topic stream.

      This is a stream that does not have a linked Event Source or News
      Items

      The only required field is Title
    responses:
      '200':
        description: The stream object of the newly created stream
        schema:
          $ref: '#/definitions/StreamResponse'
      '400':
        description: |
          Input validation failed.

          The field name will be in errorType and reason in errorMessage
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
```
```

```
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
/stream/create/news:
  post:
    operationId: Create a "NEWS" stream
    summary: Create a "NEWS" stream
    consumes:
      - application/json
    parameters:
      - in: body
        name: StreamCreateBody
        description: Basic Stream Object
        required: true
        schema:
          $ref: '#/definitions/StreamCreate'
    security:
      - apiKey: []
    tags:
      - Stream
    description: |
      Used to create a news stream.

      This is a stream with a linked news article

      Required fields are "title"  , "news.feedId", "news.id"
    responses:
      '200':
        description: The stream object of the newly created stream
        schema:
          $ref: '#/definitions/StreamResponse'
      '400':
        description: |
          Input validation failed.

          The field name will be in errorType and reason in errorMessage
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
/stream/create/event:
  post:
    operationId: Create a "EVENT" stream
    summary: Create a "EVENT" stream
    consumes:
      - application/json
    parameters:
      - in: body
        name: StreamCreateBody
        description: Basic Stream Object
        required: true
        schema:
          $ref: '#/definitions/StreamCreate'
    security:
      - apiKey: []
    tags:
      - Stream
    description: |
      Used to create a news stream.

      This is a stream with a linked linked event

      Required fields are "title"  , "event.id"
```

```
    responses:
      '200':
        description: The stream object of the newly created stream
        schema:
          $ref: '#/definitions/StreamResponse'
      '400':
        description: |
          Input validation failed.

          The field name will be in errorType and reason in errorMessage
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'

'/stream/{streamId}/chat/auth':
  post:
    operationId: Auth for Pusher Presence Channel
    summary: Auth for Pusher Presence Channel
    description: >
      This is the authorization endpoint that pusher uses.


      **NOTE THIS DOES NOT RESPOND IN STANDARD FORMAT**


      **There is no reason to request this URL directly, you must define it in
      your Pusher Presence Channel Config**
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/streamId'
    security:
      - apiKey: []
    tags:
      - Stream
    responses:
      '200':
        description: Successful Auth
      '403':
        description: Authentication Failed

'/stream/shortLink/{shortLinkId}':
  get:
    operationId: Get stream info by shortlink
    summary: Get stream info by shortlink
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/shortLinkId'
    security:
      - apiKey: []
    tags:
      - Stream
    description: |
      Used to pull the data for a stream using a shortLink instead of id
    responses:
      '200':
        description: |
          Stream
        schema:
          $ref: '#/definitions/StreamResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
```

```
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: >
          Stream not found
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'

'/stream/{streamId}':
  get:
    operationId: Get stream info
    summary: Get stream info
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/streamId'
      - $ref: '#/parameters/endStream'
    security:
      - apiKey: []
    tags:
      - Stream
    description: |
      Used to pull the data for a stream, normally to view it
    responses:
      '200':
        description: |
          Stream
        schema:
          $ref: '#/definitions/StreamResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: >
          Stream not found
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
  delete:
    operationId: Delete a stream
    summary: Delete a stream
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/streamId'
    security:
      - apiKey: []
    tags:
      - Stream
    description: |
      Deletes a stream, must be the owner
    responses:
      '200':
        description: |
          Stream was deleted
        schema:
          $ref: '#/definitions/StreamResponseDelete'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
```

```
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: >
          Stream not found to delete - This will be returned if you don't have permission
          to delete the stream as well
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
'/stream/{streamId}/chat':
  post:
    operationId: Post a new message to a stream's chat
    summary: Post a new message to a stream's chat
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/streamId'
      - in: body
        name: StreamStreamIdChatBodyPOST
        description: Holds the message to be posted
        required: true
        schema:
          properties:
            message:
              type: string
              description: The text to post to the stream
    security:
      - apiKey: []
    tags:
      - Stream
    description: |
      Used to post a new message to the stream chat
    responses:
      '200':
        description: |
          The messageId of the newly created message.
        schema:
          $ref: '#/definitions/StreamIdChatResponsePOST'
      '400':
        description: |
          Input validation failed.

          The field name will be in errorType and reason in errorMessage
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '410':
        description: >
          Can not post to stream.


          Stream has either not started ( meta.errorType = streamNotStarted )
          or has ended ( streamEnded )
        schema:
          properties:
            meta:
```

```
            $ref: '#/definitions/GeneralError'
      '429':
        description: |
          User has been rate limited.

          Time left in lock will be returned in the meta.message
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
  get:
    operationId: receive the most recent chat items in  chronological order
    summary: get the 10 most recent chat items in  chronological order
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/streamId'
    security:
      - apiKey: []
    tags:
      - Stream
    description: |
      Used to get the 10 most recent chat items in  chronological ( old to new ) order.

      Assuming your "add chat" function posts to end and pushes up, you can just
      iterate through the array and the items will get inserted in the correct order
    responses:
      '200':
        description: |
          Array of messages and mini user objects
        schema:
          $ref: '#/definitions/StreamIdChatResponseGET'
      '404':
        description: Stream not found
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            me$ref: '#/definitions/GeneralError'
'/stream/{streamId}/replayEvents':

  post:
    operationId: Get the replay events for a stream
    summary: Get the replay events for a stream
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/streamId'
      - $ref: '#/parameters/startTime'
    security:
      - apiKey: []
    tags:
      - Stream
    description: |
      Used to retrieve the events for replaying a stream

      Will give you 10 seconds worth starting at the STARTTIME

      Start time is based on the STREAMS timestamp
    responses:
      '200':
        description: |
          replay events for the 10 second window.
        schema:
          $ref: '#/definitions/StreamIdReplayEventsResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
```

```
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: >
          Stream not found OR stream has not started/ended
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
'/stream/{streamId}/viewers/{timestamp}':
  post:
    operationId: Get a list of viewers of a stream at a timestamp
    summary: Get a list of viewers of a stream at a timestamp
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/streamId'
      - $ref: '#/parameters/timestamp'
      - $ref: '#/parameters/pageNumber'
      - $ref: '#/parameters/allTime'
    security:
      - apiKey: []
    tags:
      - Stream
    description: |
      Used to retrive a list of MiniUser objects
      matching the people currently watching the stream
      at a given timestamp

      Results are paginated

    responses:
      '200':
        description: |
          list of viewers of a stream at a timestamp
        schema:
          $ref: '#/definitions/StreamIdViewersTimestampResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: >
          Stream not found OR stream has not started/ended
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
'/stream/{streamId}/share/email':
  post:
    operationId: Share a stream via email
    summary: Share a stream via email
    consumes:
      - application/json
    parameters:
      - $ref: '#/parameters/streamId'
      - $ref: '#/parameters/emails'
    security:
```

```
      - apiKey: []
    tags:
      - Stream
    description: |
      Send an email to specified email to share a stream

      the form field "emails" can have multiple emails, seperated by white space and/or commas
    responses:
      '200':
        description: |
          Stream
        schema:
          $ref: '#/definitions/StreamResponse'
      '401':
        description: Current User not found - **SEND THEM TO LOGIN**
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '403':
        description: |
          Current User has been *SUSPENDED*

          Will contain the reason in the "errorMessage"
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
      '404':
        description: >
          Stream not found
        schema:
          properties:
            meta:
              $ref: '#/definitions/GeneralError'
definitions:
  StreamIdViewersTimestampResponse:
    properties:
      data:
        properties:
          viewers:
            type: array
            items:
              $ref: "#/definitions/MiniUserFollowing"
          anonymousCount:
            type: integer
          registeredCount:
            type: integer
      pagination:
        properties:
          nextUrl:
            type: string
            description: The STUB url to get the next page of results if available
          currentPage:
            type: integer
          totalPages:
            type: integer


  StreamIdReplayEventsResponse:
    properties:
      data:
        properties:
          "events":
            type: object
            properties:
              "timestamp":
                additionalProperties:
                  $ref: "#/definitions/ReplayEvent"

  ReplayEvent:
    properties:
      watcherCount:
        type: integer
      chat:
        type: array
        items:
          properties:
            user:
              $ref: "#/definitions/MiniUser"
```

```
          "message":
            type: string
    members:
      type: array
      items:
        properties:
          event:
            type: string
    event:
      $ref: "#/definitions/Event"



StreamNewsResponse:
  properties:
    data:
      properties:
        items:
          type: array
          items:
            $ref: "#/definitions/NewsItem"

NewsItem:
  properties:
    id:
      type: integer
    title:
      type: string
    permalink:
      type: string
    image:
      type: string

StreamIdChatResponsePOST:
  properties:
    data:
      properties:
        messageId:
          type: number

StreamIdChatResponseGET:
  properties:
    data:
      properties:
        messages:
          type: array
          items:
            type: object
            properties:
              id:
                type: integer
              messageId:
                type: integer
              timestamp:
                type: integer
              userId:
                type: integer
              user:
                $ref: "#/definitions/MiniUser"
              message:
                type: string
                description: The chat message

StreamResponse:
  properties:
    data:
      properties:
        stream:
          $ref: '#/definitions/Stream'
        followingOwner:
          type: boolean

StreamResponseDelete:
  properties:
    data:
      properties:
        deleted:
          type: boolean
```

```
Stream:
  properties:
    id:
      type: integer
    secureId:
      type: string
    type:
      type: string
      description: 'This is the stream type. Values are "basic", "news", "event"'
    title:
      type: string
    tags:
      type: array
      items:
        type: string
    owner:
      $ref: '#/definitions/User'
    createTime:
      type: integer
    startTime:
      type: integer
    endTime:
      type: integer
    viewCount:
      type: integer
      description: displayed on profile/notifications
    viewCountLive:
      type: integer
      description: displayed on post broadcast screen
    viewCountRecorded:
      type: integer
      description: not used at moment
    followDuringStream:
      type: integer
      description: displayed on post broadcast screen
    shortLinkId:
      type: string
      description: |
        used to make the link ( http://scln.tv/{shortLinkId} ) on post broadcast
        screen
    viewHeatMap:
      type: array
      items:
        type: integer
    hostname:
      type: string
      description: server to connect to broadcast or view
    filename:
      type: string
      description: URL to the video file, this is the aggregate for all streams
    filenameLow:
      type: string
      description: URL to the video file at 320p for low bandwidth
    filenameMid:
      type: string
      description: URL to the video file at 480p for low bandwidth
    filenameHigh:
      type: string
      description: URL to the video file at 728p for low bandwidth
    liveStream:
      type: string
      description: the URL to the live stream video ( RTMP/HLS ) hires
    liveStreamMobile:
      type: string
      description: |
        the URL to the live stream video ( RTMP/HLS ) lowres for cellular connections

    isLive:
      type: boolean
      description: true if currently broadcasting
    isRendering:
      type: boolean
      description: true if broadcast ended but video files are not ready for viewing
    image:
      type: string
      description: url to the screenshot
    shareImage:
      type: string
      description: image for sharing with 1080x565 for facebook/twitter
    shareImageSquare:
```

```
      type: string
      description: square image for sharing with instagram
    news:
      properties:
        id:
          type: integer
        feedId:
          type: integer
        title:
          type: string
        permalink:
          type: string
        image:
          type: string
        created:
          type: integer
    event:
      $ref: "#/definitions/Event"
    eventOriginal:
      $ref: "#/definitions/Event"
    shareLocation:
      type: boolean
    location:
      properties:
        formatted:
          type: string
          description: This is what to display
        latitude:
          type: string
        longitude:
          type: string
        name:
          type: string
        thoroughfare:
          type: string
        subThoroughfare:
          type: string
        locality:
          type: string
        subLocality:
          type: string
        administrativeArea:
          type: string
        subAdministrativeArea:
          type: string
        postalCode:
          type: string
        country:
          type: string
        inlandWater:
          type: string
        ocean:
          type: string

Event:
  properties:
    id:
      type: integer
    "type":
      type: string
    "status":
      type: string
    "period":
      type: string
    year:
      type: integer
    month:
      type: integer
    day:
      type: integer
    hour:
      type: integer
    minute:
      type: integer
    timestamp:
      type: integer
      description: Epoch timestamp of game start
    title:
      type: string
    homeTeam:
```

```
      properties:
        score:
          type: integer
        teamId:
          type: integer
        location:
          type: string
        name:
          type: string
        abbreviation:
          type: string
        timeouts:
          type: integer
        filename:
          type: string
    awayTeam:
      properties:
        score:
          type: integer
        teamId:
          type: integer
        location:
          type: string
        name:
          type: string
        abbreviation:
          type: string
        timeouts:
          type: integer
        filename:
          type: string
    "eventStatus":
      description: This is the generic named holder that duplicates event{TYPE}
      properties:
        clockMinutes:
          type: integer
        clockSeconds:
          type: integer
    "eventNFL":
      description: |
        Values and properties that are specific to NFL games
        Only defined if NFL game
      properties:
        possession:
          type: string
          description: Will be "home" or "away"
        down:
          type: integer
        distance:
          type: integer
        yardsFromGoal:
          type: integer
        clockMinutes:
          type: integer
        clockSeconds:
          type: integer
StreamCreate:
  properties:
    type:
      type: string
    title:
      type: string
    tags:
      type: array
      items:
        type: string
    socialNotify:
      properties:
        facebook:
          type: boolean
        twitter:
          type: boolean
        instagram:
          type: boolean
        followers:
          type: boolean
        userMessage:
          type: string
        facebookAuthKey:
          type: string
```

```
    event:
      description: |
        If creating a event type stream you must
        provide the event id
      properties:
        id:
          type: integer
    news:
      description: |
        If creating a news type stream, you must
        provide the id and feedId of the news story
      properties:
        id:
          type: integer
        feedId:
          type: integer
    shareLocation:
      type: boolean
    location:
      properties:
        formatted:
          type: string
          description: This is what to display
        latitude:
          type: string
        longitude:
          type: string
        name:
          type: string
        thoroughfare:
          type: string
        subThoroughfare:
          type: string
        locality:
          type: string
        subLocality:
          type: string
        administrativeArea:
          type: string
        subAdministrativeArea:
          type: string
        postalCode:
          type: string
        country:
          type: string
        inlandWater:
          type: string
        ocean:
          type: string

SystemTagsResponse:
  properties:
    data:
      properties:
        tags:
          type: array
          items:
            $ref: '#/definitions/Tag'
Tag:
  properties:
    tag:
      type: string
    weight:
      type: integer

SystemTopicsResponse:
  properties:
    data:
      properties:
        topicInfo:
          $ref: '#/definitions/TopicInfo'
UserUserIdFollowersResponse:
  properties:
    pagination:
      properties:
        nextUrl:
          type: string
          description: The STUB url to get the next page of results if available
        currentPage:
          type: integer
```

```
        totalPages:
          type: integer
    data:
      properties:
        total:
          type: integer
        user:
          $ref: '#/definitions/User'
        users:
          type: array
          items:
            properties:
              user:
                $ref: '#/definitions/MiniUser'
              following:
                type: boolean
                description: Is the current user following this user
UserUserIdFollowingResponse:
  properties:
    pagination:
      properties:
        nextUrl:
          type: string
          description: The STUB url to get the next page of results if available
        currentPage:
          type: integer
        totalPages:
          type: integer
    data:
      properties:
        total:
          type: integer
        user:
          $ref: '#/definitions/User'
        users:
          type: array
          items:
            properties:
              user:
                $ref: '#/definitions/MiniUser'
              following:
                type: boolean
                description: Is the current user following this user
MeLogoutResponse:
  properties:
    data:
      properties:
        good:
          type: boolean
MeFeedbackResponse:
  properties:
    data:
      properties:
        feedbackId:
          type: integer
CurrentUserResponse:
  properties:
    pagination:
      properties:
        nextUrl:
          type: string
          description: The STUB url to get the next page of results if available
        currentPage:
          type: integer
        totalPages:
          type: integer
    data:
      properties:
        currentUser:
          $ref: '#/definitions/User'
        media:
          type: array
          items:
            $ref: "#/definitions/Stream"


MeNotificationsResponse:
  properties:
    pagination:
      properties:
```

```
        currentId:
          type: integer
          description: this is the next id number for the stream
        nextUrl:
          type: string
          description: The STUB url to get the next page of results if available
    data:
      properties:
        total:
          type: integer
        notifications:
          type: array
          items:
            $ref: '#/definitions/Notification'
MeFollowUserIdResponse:
  properties:
    data:
      properties:
        currentUser:
          $ref: '#/definitions/User'
        followedUser:
          $ref: '#/definitions/MiniUser'
        following:
          type: boolean
MeFollowersResponse:
  properties:
    pagination:
      properties:
        nextUrl:
          type: string
          description: The STUB url to get the next page of results if available
        currentPage:
          type: integer
        totalPages:
          type: integer
    data:
      properties:
        total:
          type: integer
        users:
          type: array
          items:
            properties:
              user:
                $ref: '#/definitions/MiniUser'
              following:
                type: boolean
                description: is the current user following this user
MeFollowingResponse:
  properties:
    pagination:
      properties:
        nextUrl:
          type: string
          description: The STUB url to get the next page of results if available
        currentPage:
          type: integer
        totalPages:
          type: integer
    data:
      properties:
        total:
          type: integer
        users:
          type: array
          items:
            properties:
              user:
                $ref: '#/definitions/MiniUser'
              follower:
                type: boolean
                description: Is the user following the current user
MeResponseDELETE:
  properties:
    data:
      properties:
        deleteTime:
          type: integer
SystemTermsResponse:
  properties:
```

```
    data:
      properties:
        termsAndConditions:
          type: string
SystemPrivacyResponse:
  properties:
    data:
      properties:
        privacyPolicy:
          type: string
SystemShortLinkResponse:
  properties:
    data:
      properties:
        url:
          type: string
UserResponse:
  properties:
    pagination:
      properties:
        nextUrl:
          type: string
          description: The STUB url to get the next page of results if available
        currentPage:
          type: integer
        totalPages:
          type: integer
    data:
      properties:
        user:
          $ref: '#/definitions/User'
        following:
          description: is the current user following this user
          type: boolean
        media:
          type: array
          items:
            $ref: "#/definitions/Stream"


SystemLoginPhoneNumberResponse:
  properties:
    data:
      properties:
        userId:
          type: integer
        phoneNumber:
          type: string
          description: |
            **THIS SHOULD BE PASSED IN WITH THE CHALLENGE CODE**
SystemLoginResponse:
  type: object
  properties:
    data:
      properties:
        currentUser:
          $ref: '#/definitions/User'
        isNewAccount:
          type: boolean
GeneralError:
  type: object
  properties:
    errorType:
      type: string
    code:
      type: integer
    errorMessage:
      type: string
Notification:
  type: object
  properties:
    id:
      type: integer
    notificationType:
      type: string
    message:
      type: string
    timestamp:
      type: integer
    user:
```

```
      $ref: '#/definitions/MiniUser'
    stream:
      $ref: '#/definitions/Stream'
    following:
      type: boolean
      description: Is the current user following this user
TopicInfo:
  type: array
  items:
    properties:
      topicId:
        type: integer
      topicName:
        type: string
      topicImage:
        description: URL to the image for the topic logo
        type: string
      focuses:
        type: array
        items:
          properties:
            focusId:
              type: integer
            focusName:
              type: string
            focusImage:
              description: URL to the image for the focus logo
              type: string
Topic:
  type: object
  properties:
    topicId:
      type: integer
    topicName:
      type: string
    topicImage:
      description: URL to the image for the topic logo
      type: string
    focusId:
      type: integer
    focusName:
      type: string
    focusImage:
      description: URL to the image for the focus logo
      type: string
KeyPair:
  type: object
  properties:
    key:
      type: string
    value:
      type: string
User:
  type: object
  properties:
    id:
      type: integer
    loginType:
      type: string
    socialId:
      type: string
    username:
      type: string
    firstName:
      type: string
    lastName:
      type: string
    email:
      type: string
      description: Only provided in the /me methods
    profilePicture:
      type: string
    topicInfo:
      type: array
      items:
        $ref: '#/definitions/Topic'
    bio:
      type: string
    accountCreated:
      type: integer
```

```
      description: Epoch timestamp of when account was created
    apiKey:
      type: string
      description: Only provided via the /me methods
    streaming:
      type: boolean
      description: Is the current user streaming
    streamId:
      type: integer
      description: 'If the current user is streaming, their streamId number'
    privateProfile:
      type: boolean
      description: account is private, must follow currentUser for currentUser to see content
    social:
      type: object
      properties:
        facebook:
          properties:
            active:
              type: boolean
            data:
              type: array
              items:
                $ref: '#/definitions/KeyPair'
        twitter:
          properties:
            active:
              type: boolean
            data:
              type: array
              items:
                $ref: '#/definitions/KeyPair'
        instagram:
          properties:
            active:
              type: boolean
            data:
              type: array
              items:
                $ref: '#/definitions/KeyPair'
    counts:
      type: object
      properties:
        media:
          type: integer
        following:
          type: integer
        followers:
          type: integer
        notifications:
          type: integer
    notifications:
      type: object
      properties:
        stream:
          type: object
          properties:
            mobile:
              type: boolean
            email:
              type: boolean
            computer:
              type: boolean
        fan:
          type: object
          properties:
            mobile:
              type: boolean
            email:
              type: boolean
            computer:
              type: boolean
MiniUser:
  type: object
  properties:
    id:
      type: integer
    username:
      type: string
    fullName:
```

```
      type: string
    profilePicture:
      type: string
    streaming:
      type: boolean
      description: Is the current user streaming
    streamId:
      type: integer
      description: 'If the current user is streaming, their streamId number'
    accountCreated:
      type: integer
      description: Epoch timestamp of when account was created
    privateProfile:
      type: boolean
      description: account is private, must follow currentUser for currentUser to see content

MiniUserFollowing:
  type: object
  properties:
    id:
      type: integer
    username:
      type: string
    fullName:
      type: string
    profilePicture:
      type: string
    streaming:
      type: boolean
      description: Is the current user streaming
    streamId:
      type: integer
      description: 'If the current user is streaming, their streamId number'
    accountCreated:
      type: integer
      description: Epoch timestamp of when account was created
    following:
      type: boolean
    privateProfile:
      type: boolean
      description: account is private, must follow currentUser for currentUser to see content
```

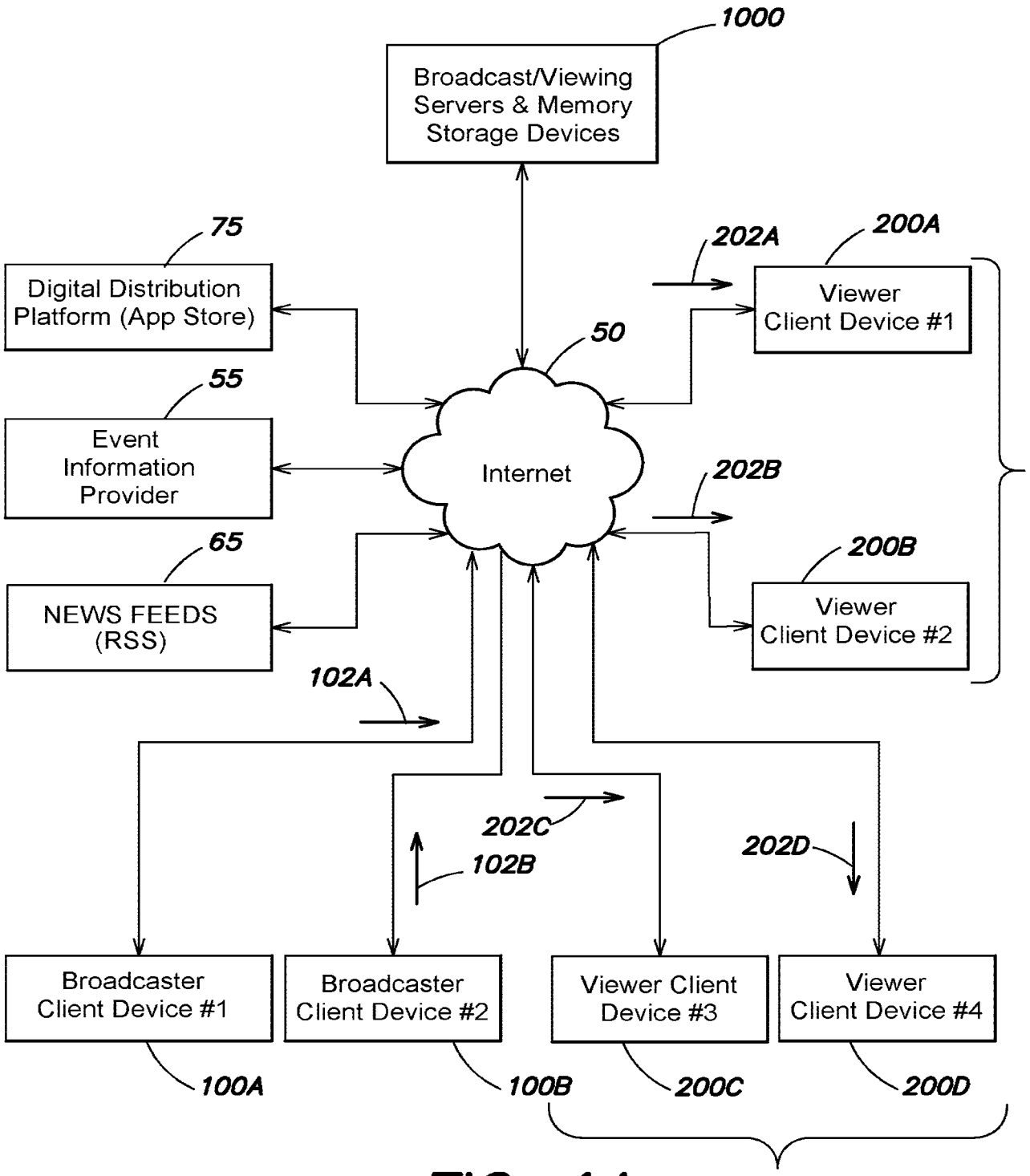

1000
Broadcast/Viewing Servers & Memory Storage Devices
75
Digital Distribution Platform (App Store)
55
Event Information Provider
65
NEWS FEEDS (RSS)
50
Internet
202A
200A
Viewer Client Device #1
202B
200B
Viewer Client Device #2
102A
202C
102B
202D
Broadcaster Client Device #1
Broadcaster Client Device #2
Viewer Client Device #3
Viewer Client Device #4
100A
100B
200C
200D

FIG. 1A


250
254
200A
252
258
256
33
WIS
2:34
2nd
DUK
48
2.7k
Live
Frank Smith
John Doe
Seattle, WA #2 seed Wisconsin tries to make a comeback on #4 Duke!
Duke vs Wisconsin
SC
Chat with 2.7k others...

FIG. 1B

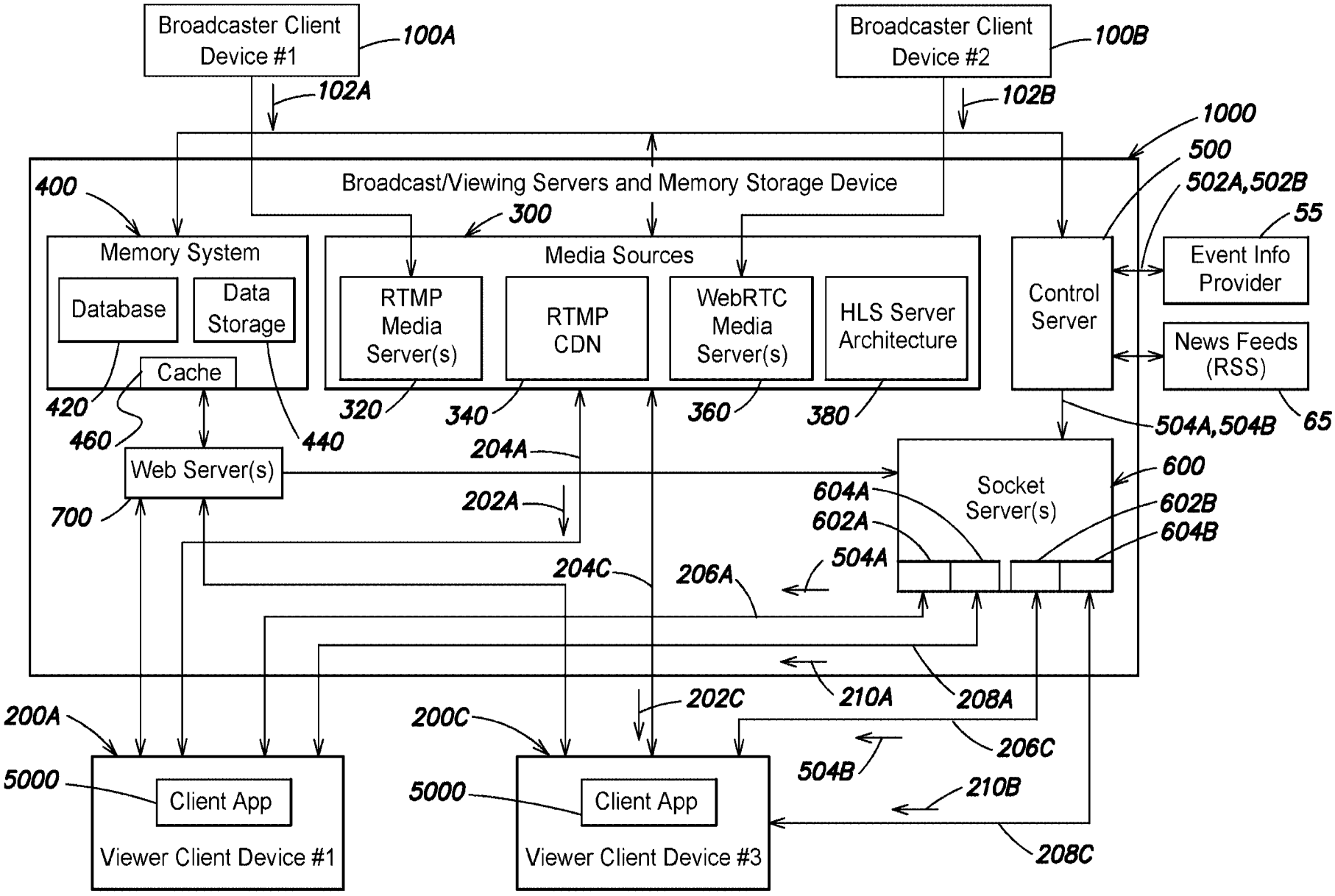

Broadcaster Client Device #1
100A
102A
Broadcaster Client Device #2
100B
102B
1000
500
502A,502B
55
400
Broadcast/Viewing Servers and Memory Storage Device
300
Memory System
Database
Data Storage
Cache
420
460
440
Media Sources
RTMP Media Server(s)
RTMP CDN
WebRTC Media Server(s)
HLS Server Architecture
320
340
360
380
Control Server
Event Info Provider
News Feeds (RSS)
504A,504B
65
Web Server(s)
700
204A
202A
Socket Server(s)
600
604A
602A
602B
604B
504A
204C
206A
210A
208A
202C
200A
200C
206C
504B
210B
208C
5000
Client App
Viewer Client Device #1
5000
Client App
Viewer Client Device #3

FIG. 2

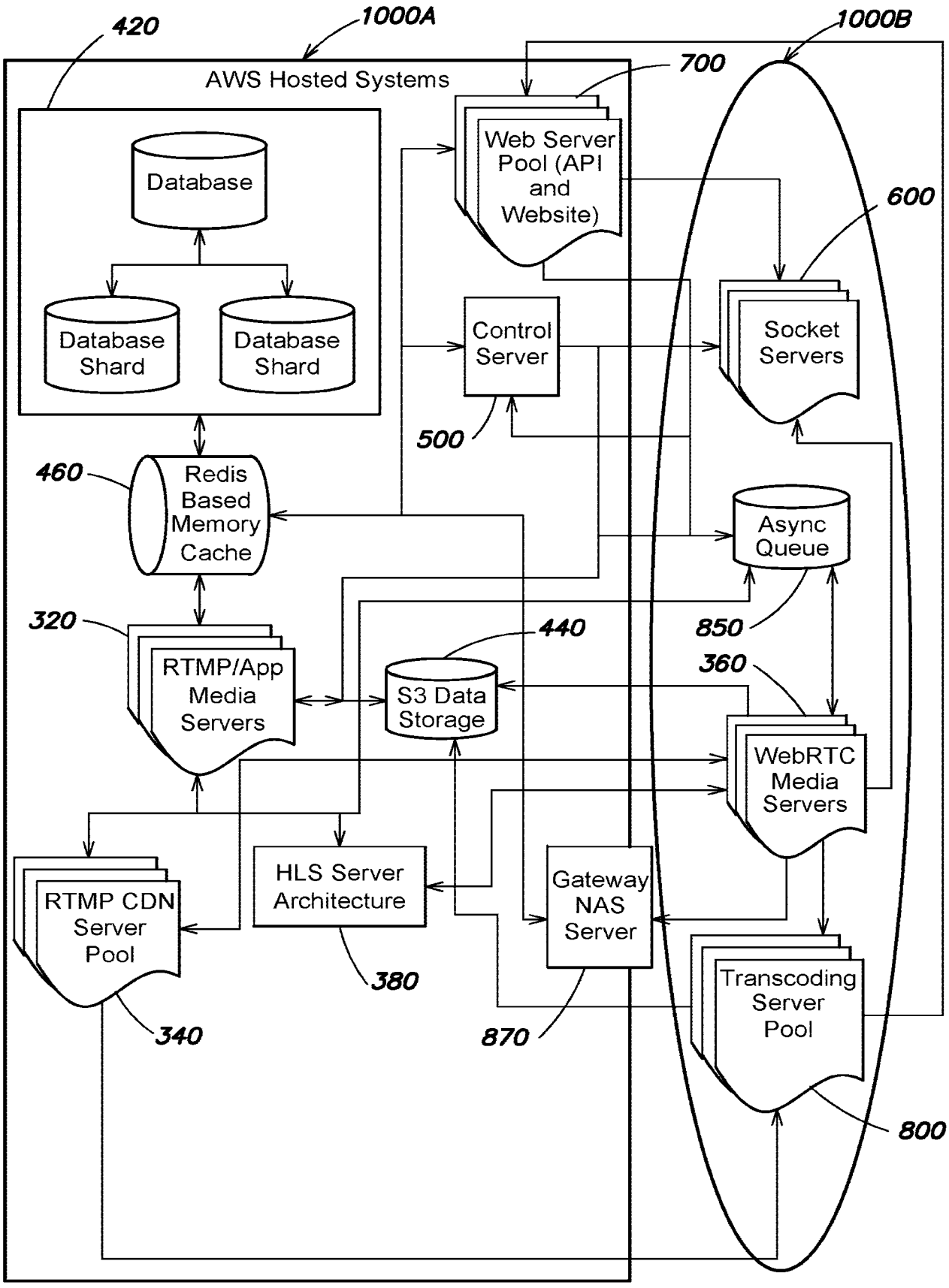

420
1000A
1000B
AWS Hosted Systems
700
Web Server Pool (API and Website)
Database
Database Shard
Database Shard
Control Server
500
600
Socket Servers
460
Redis Based Memory Cache
Async Queue
850
320
RTMP/App Media Servers
440
S3 Data Storage
360
WebRTC Media Servers
RTMP CDN Server Pool
340
HLS Server Architecture
380
Gateway NAS Server
870
Transcoding Server Pool
800

FIG. 3

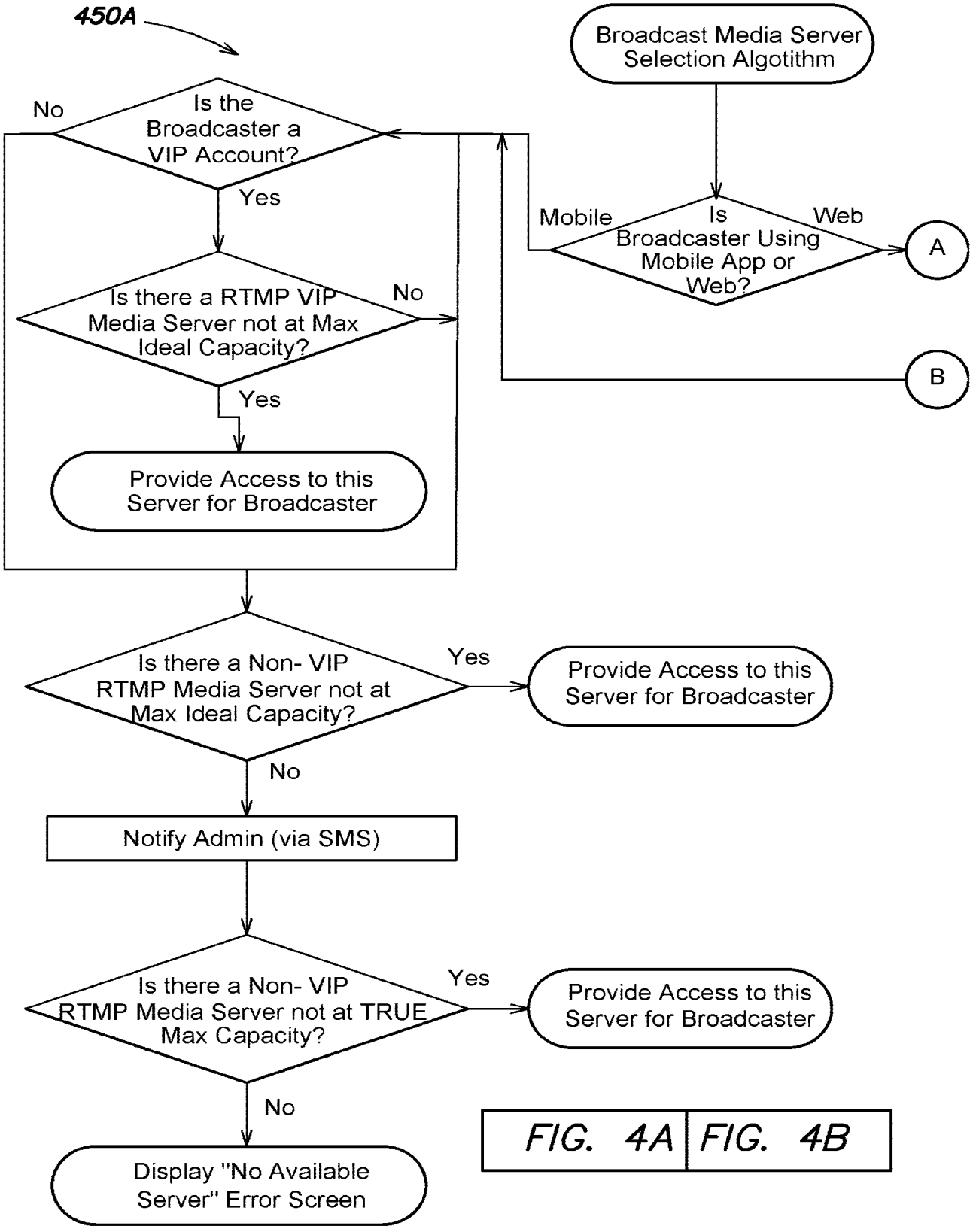


FIG. 4A | FIG. 4B

FIG. 4A

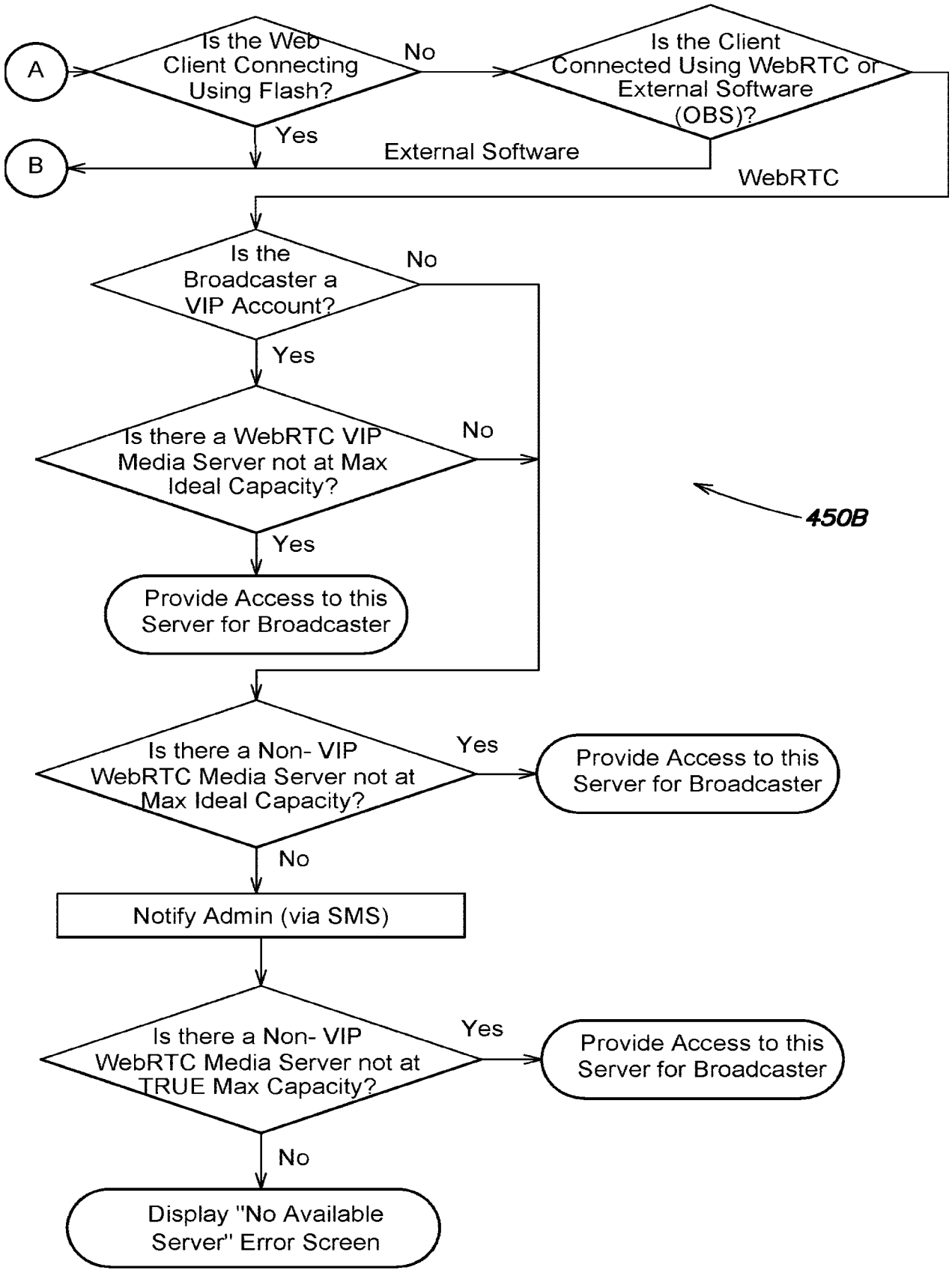

A
Is the Web Client Connecting Using Flash?
No
Is the Client Connected Using WebRTC or External Software (OBS)?
Yes
External Software
B
WebRTC
Is the Broadcaster a VIP Account?
No
Yes
Is there a WebRTC VIP Media Server not at Max Ideal Capacity?
No
Yes
Provide Access to this Server for Broadcaster
450B
Is there a Non- VIP WebRTC Media Server not at Max Ideal Capacity?
Yes
Provide Access to this Server for Broadcaster
No
Notify Admin (via SMS)
Is there a Non- VIP WebRTC Media Server not at TRUE Max Capacity?
Yes
Provide Access to this Server for Broadcaster
No
Display "No Available Server" Error Screen

FIG. 4B

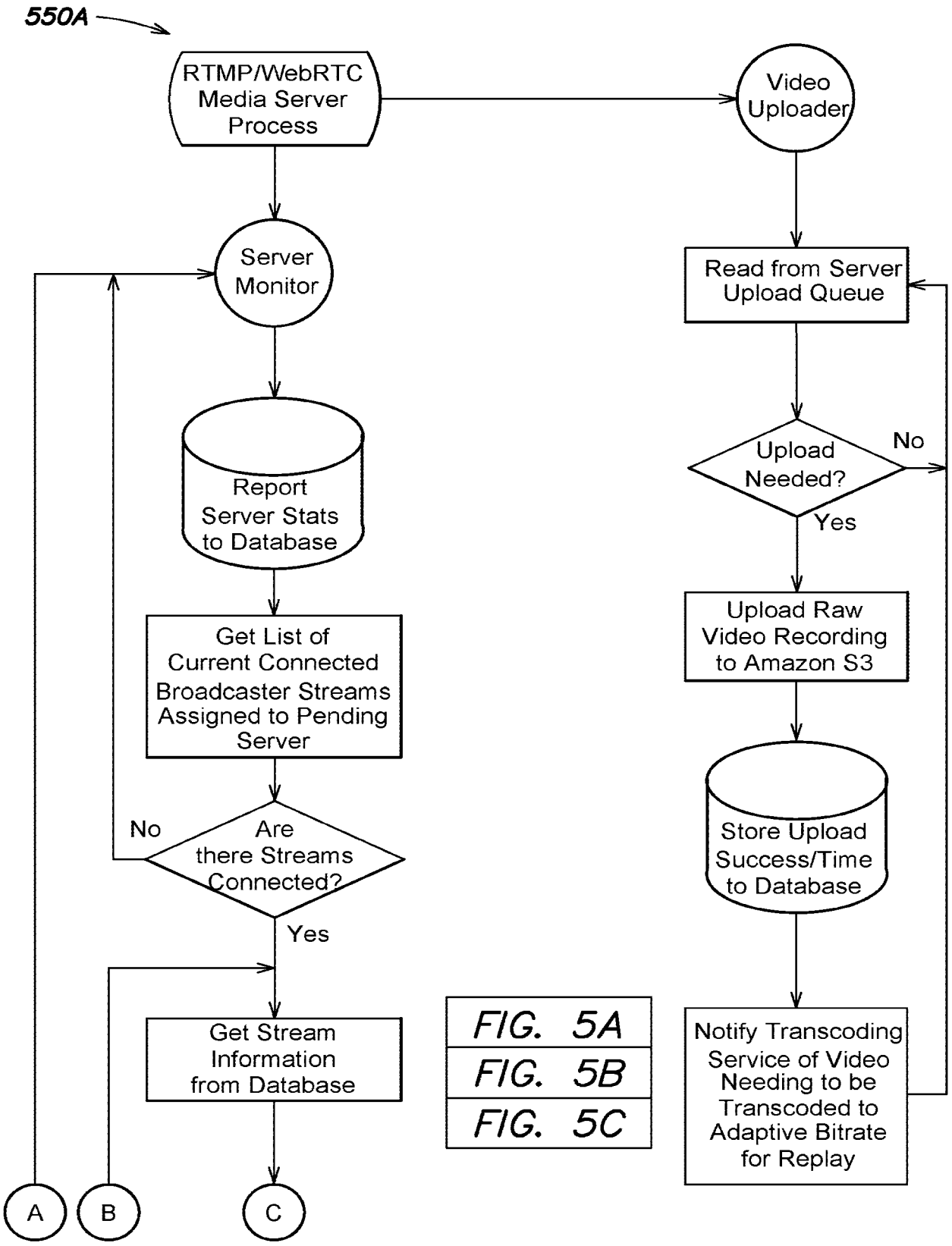


FIG. 5A
FIG. 5B
FIG. 5C

FIG. 5A

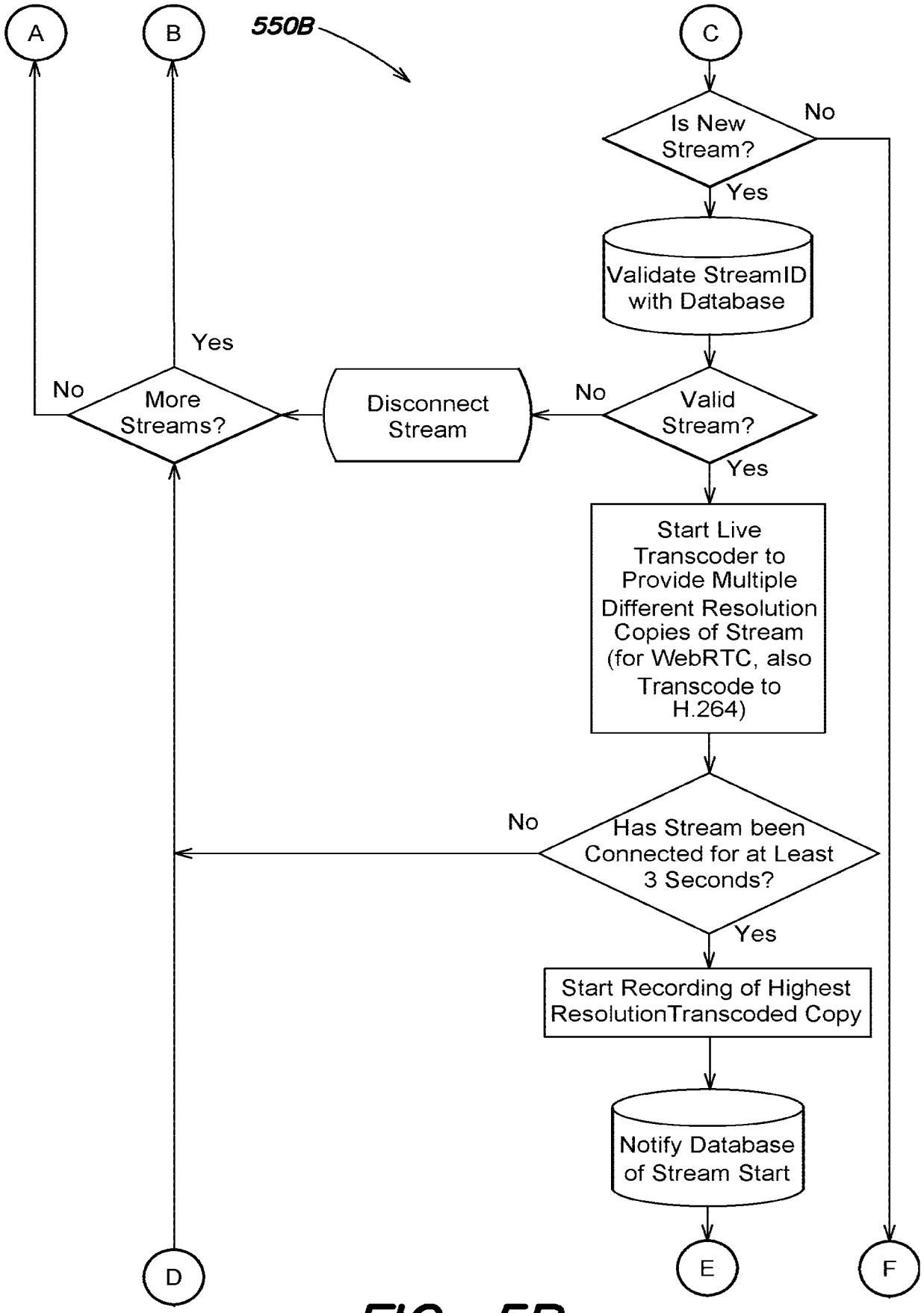

A
B
550B
C
Is New Stream?
No
Yes
Validate StreamID with Database
Yes
No
More Streams?
Disconnect Stream
No
Valid Stream?
Yes
Start Live Transcoder to Provide Multiple Different Resolution Copies of Stream (for WebRTC, also Transcode to H.264)
No
Has Stream been Connected for at Least 3 Seconds?
Yes
Start Recording of Highest ResolutionTranscoded Copy
Notify Database of Stream Start
D
E
F

FIG. 5B

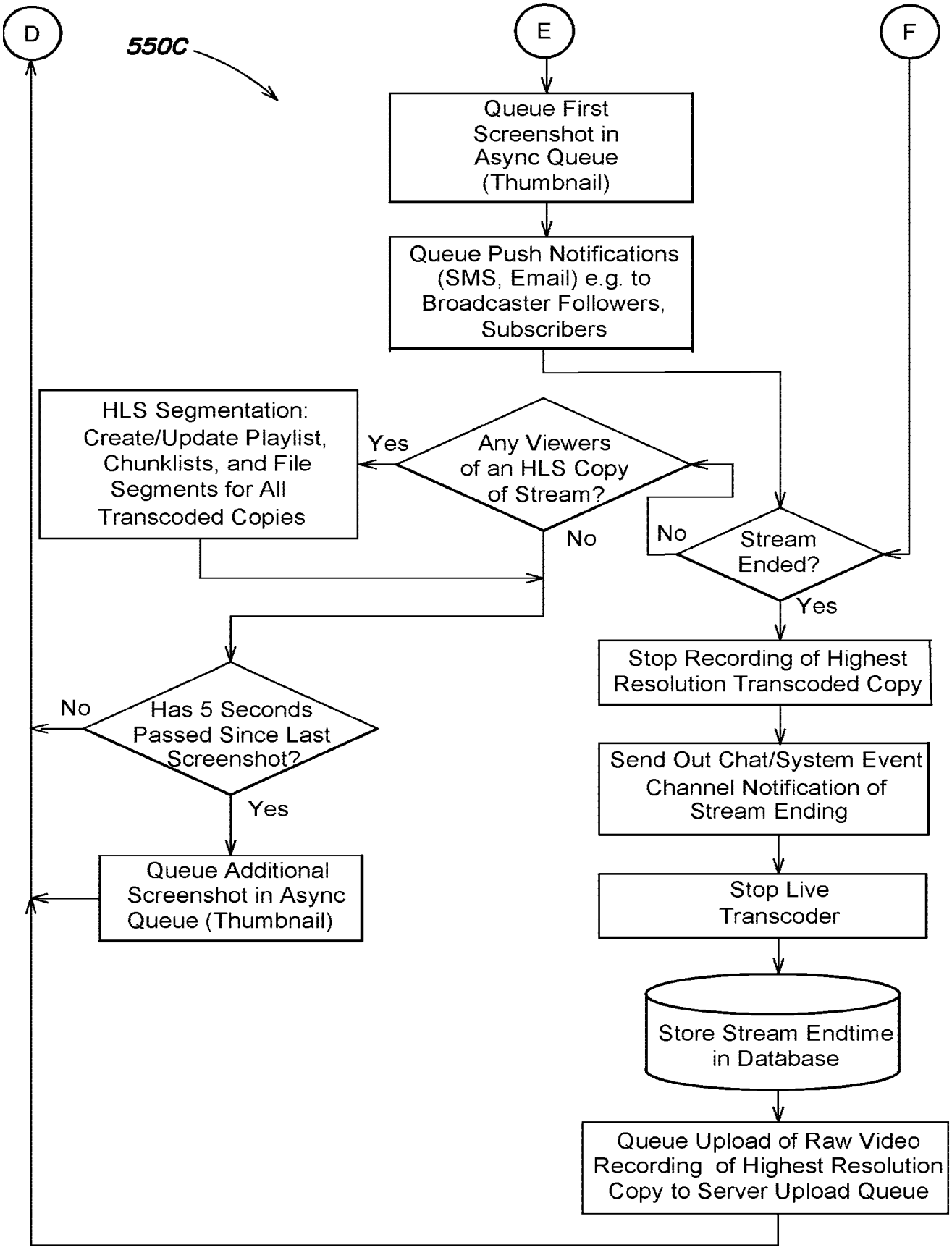

D
550C
E
F
Queue First Screenshot in Async Queue (Thumbnail)
Queue Push Notifications (SMS, Email) e.g. to Broadcaster Followers, Subscribers
HLS Segmentation: Create/Update Playlist, Chunklists, and File Segments for All Transcoded Copies
Yes
Any Viewers of an HLS Copy of Stream?
No
No
Stream Ended?
Yes
Stop Recording of Highest Resolution Transcoded Copy
No
Has 5 Seconds Passed Since Last Screenshot?
Yes
Send Out Chat/System Event Channel Notification of Stream Ending
Queue Additional Screenshot in Async Queue (Thumbnail)
Stop Live Transcoder
Store Stream Endtime in Database
Queue Upload of Raw Video Recording of Highest Resolution Copy to Server Upload Queue

FIG. 5C

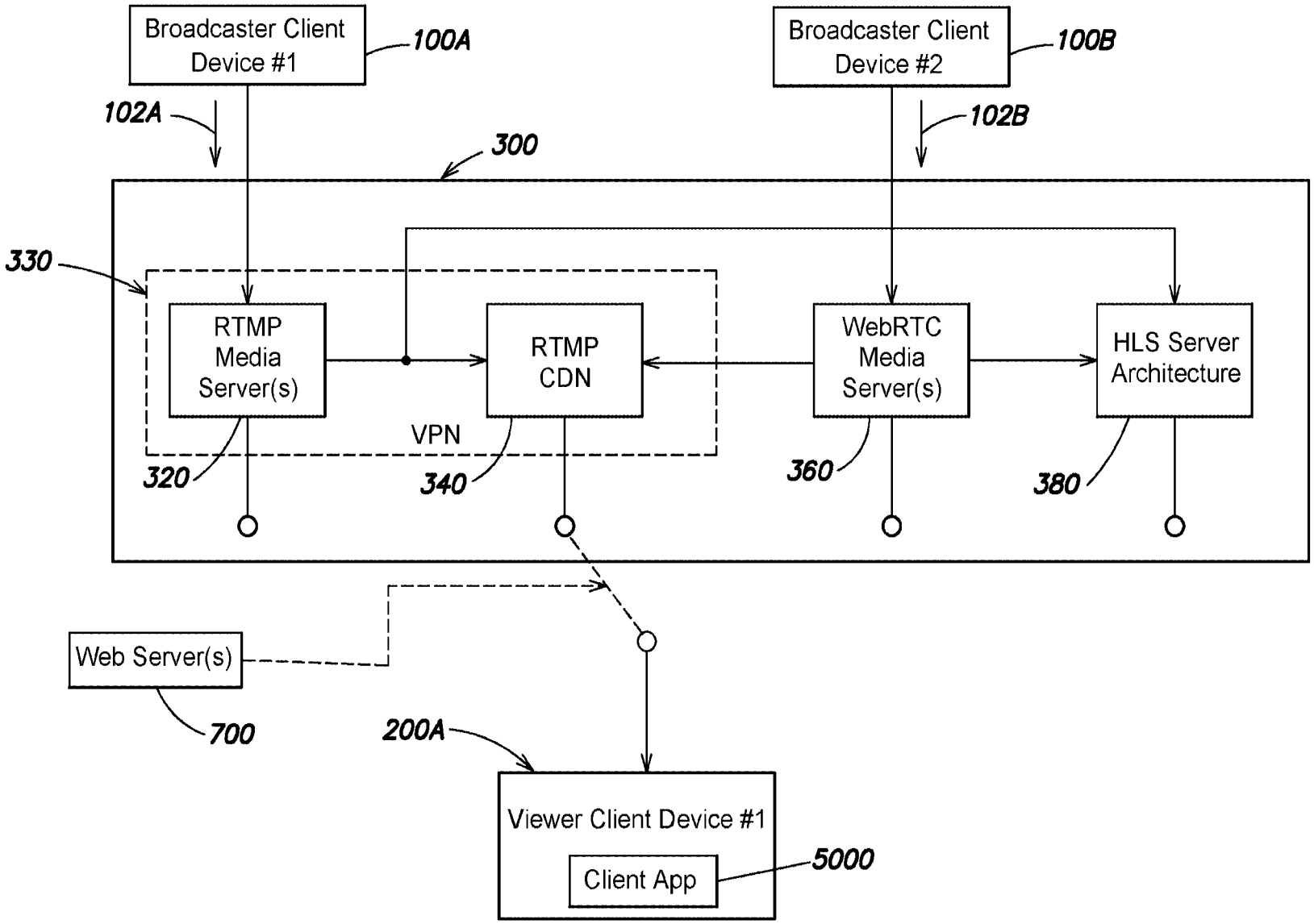

Broadcaster Client Device #1
100A
Broadcaster Client Device #2
100B
102A
102B
300
330
RTMP Media Server(s)
RTMP CDN
WebRTC Media Server(s)
HLS Server Architecture
VPN
320
340
360
380
Web Server(s)
700
200A
Viewer Client Device #1
Client App
5000

FIG. 6

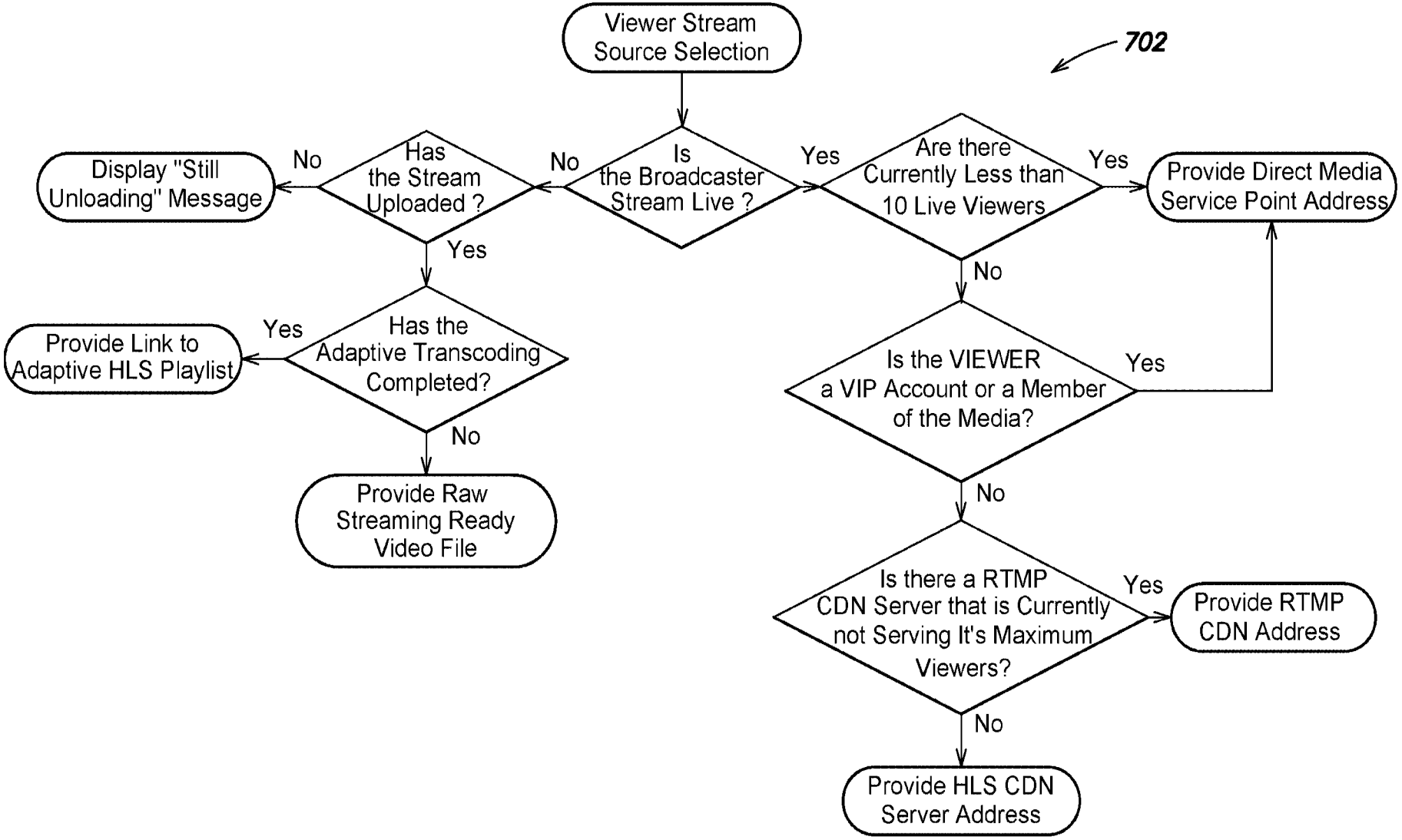

Viewer Stream Source Selection
702
Is the Broadcaster Stream Live ?
No
Yes
Has the Stream Uploaded ?
No
Yes
Display "Still Unloading" Message
Are there Currently Less than 10 Live Viewers
Yes
Provide Direct Media Service Point Address
No
Has the Adaptive Transcoding Completed?
Yes
Provide Link to Adaptive HLS Playlist
No
Provide Raw Streaming Ready Video File
Is the VIEWER a VIP Account or a Member of the Media?
Yes
No
Is there a RTMP CDN Server that is Currently not Serving It's Maximum Viewers?
Yes
Provide RTMP CDN Address
No
Provide HLS CDN Server Address

FIG. 7

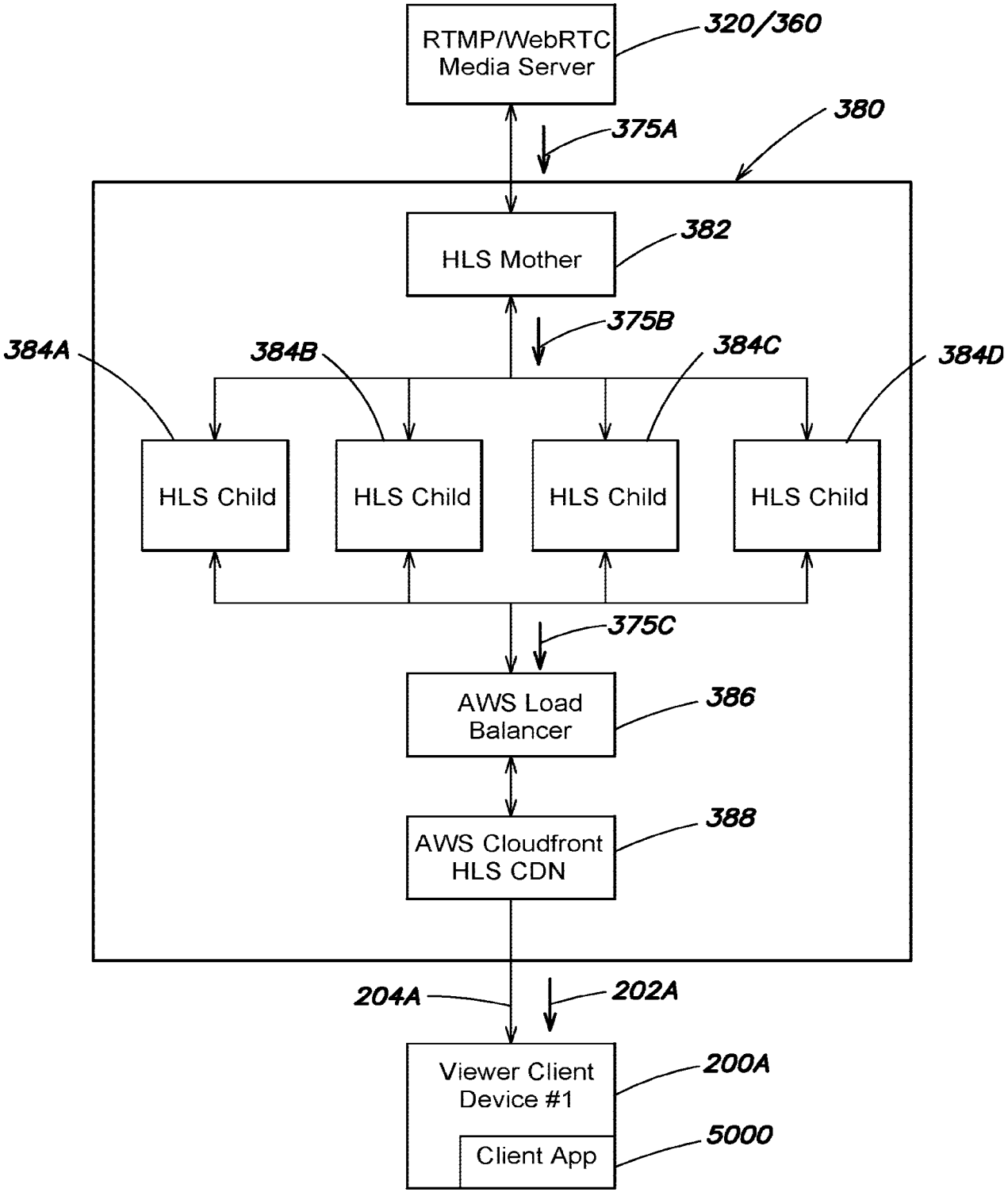

RTMP/WebRTC Media Server
320/360
380
375A
HLS Mother
382
375B
384A
384B
384C
384D
HLS Child
HLS Child
HLS Child
HLS Child
375C
AWS Load Balancer
386
AWS Cloudfront HLS CDN
388
204A
202A
Viewer Client Device #1
200A
Client App
5000

FIG. 8

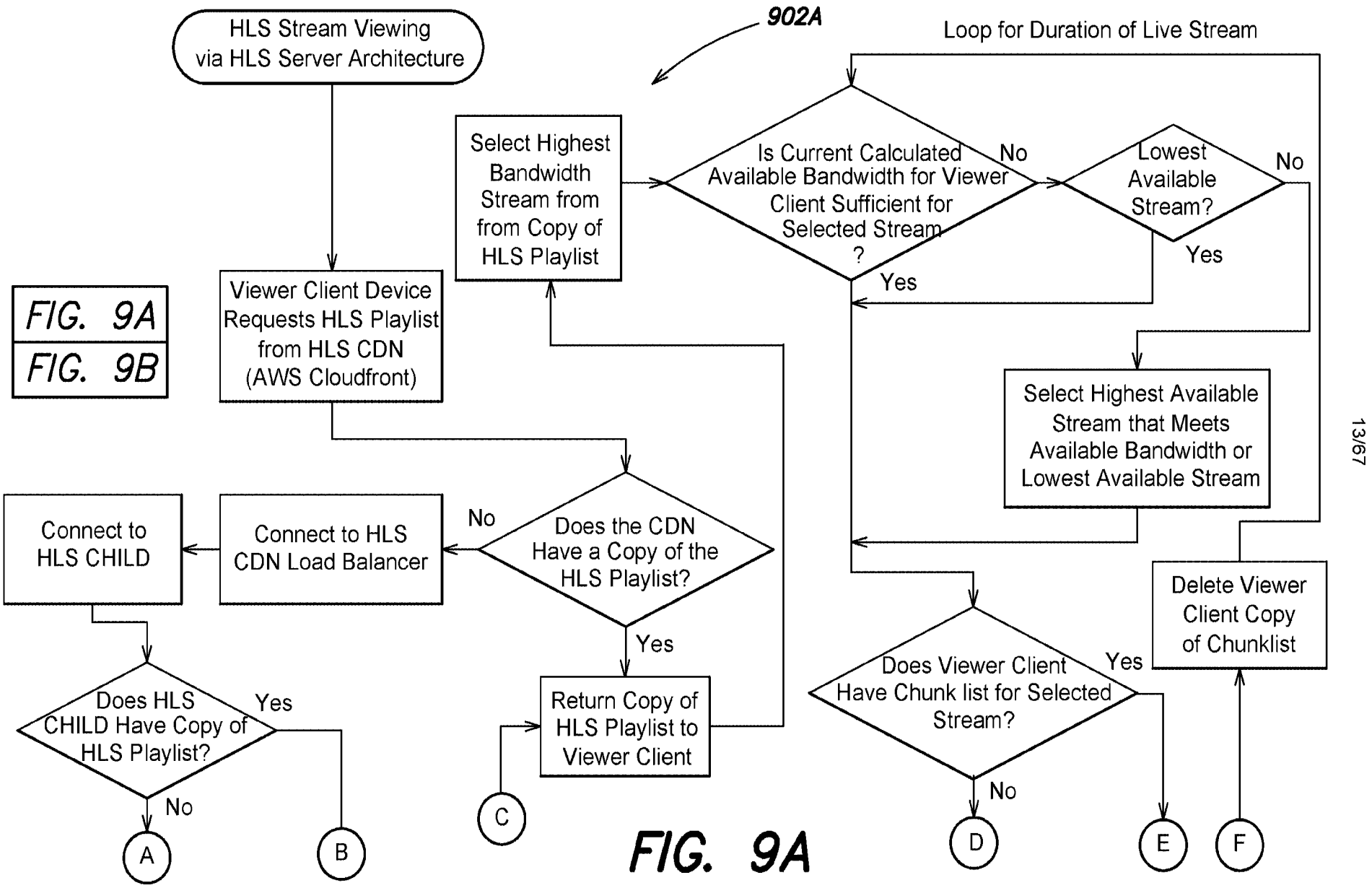


FIG. 9A

FIG. 9B

FIG. 9A

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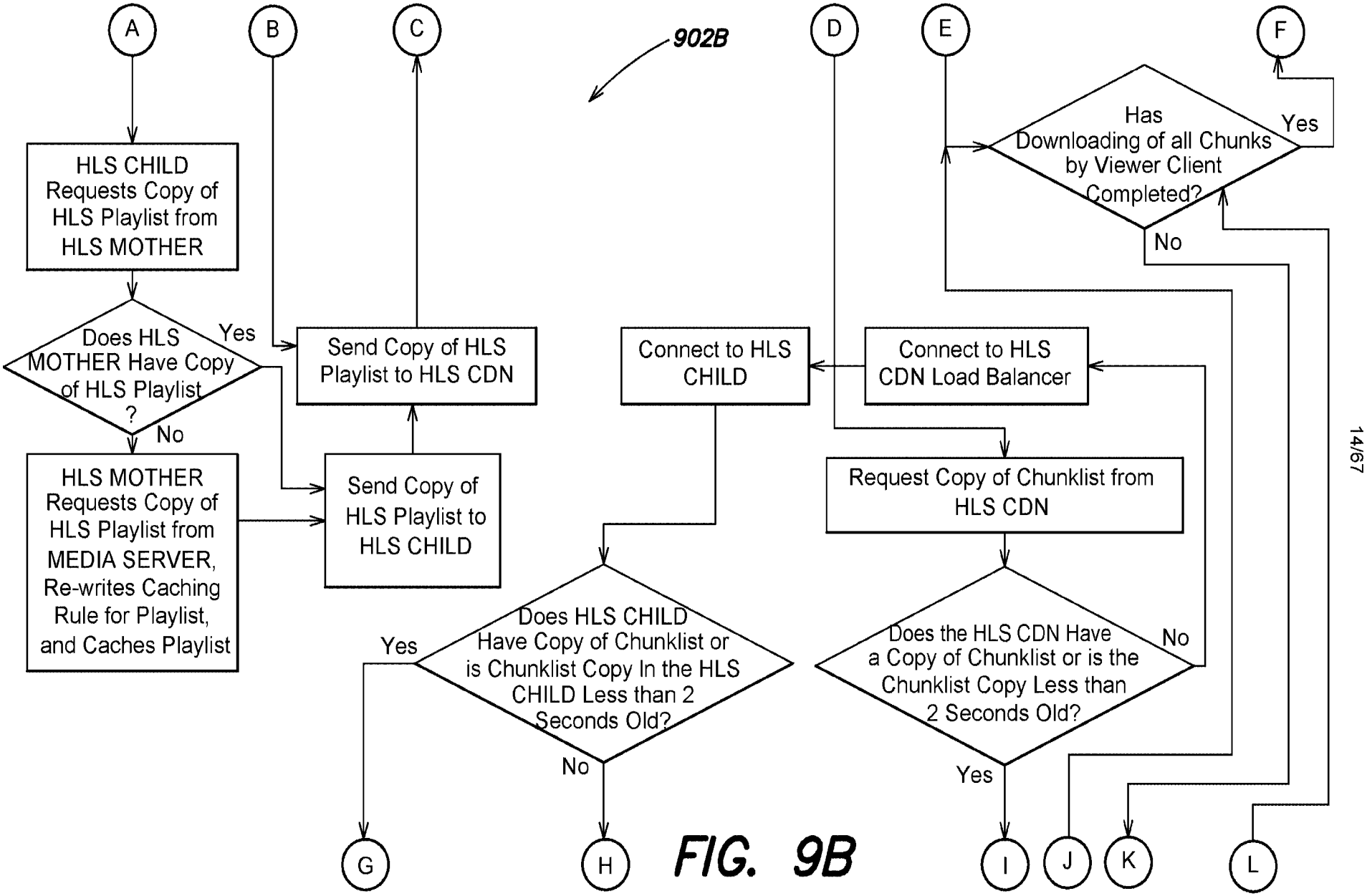

902B
A
B
C
D
E
F
HLS CHILD Requests Copy of HLS Playlist from HLS MOTHER
Does HLS MOTHER Have Copy of HLS Playlist ?
Yes
No
Send Copy of HLS Playlist to HLS CDN
HLS MOTHER Requests Copy of HLS Playlist from MEDIA SERVER, Re-writes Caching Rule for Playlist, and Caches Playlist
Send Copy of HLS Playlist to HLS CHILD
Connect to HLS CHILD
Connect to HLS CDN Load Balancer
Request Copy of Chunklist from HLS CDN
Has Downloading of all Chunks by Viewer Client Completed?
Yes
No
Does HLS CHILD Have Copy of Chunklist or is Chunklist Copy In the HLS CHILD Less than 2 Seconds Old?
Yes
No
Does the HLS CDN Have a Copy of Chunklist or is the Chunklist Copy Less than 2 Seconds Old?
No
Yes
G
H
I
J
K
L

FIG. 9B

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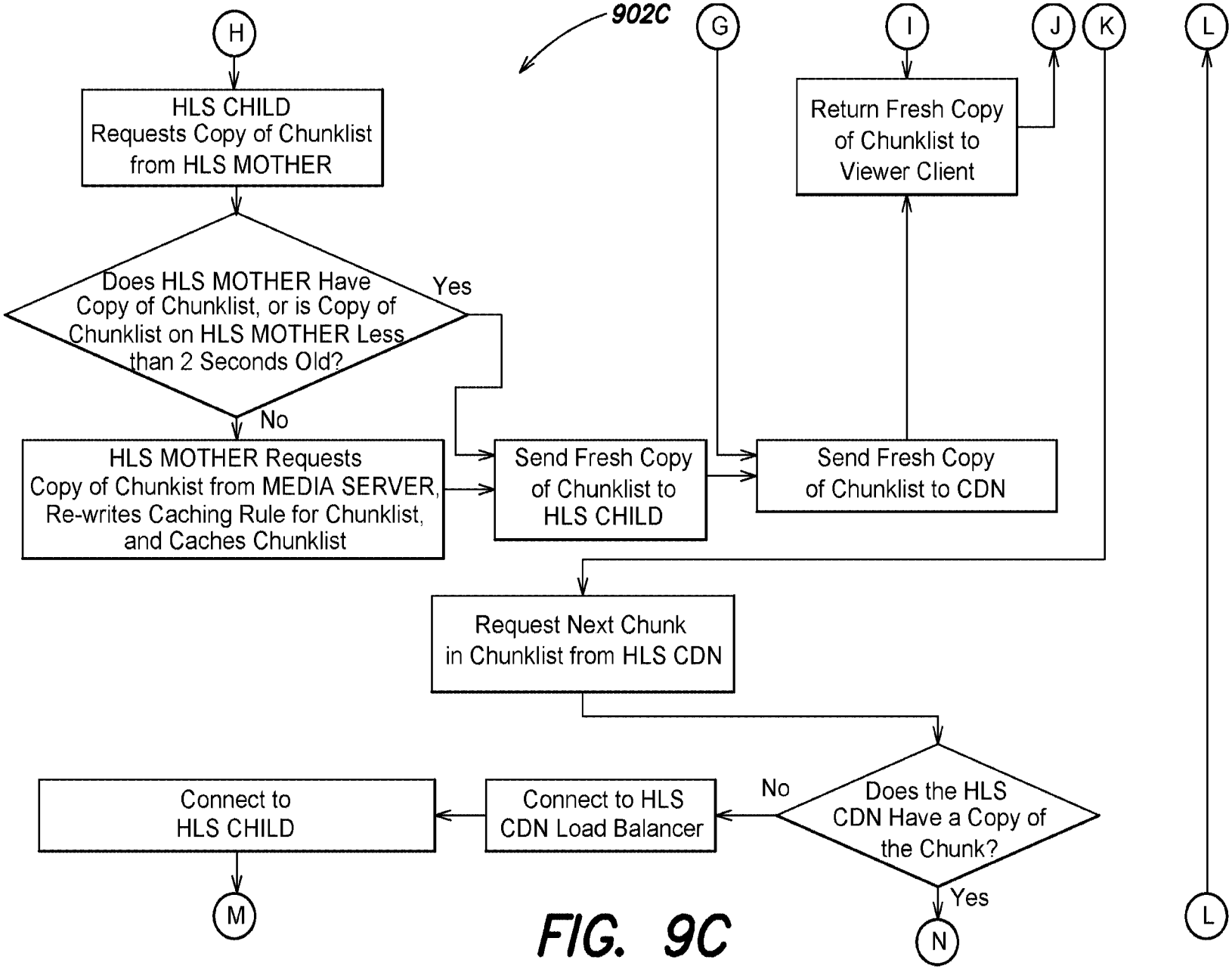

902C
H
HLS CHILD
Requests Copy of Chunklist
from HLS MOTHER
Does HLS MOTHER Have
Copy of Chunklist, or is Copy of
Chunklist on HLS MOTHER Less
than 2 Seconds Old?
Yes
No
HLS MOTHER Requests
Copy of Chunkist from MEDIA SERVER,
Re-writes Caching Rule for Chunklist,
and Caches Chunklist
Send Fresh Copy
of Chunklist to
HLS CHILD
G
Send Fresh Copy
of Chunklist to CDN
I
Return Fresh Copy
of Chunklist to
Viewer Client
J
K
L
Request Next Chunk
in Chunklist from HLS CDN
Does the HLS
CDN Have a Copy of
the Chunk?
No
Yes
Connect to HLS
CDN Load Balancer
Connect to
HLS CHILD
M
N
L

FIG. 9C

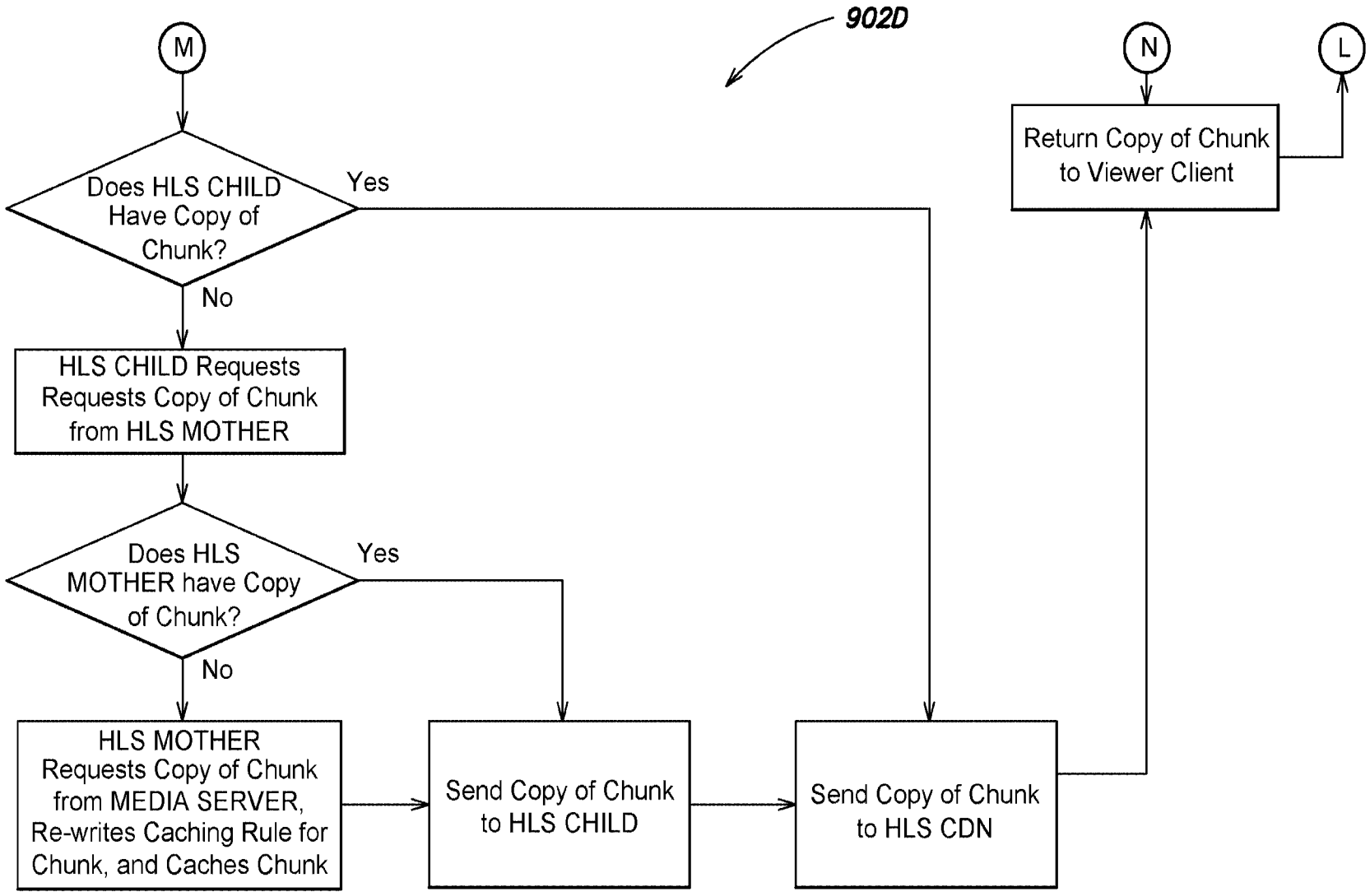

902D
M
Does HLS CHILD Have Copy of Chunk?
Yes
No
HLS CHILD Requests Requests Copy of Chunk from HLS MOTHER
Does HLS MOTHER have Copy of Chunk?
Yes
No
HLS MOTHER Requests Copy of Chunk from MEDIA SERVER, Re-writes Caching Rule for Chunk, and Caches Chunk
Send Copy of Chunk to HLS CHILD
Send Copy of Chunk to HLS CDN
N
Return Copy of Chunk to Viewer Client
L

FIG. 9D

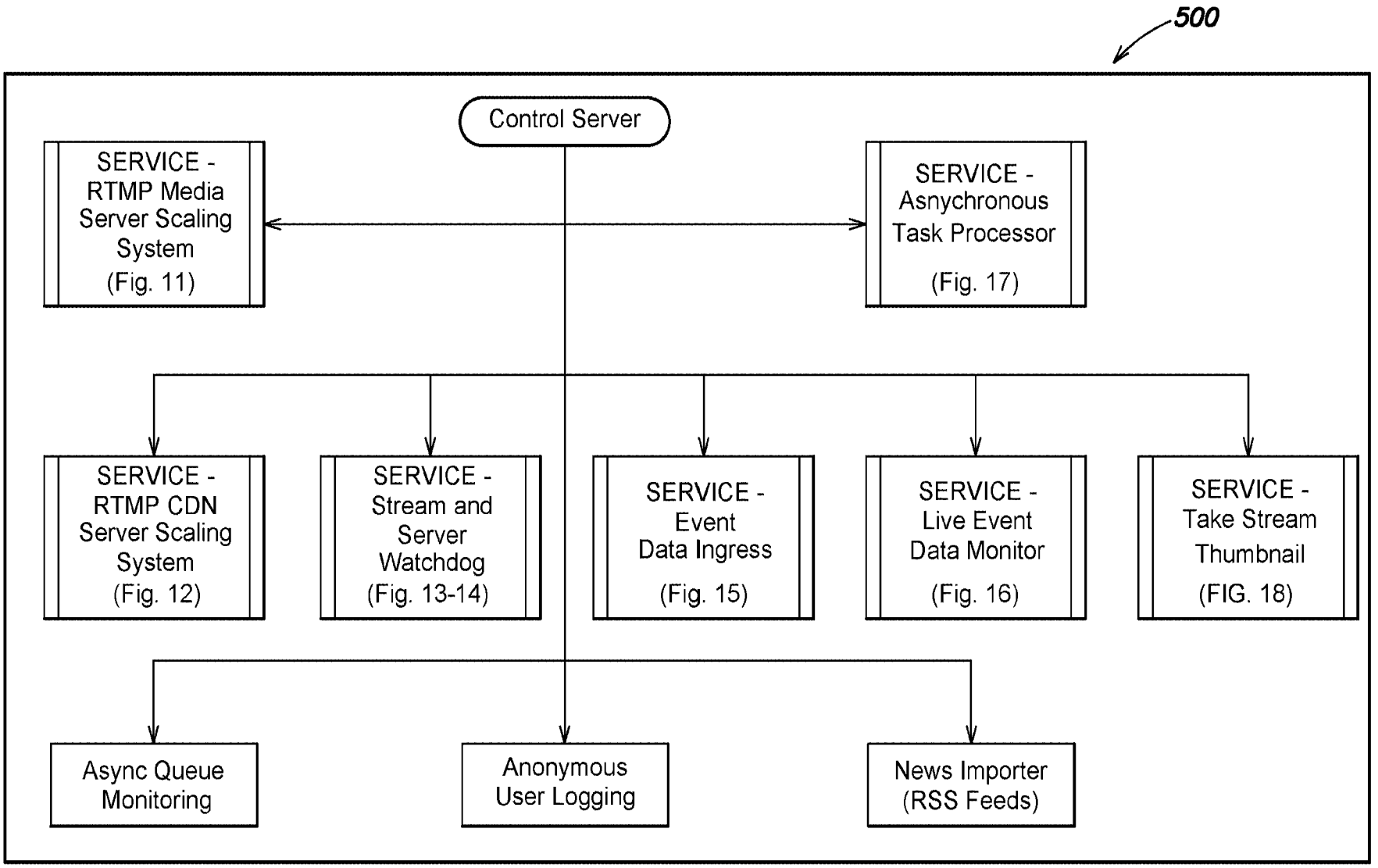

500
Control Server
SERVICE - RTMP Media Server Scaling System (Fig. 11)
SERVICE - Asnychronous Task Processor (Fig. 17)
SERVICE - RTMP CDN Server Scaling System (Fig. 12)
SERVICE - Stream and Server Watchdog (Fig. 13-14)
SERVICE - Event Data Ingress (Fig. 15)
SERVICE - Live Event Data Monitor (Fig. 16)
SERVICE - Take Stream Thumbnail (FIG. 18)
Async Queue Monitoring
Anonymous User Logging
News Importer (RSS Feeds)

FIG. 10

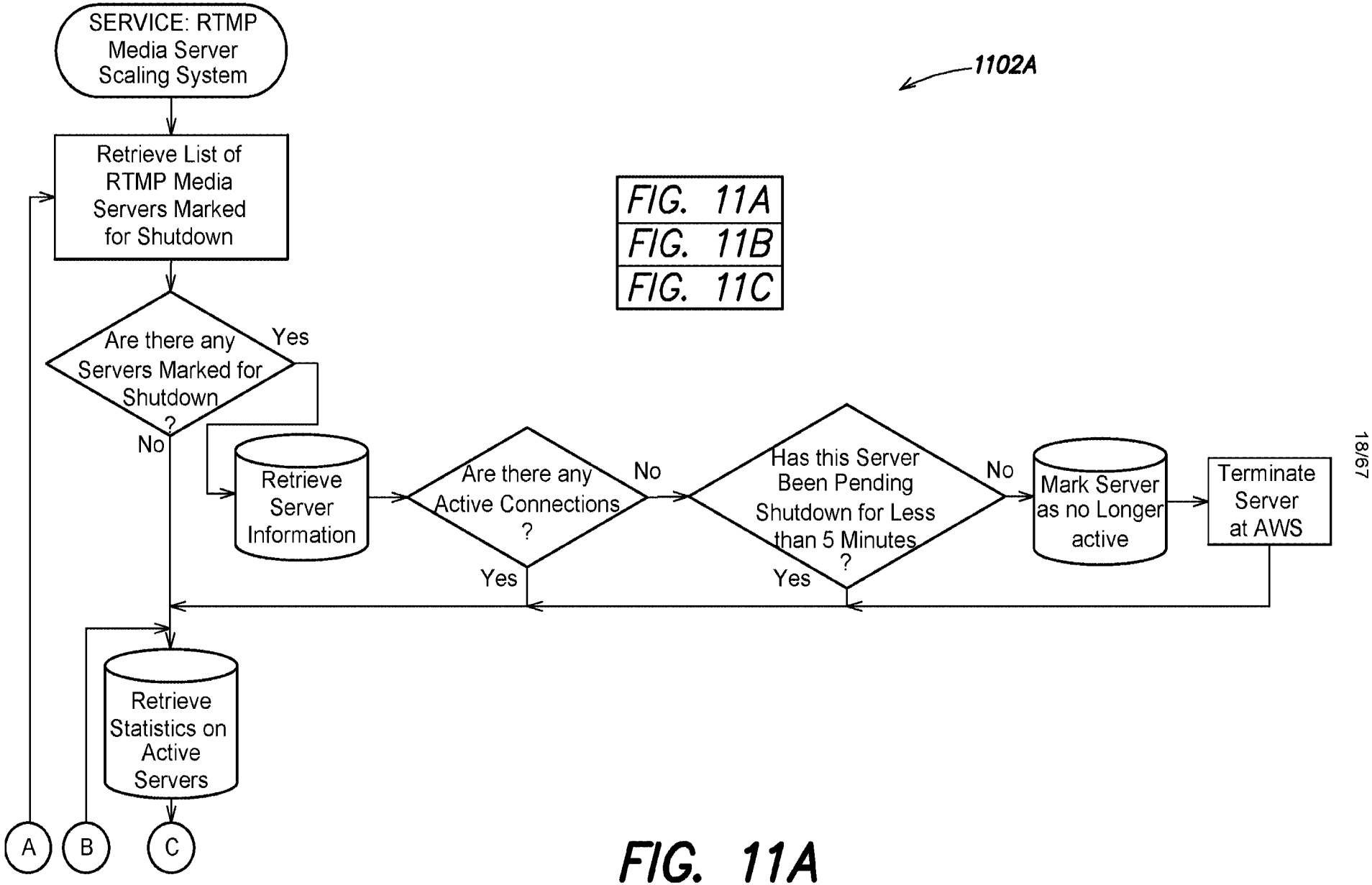


FIG. 11A
FIG. 11B
FIG. 11C

FIG. 11A

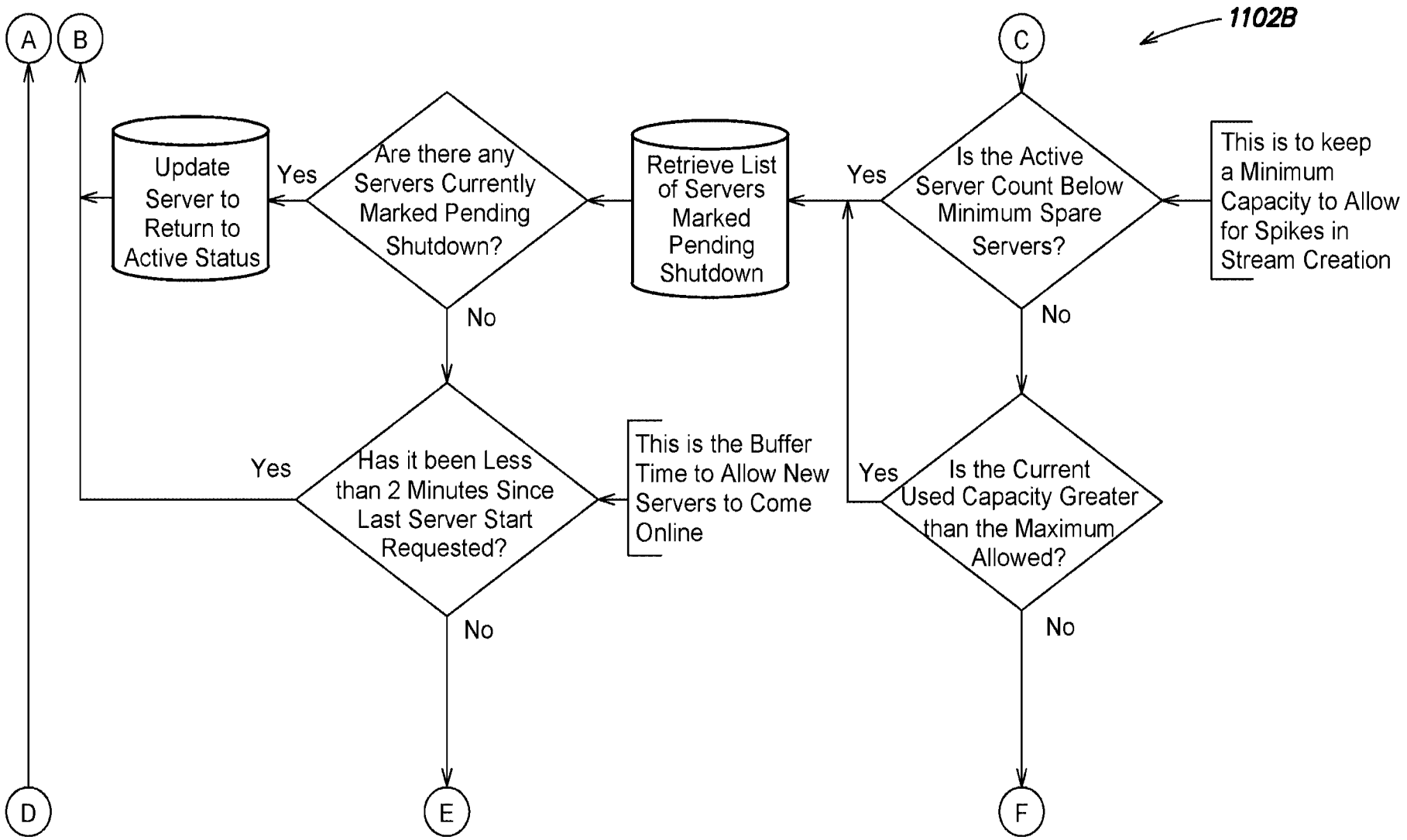

1102B
A
B
C
D
E
F
Update Server to Return to Active Status
Yes
Are there any Servers Currently Marked Pending Shutdown?
Retrieve List of Servers Marked Pending Shutdown
Yes
Is the Active Server Count Below Minimum Spare Servers?
This is to keep a Minimum Capacity to Allow for Spikes in Stream Creation
No
Yes
Has it been Less than 2 Minutes Since Last Server Start Requested?
This is the Buffer Time to Allow New Servers to Come Online
Yes
Is the Current Used Capacity Greater than the Maximum Allowed?
No
No

FIG. 11B

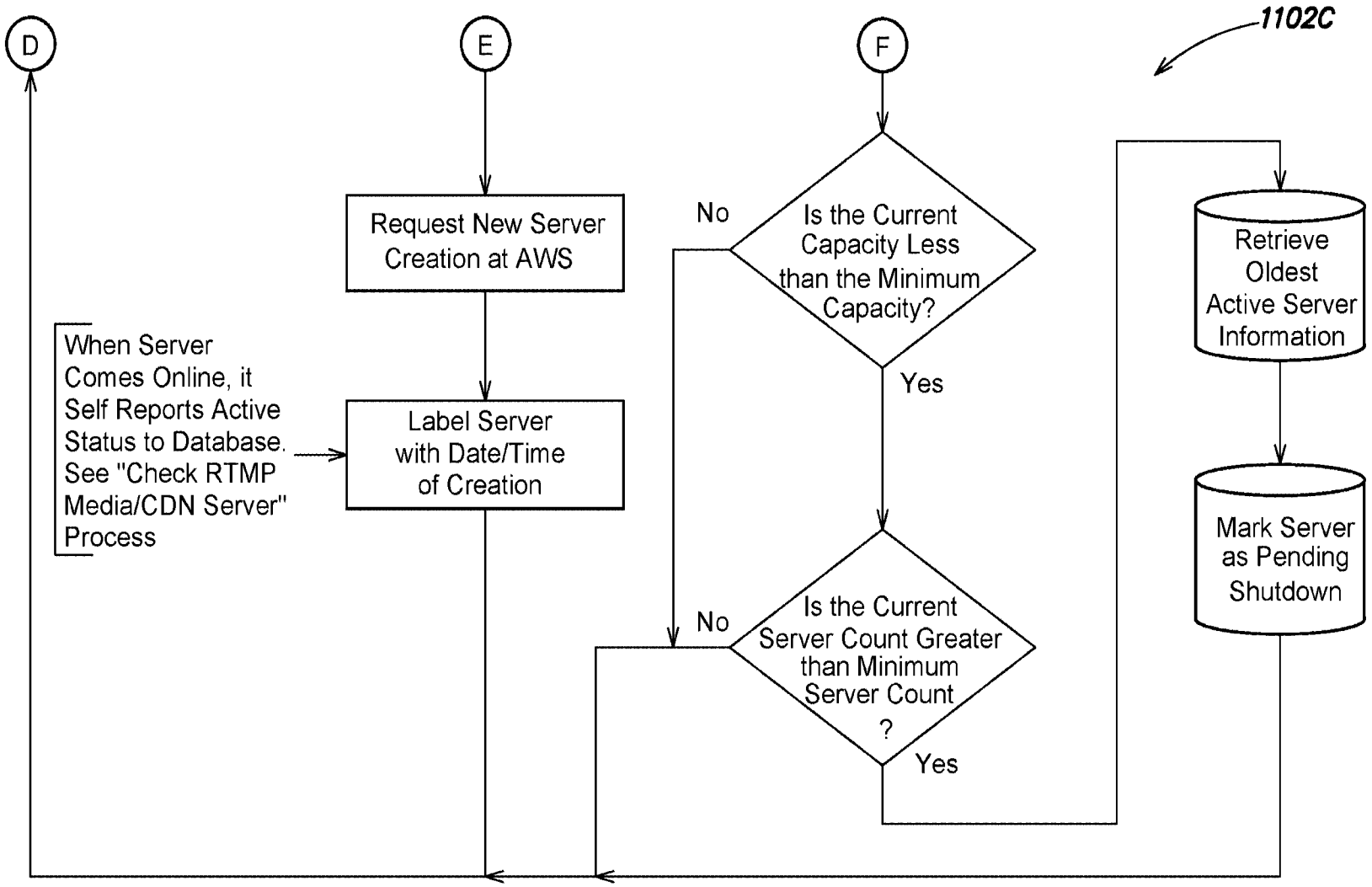

1102C
D
E
F
Request New Server Creation at AWS
When Server Comes Online, it Self Reports Active Status to Database. See "Check RTMP Media/CDN Server" Process
Label Server with Date/Time of Creation
No
Is the Current Capacity Less than the Minimum Capacity?
Yes
Retrieve Oldest Active Server Information
Mark Server as Pending Shutdown
No
Is the Current Server Count Greater than Minimum Server Count ?
Yes

FIG. 11C

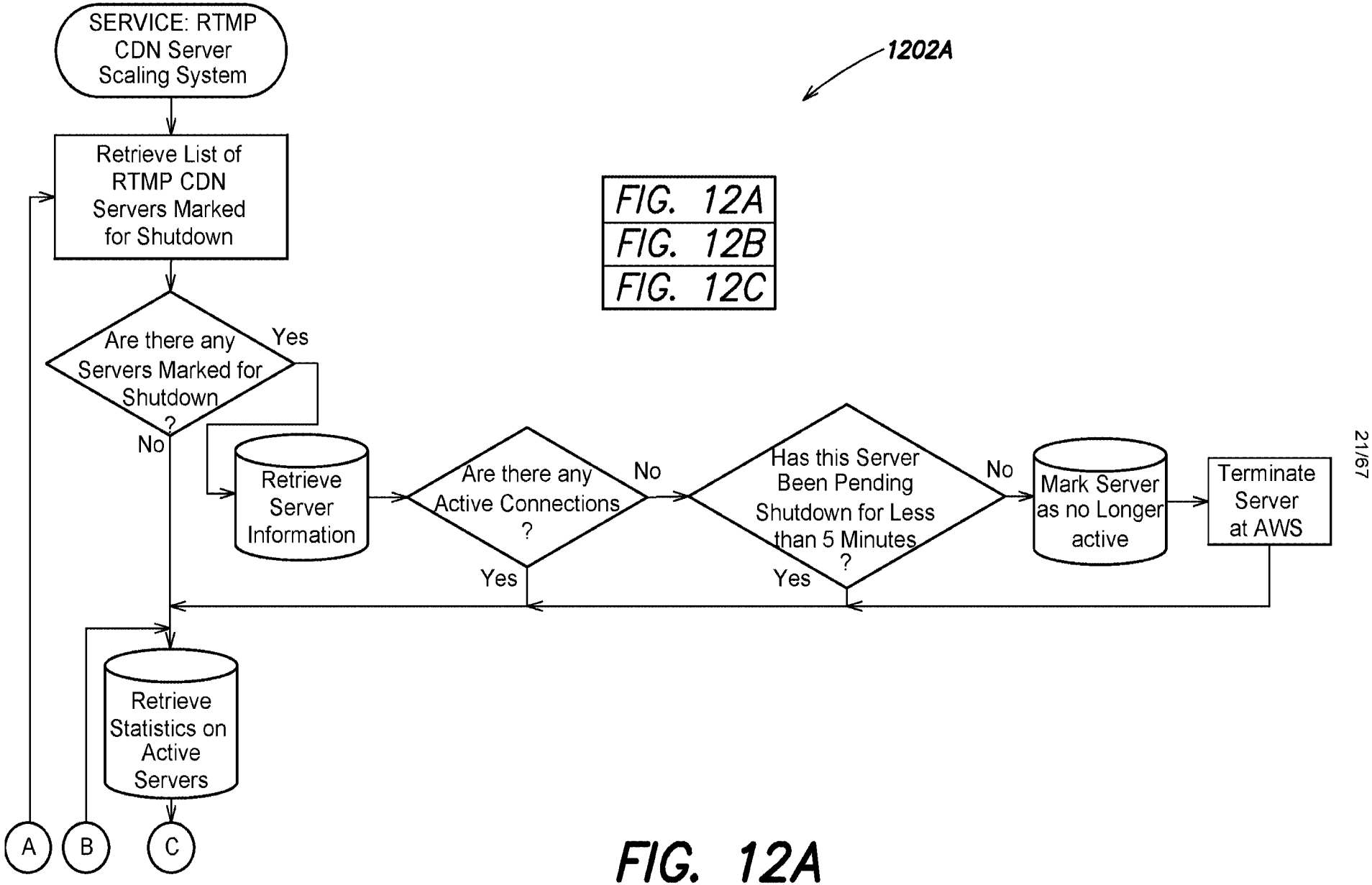


FIG. 12A
FIG. 12B
FIG. 12C

FIG. 12A

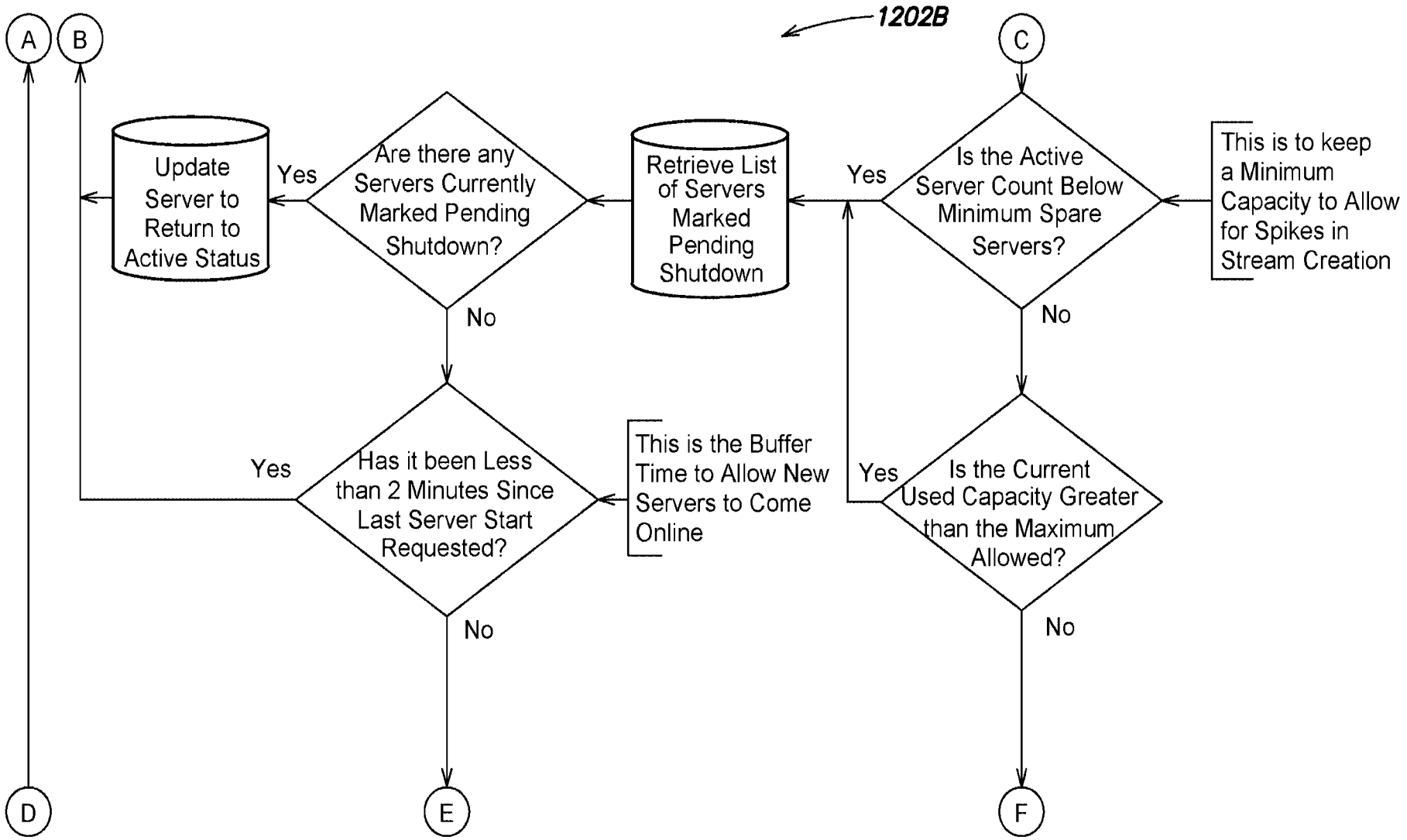

1202B
A
B
C
D
E
F
Update Server to Return to Active Status
Yes
Are there any Servers Currently Marked Pending Shutdown?
Retrieve List of Servers Marked Pending Shutdown
Yes
Is the Active Server Count Below Minimum Spare Servers?
This is to keep a Minimum Capacity to Allow for Spikes in Stream Creation
No
No
Yes
Has it been Less than 2 Minutes Since Last Server Start Requested?
This is the Buffer Time to Allow New Servers to Come Online
Yes
Is the Current Used Capacity Greater than the Maximum Allowed?
No
No

FIG. 12B

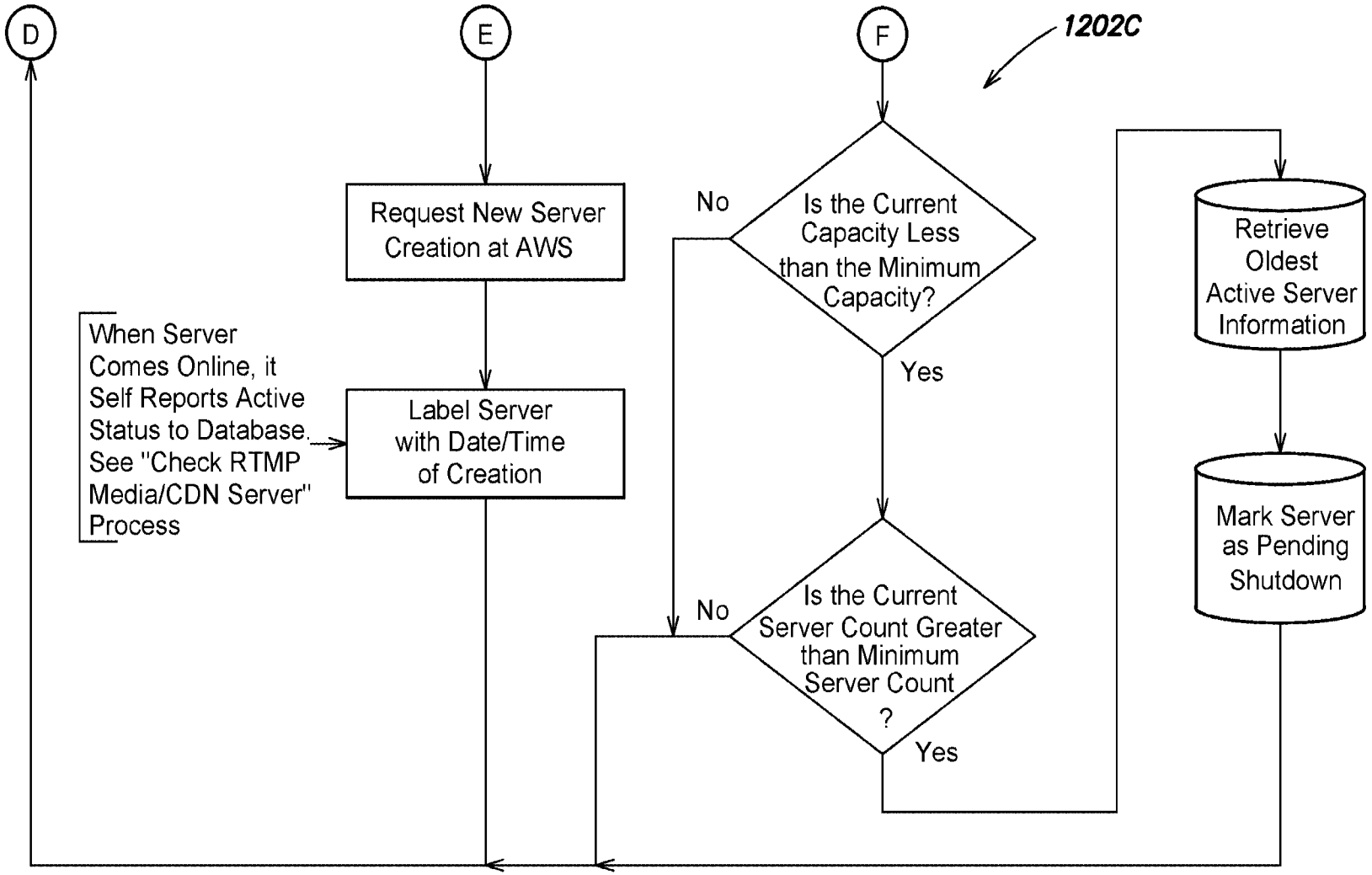

D
E
F
1202C
Request New Server Creation at AWS
When Server Comes Online, it Self Reports Active Status to Database. See "Check RTMP Media/CDN Server" Process
Label Server with Date/Time of Creation
No
Is the Current Capacity Less than the Minimum Capacity?
Yes
Retrieve Oldest Active Server Information
Mark Server as Pending Shutdown
No
Is the Current Server Count Greater than Minimum Server Count ?
Yes

FIG. 12C

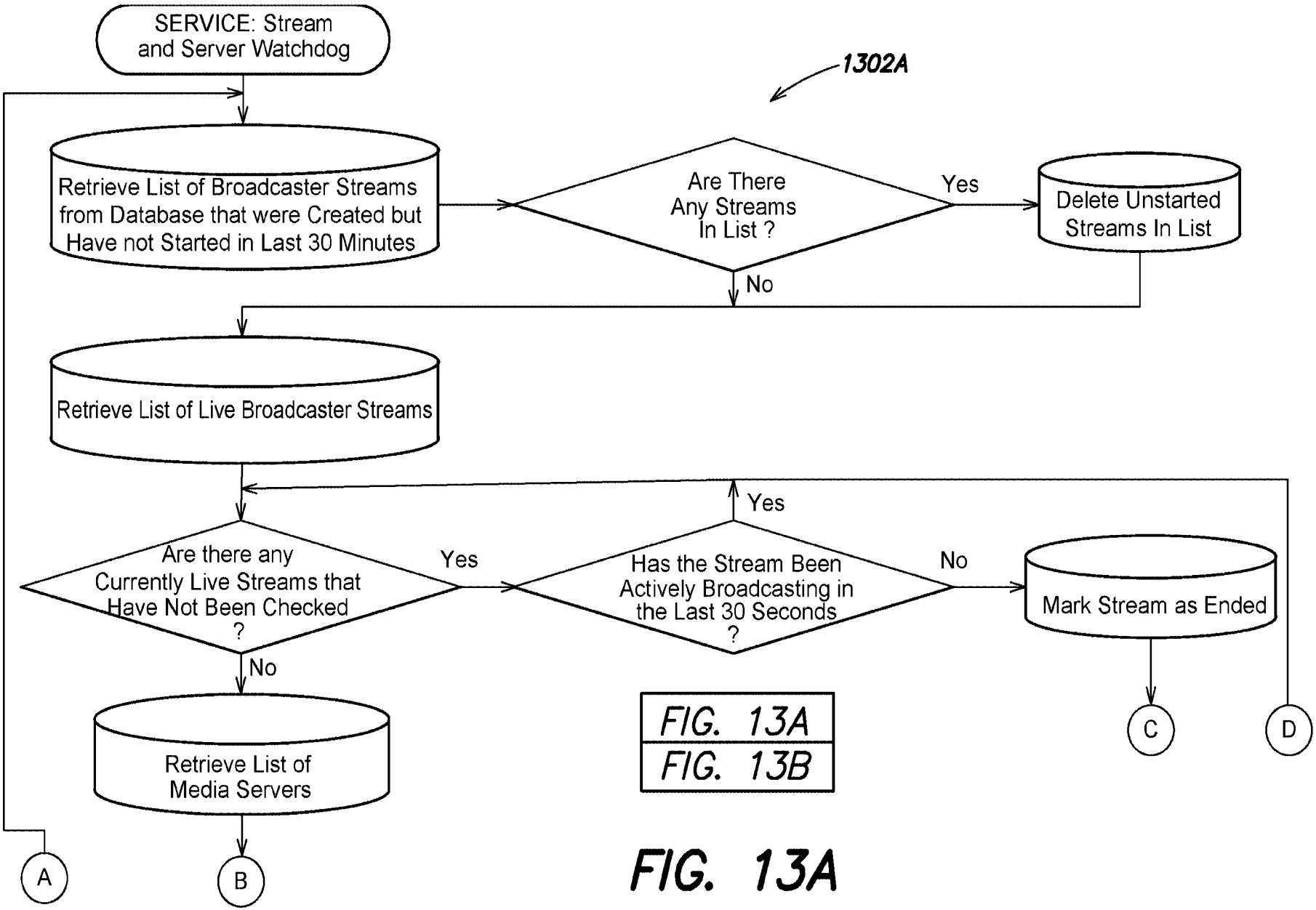


FIG. 13A
FIG. 13B

FIG. 13A

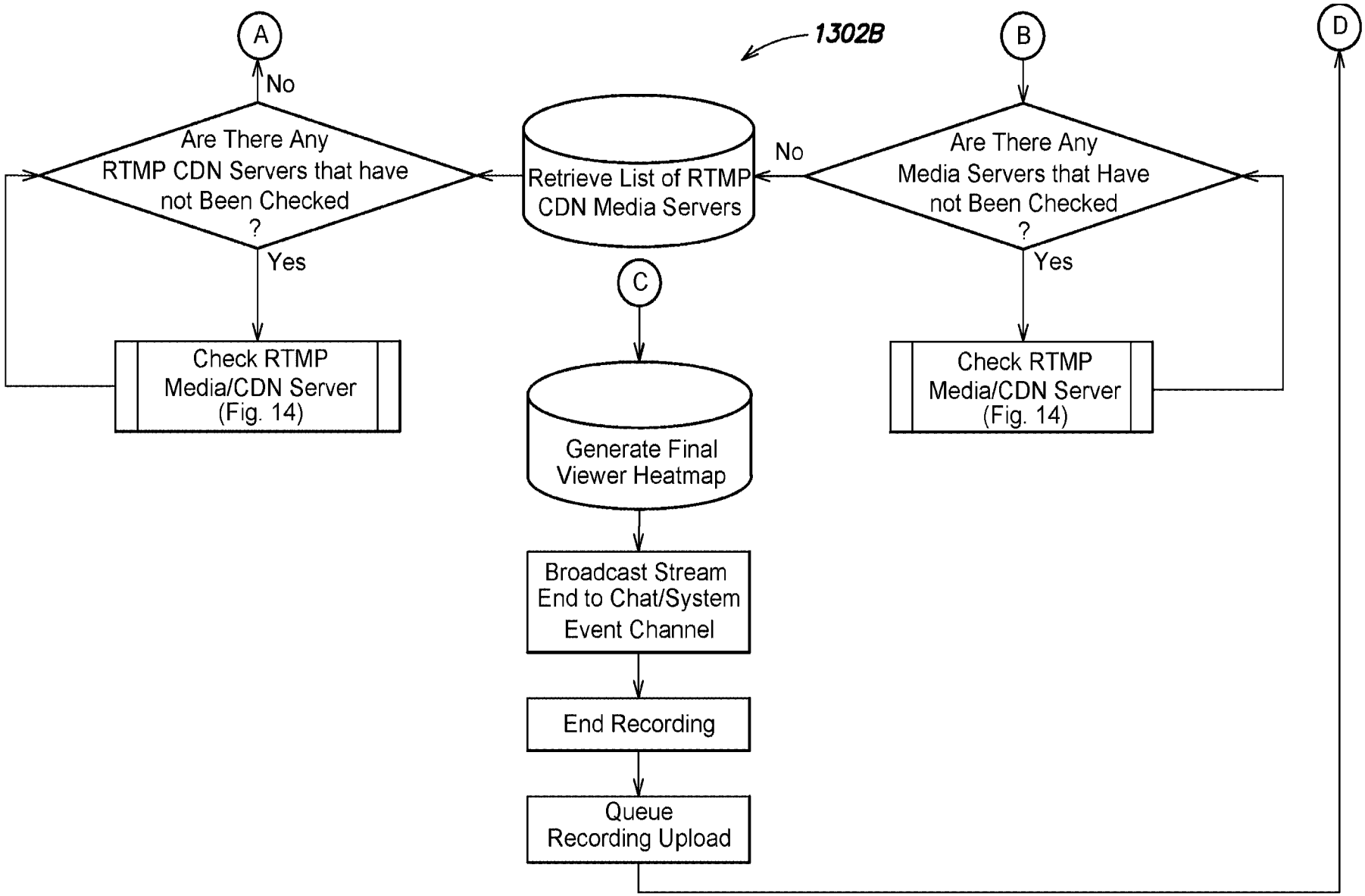

1302B
A
No
Are There Any RTMP CDN Servers that have not Been Checked ?
Yes
Check RTMP Media/CDN Server (Fig. 14)
Retrieve List of RTMP CDN Media Servers
No
B
Are There Any Media Servers that Have not Been Checked ?
Yes
Check RTMP Media/CDN Server (Fig. 14)
D
C
Generate Final Viewer Heatmap
Broadcast Stream End to Chat/System Event Channel
End Recording
Queue Recording Upload

FIG. 13B

FIG. 14A
FIG. 14B

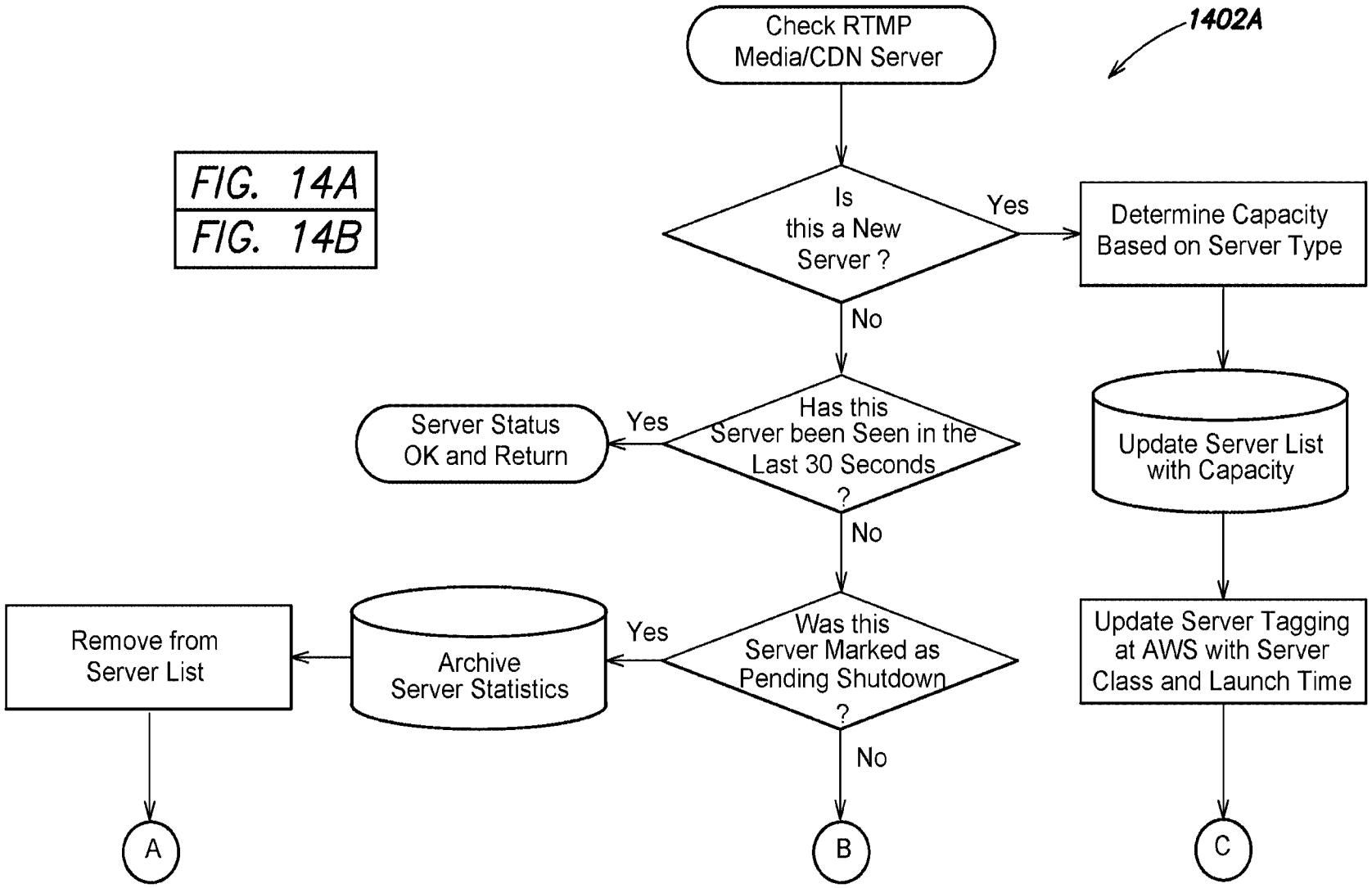


FIG. 14A

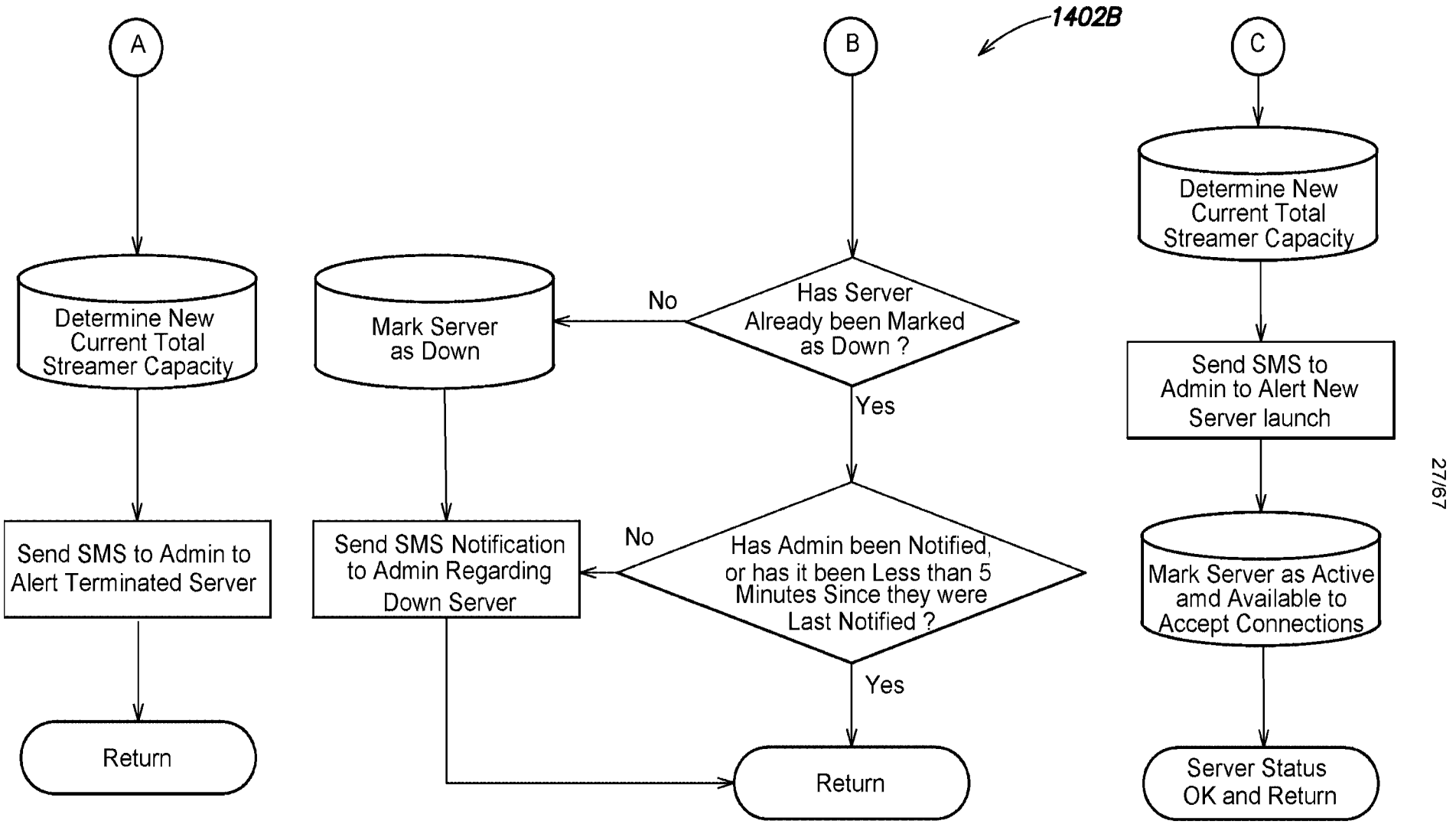

1402B
A
B
C
Determine New Current Total Streamer Capacity
Send SMS to Admin to Alert Terminated Server
Return
Mark Server as Down
No
Has Server Already been Marked as Down ?
Yes
Send SMS Notification to Admin Regarding Down Server
No
Has Admin been Notified, or has it been Less than 5 Minutes Since they were Last Notified ?
Yes
Return
Determine New Current Total Streamer Capacity
Send SMS to Admin to Alert New Server launch
Mark Server as Active amd Available to Accept Connections
Server Status OK and Return

FIG. 14B

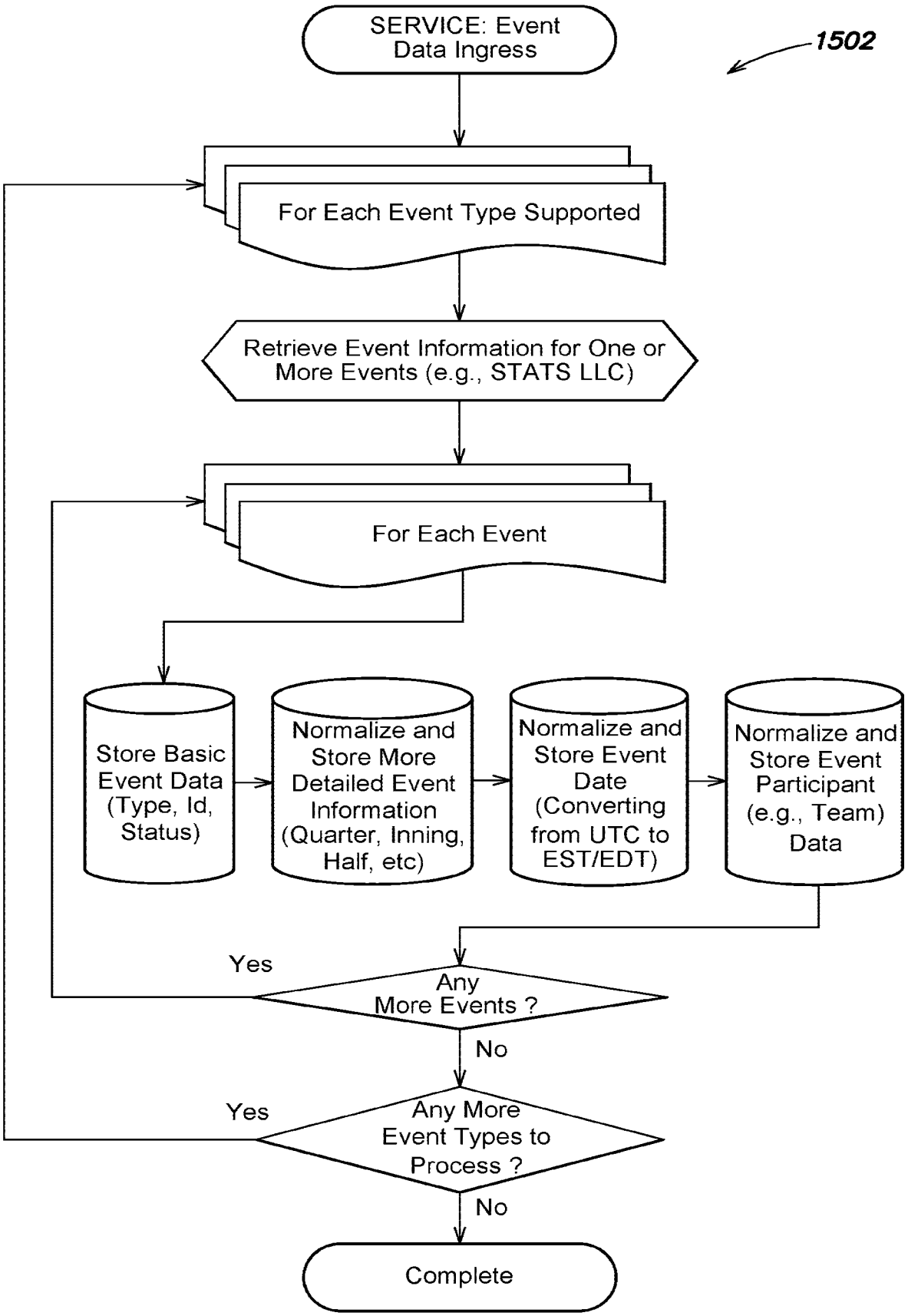

SERVICE: Event Data Ingress
1502
For Each Event Type Supported
Retrieve Event Information for One or More Events (e.g., STATS LLC)
For Each Event
Store Basic Event Data (Type, Id, Status)
Normalize and Store More Detailed Event Information (Quarter, Inning, Half, etc)
Normalize and Store Event Date (Converting from UTC to EST/EDT)
Normalize and Store Event Participant (e.g., Team) Data
Yes
Any More Events ?
No
Yes
Any More Event Types to Process ?
No
Complete

FIG. 15

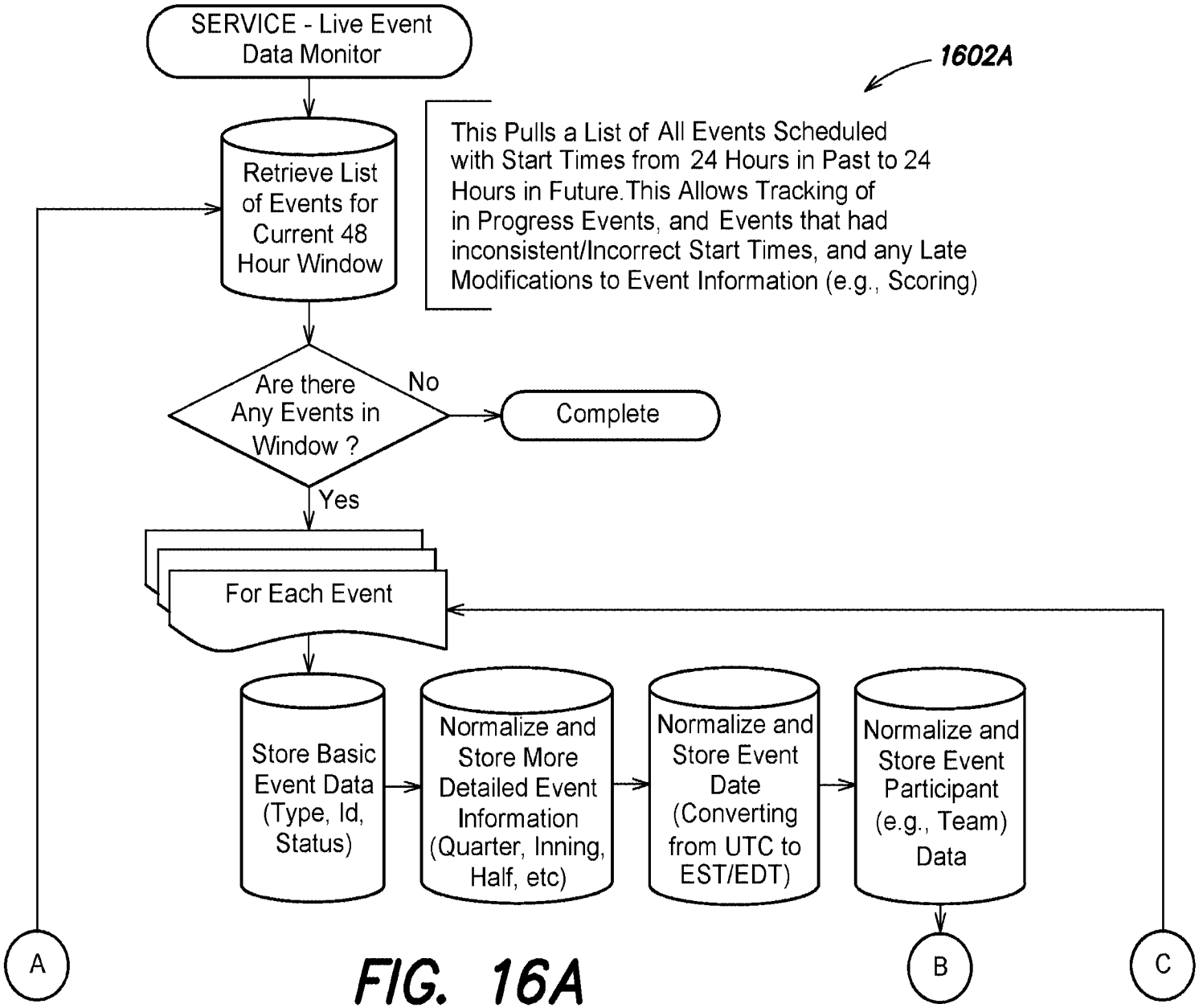


FIG. 16A

FIG. 16A

FIG. 16B

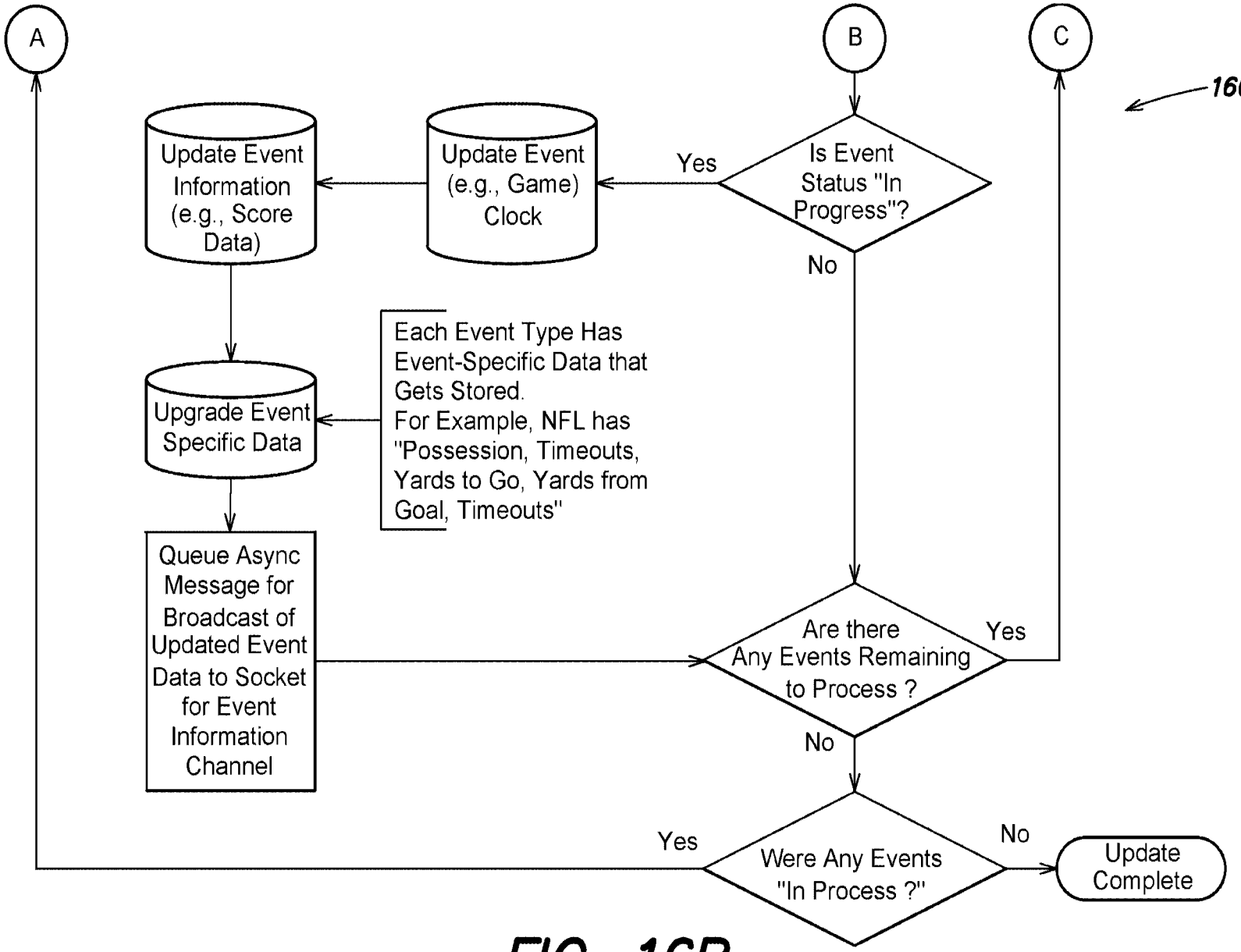

A
B
C
1602B
Update Event Information (e.g., Score Data)
Update Event (e.g., Game) Clock
Yes
Is Event Status "In Progress"?
No
Each Event Type Has Event-Specific Data that Gets Stored.
For Example, NFL has "Possession, Timeouts, Yards to Go, Yards from Goal, Timeouts"
Upgrade Event Specific Data
Queue Async Message for Broadcast of Updated Event Data to Socket for Event Information Channel
Are there Any Events Remaining to Process ?
Yes
No
Yes
Were Any Events "In Process ?"
No
Update Complete

FIG. 16B

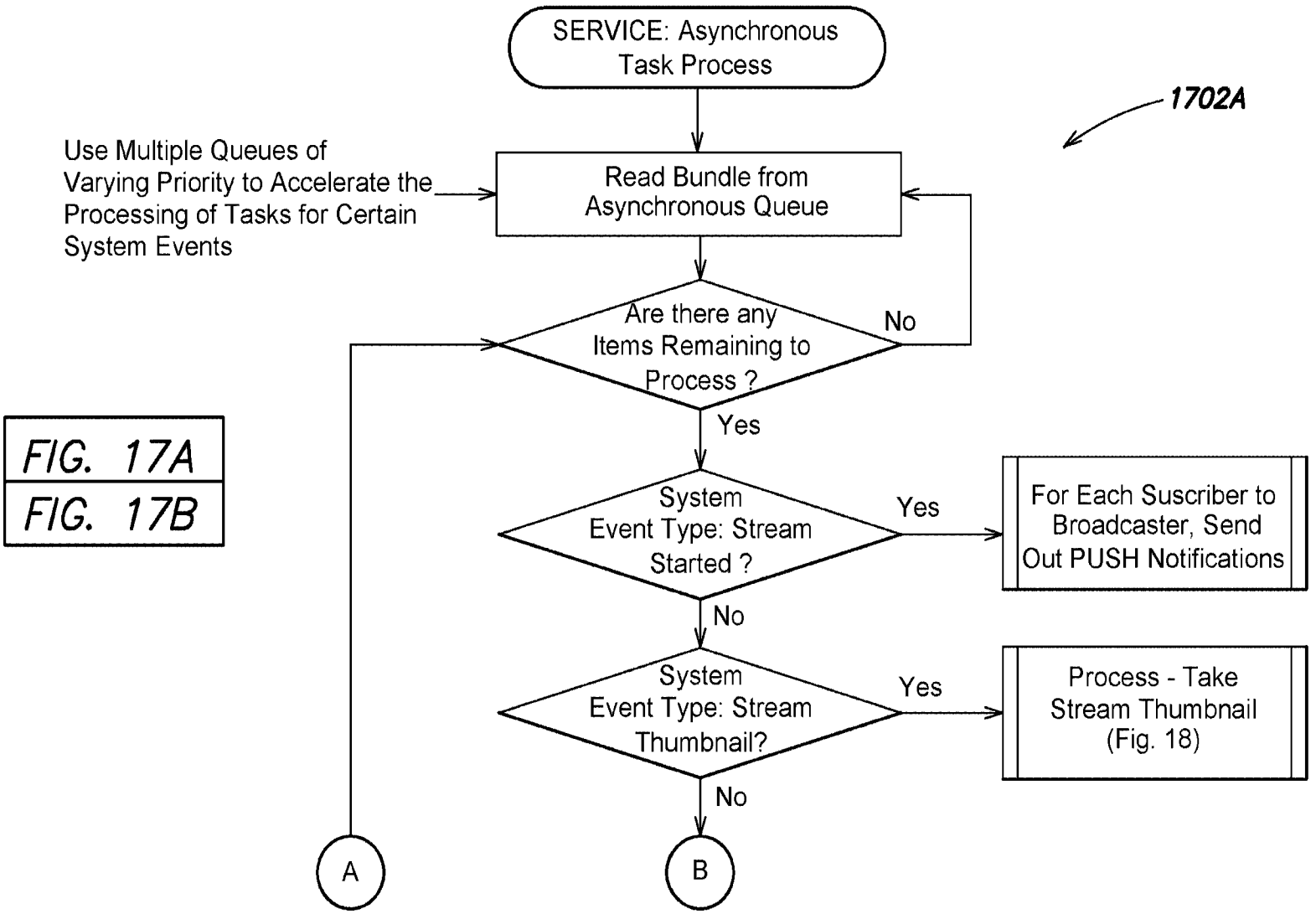


FIG. 17A
FIG. 17B

FIG. 17A

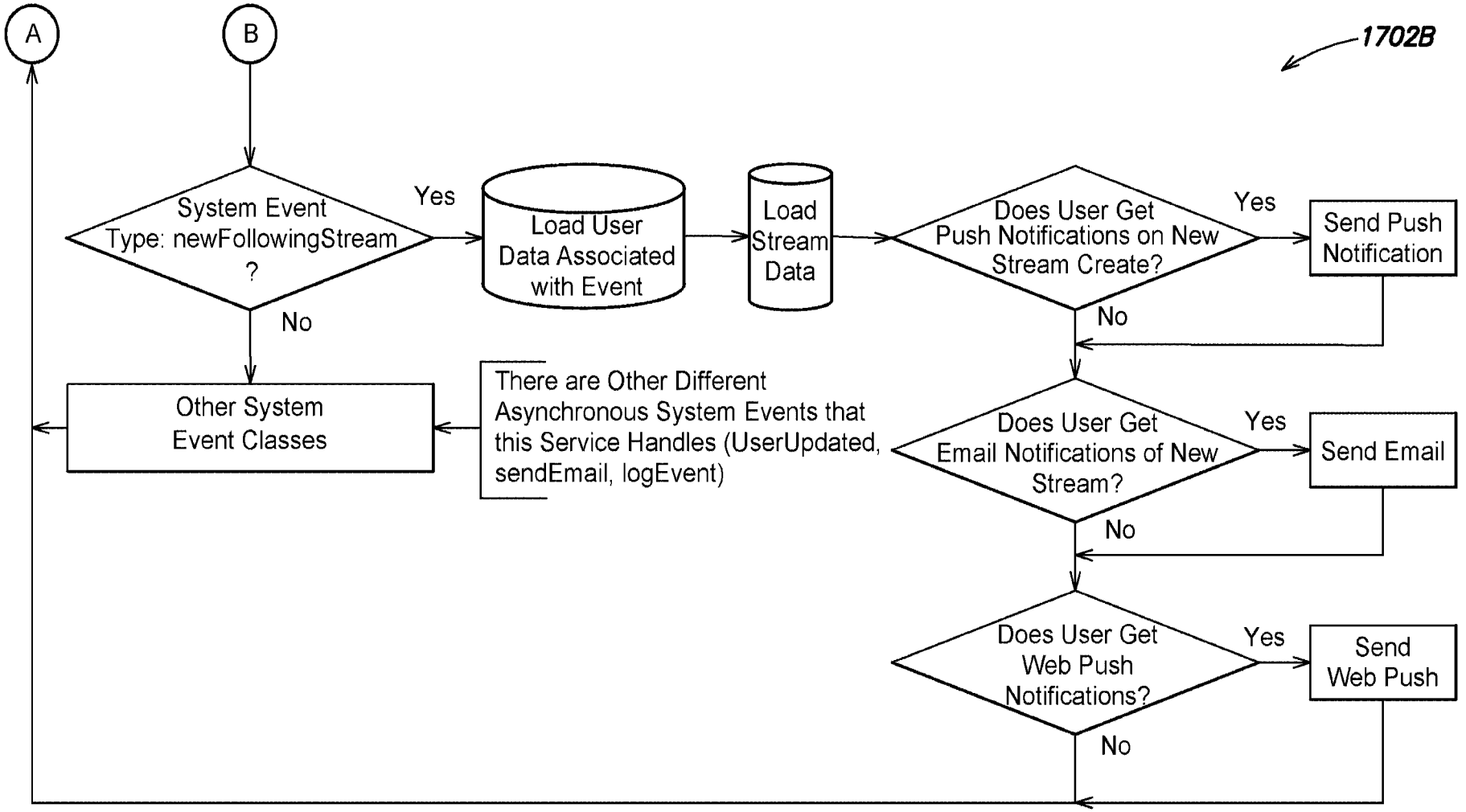

A
B
1702B
System Event Type: newFollowingStream ?
Yes
No
Load User Data Associated with Event
Load Stream Data
Does User Get Push Notifications on New Stream Create?
Yes
Send Push Notification
No
Other System Event Classes
There are Other Different Asynchronous System Events that this Service Handles (UserUpdated, sendEmail, logEvent)
Does User Get Email Notifications of New Stream?
Yes
Send Email
No
Does User Get Web Push Notifications?
Yes
Send Web Push
No

FIG. 17B

FIG. 18A
FIG. 18B

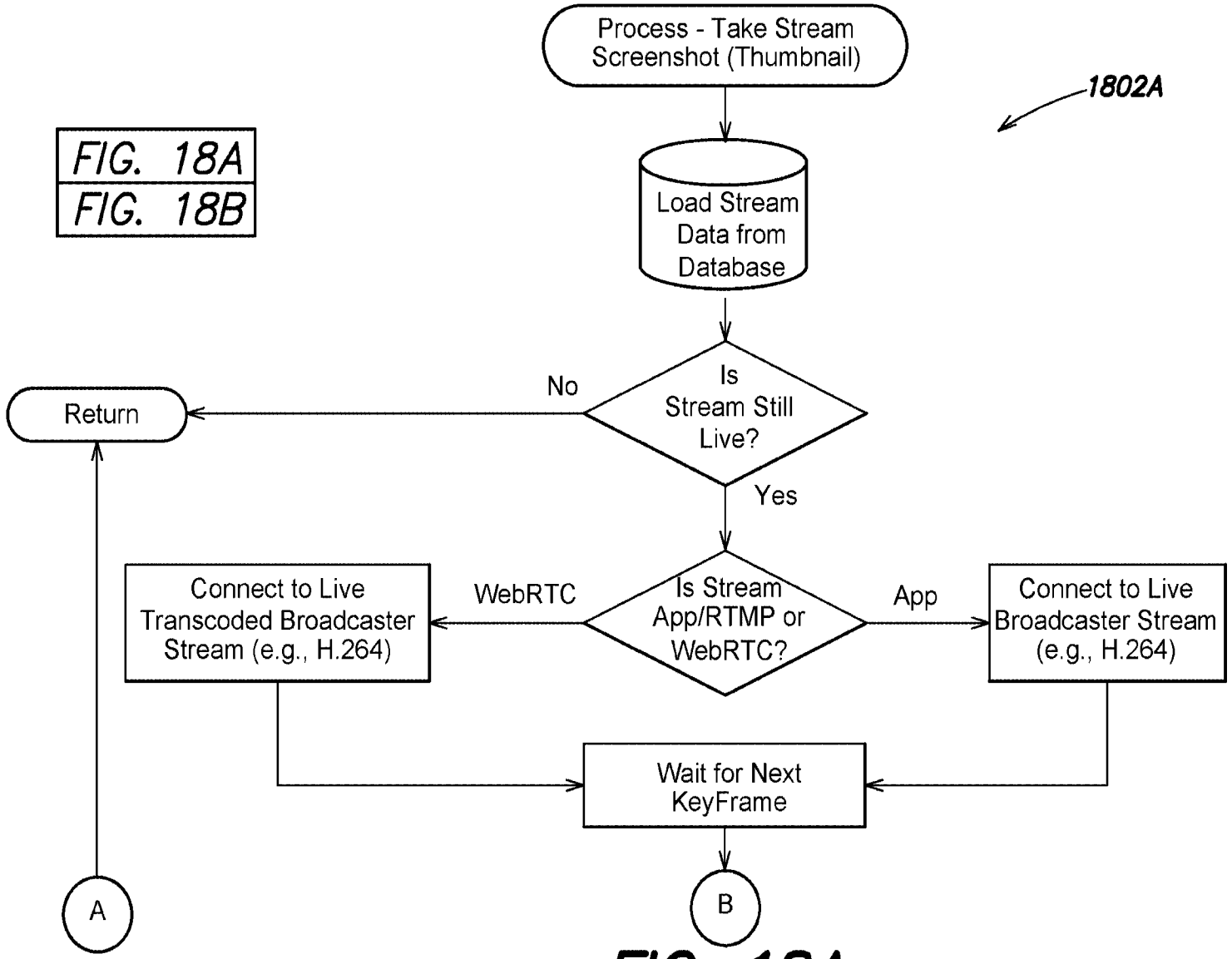


FIG. 18A

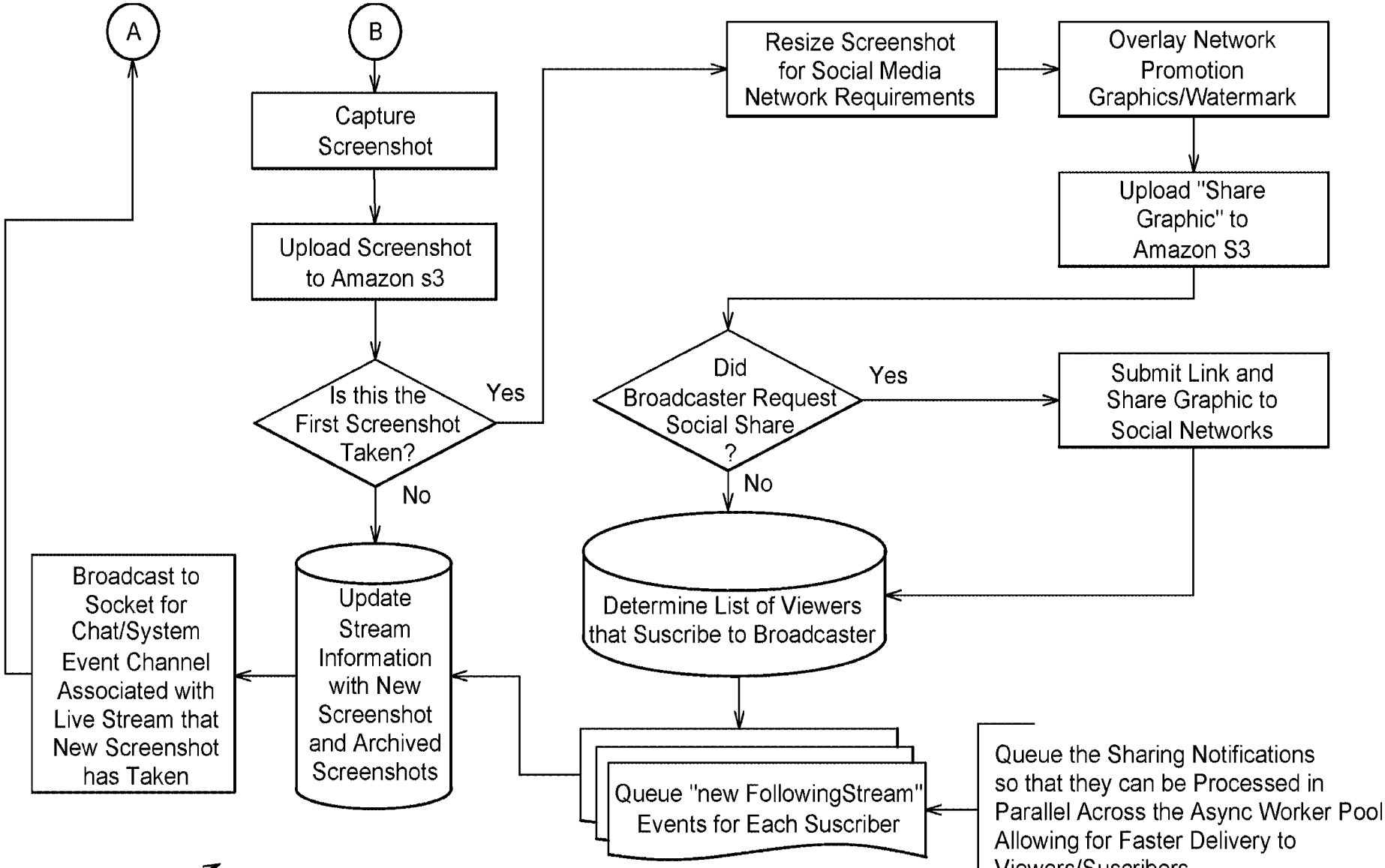

A
B
Capture Screenshot
Upload Screenshot to Amazon s3
Is this the First Screenshot Taken?
Yes
No
Resize Screenshot for Social Media Network Requirements
Overlay Network Promotion Graphics/Watermark
Upload "Share Graphic" to Amazon S3
Did Broadcaster Request Social Share ?
Yes
No
Submit Link and Share Graphic to Social Networks
Determine List of Viewers that Suscribe to Broadcaster
Update Stream Information with New Screenshot and Archived Screenshots
Broadcast to Socket for Chat/System Event Channel Associated with Live Stream that New Screenshot has Taken
Queue "new FollowingStream" Events for Each Suscriber
Queue the Sharing Notifications so that they can be Processed in Parallel Across the Async Worker Pool Allowing for Faster Delivery to Viewers/Suscribers
1802B

FIG. 18B

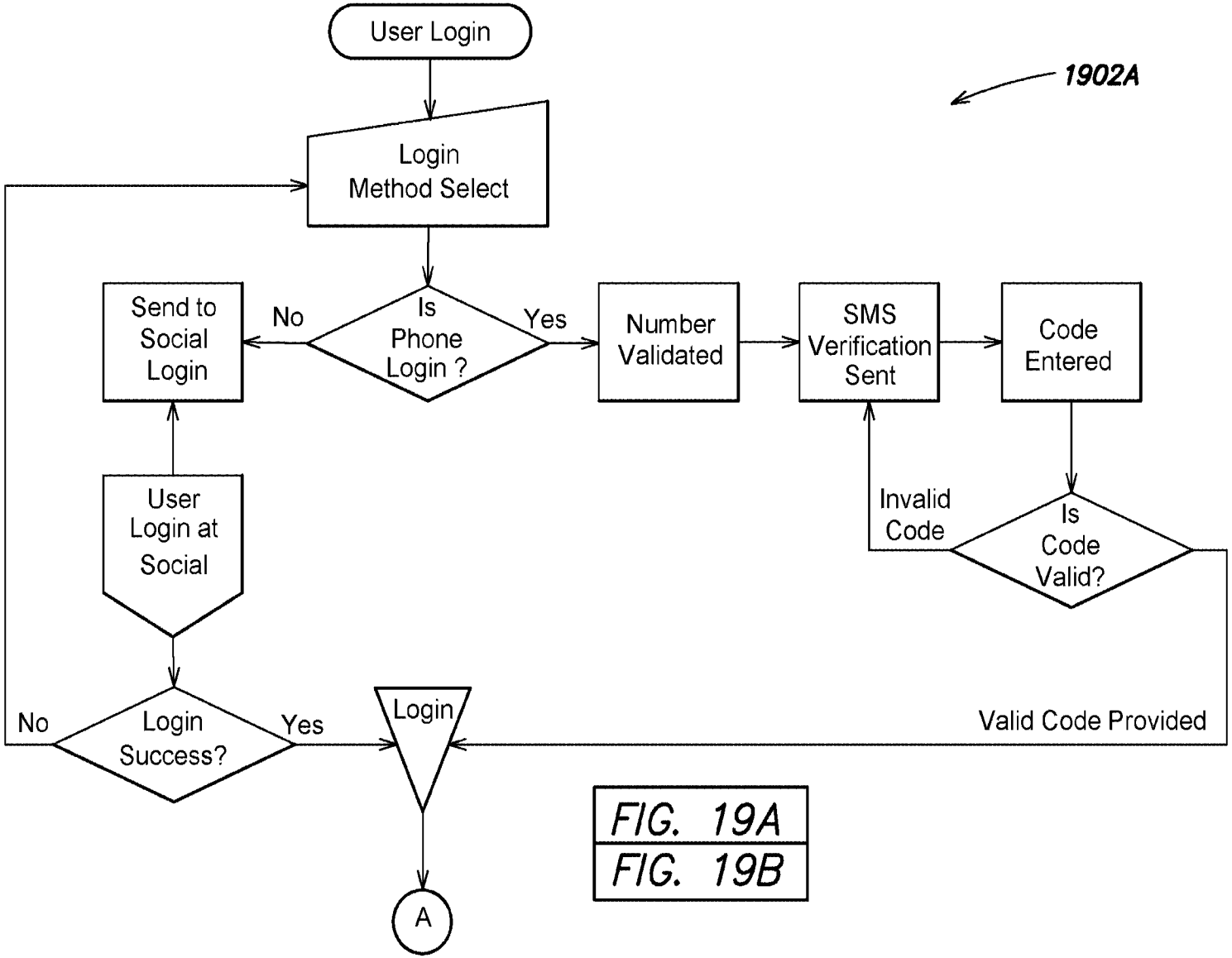


FIG. 19A
FIG. 19B

FIG. 19A

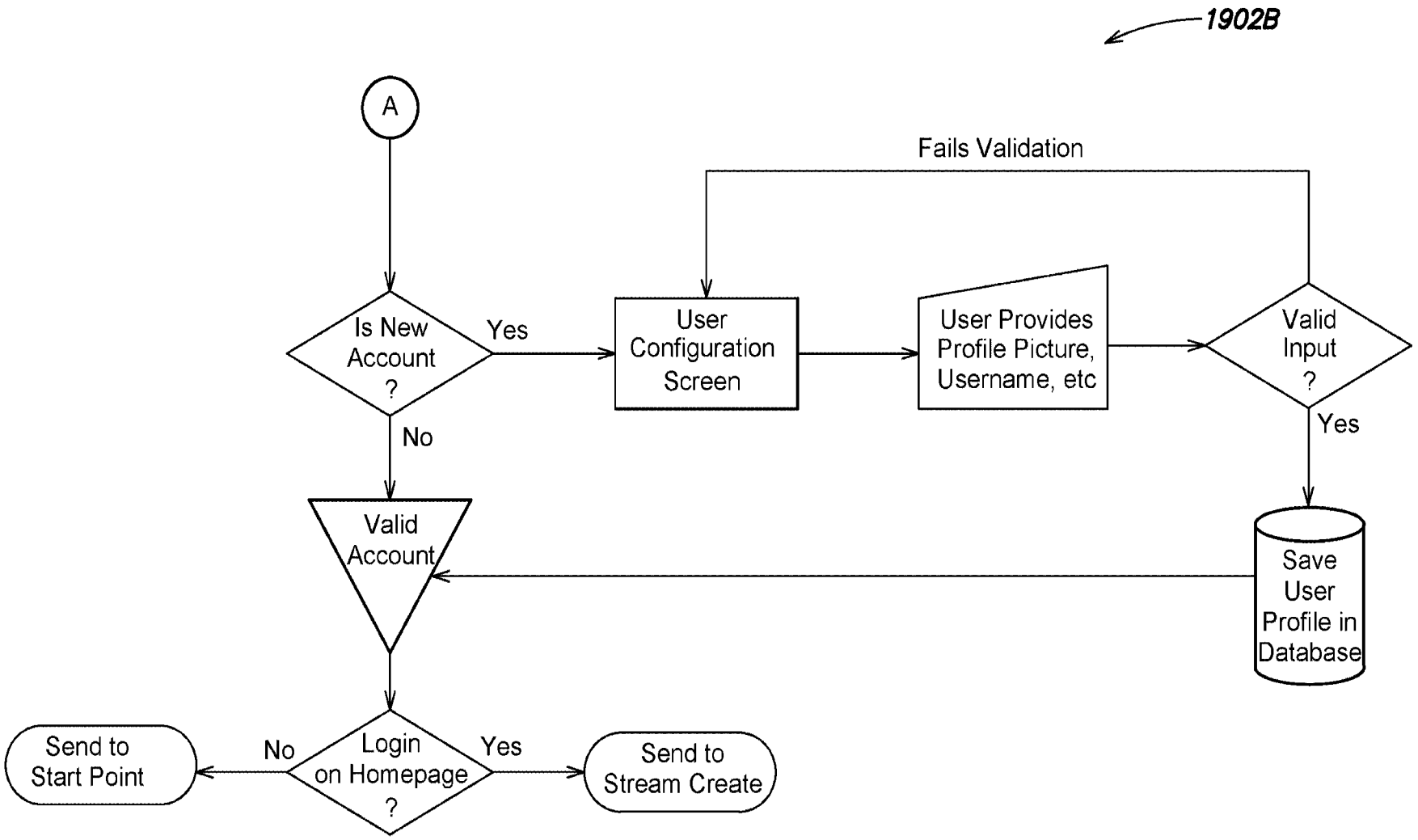

1902B
A
Fails Validation
Is New Account ?
Yes
User Configuration Screen
User Provides Profile Picture, Username, etc
Valid Input ?
Yes
No
Valid Account
Save User Profile in Database
Send to Start Point
No
Login on Homepage ?
Yes
Send to Stream Create

FIG. 19B

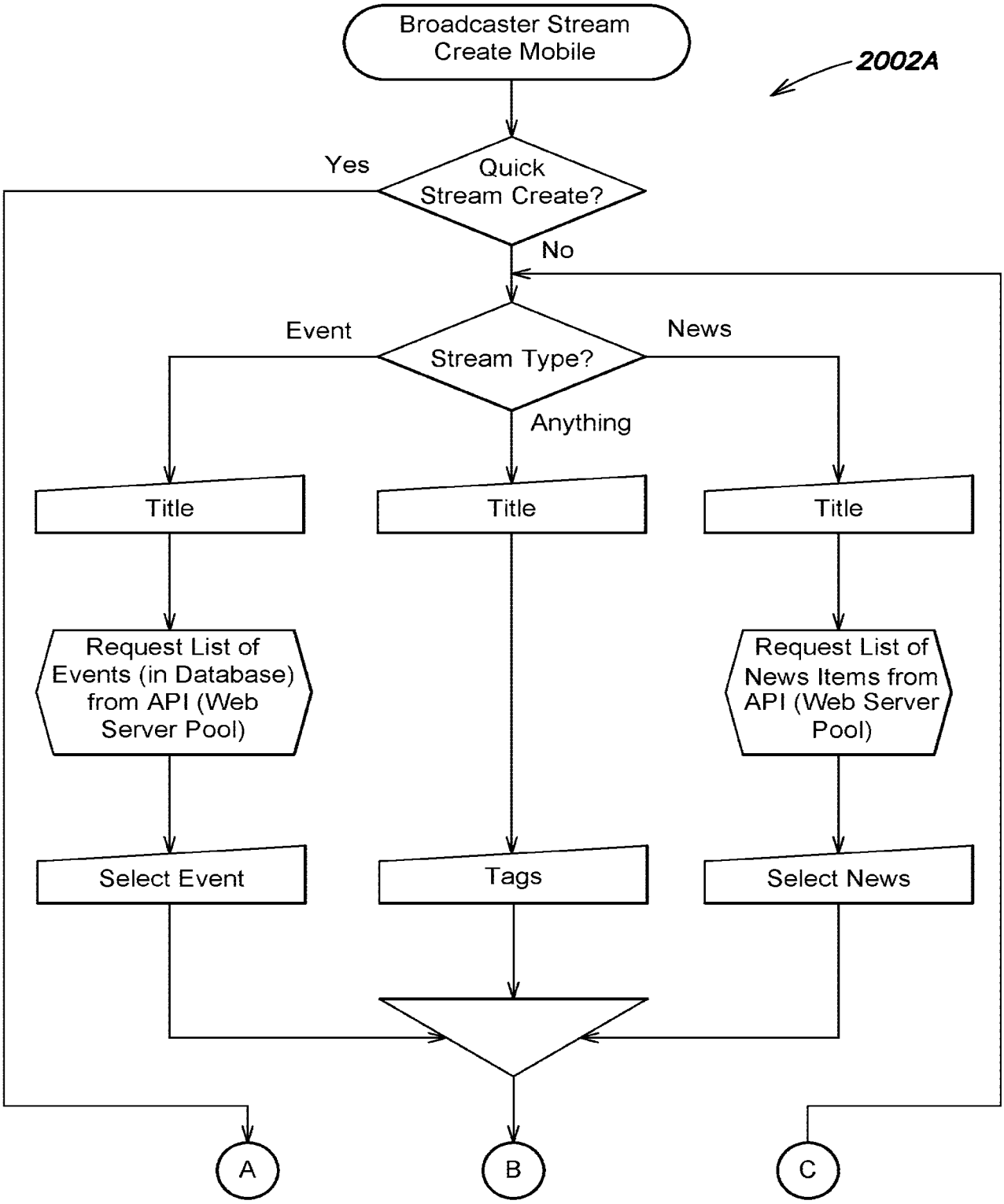


FIG. 20A
FIG. 20B

FIG. 20A

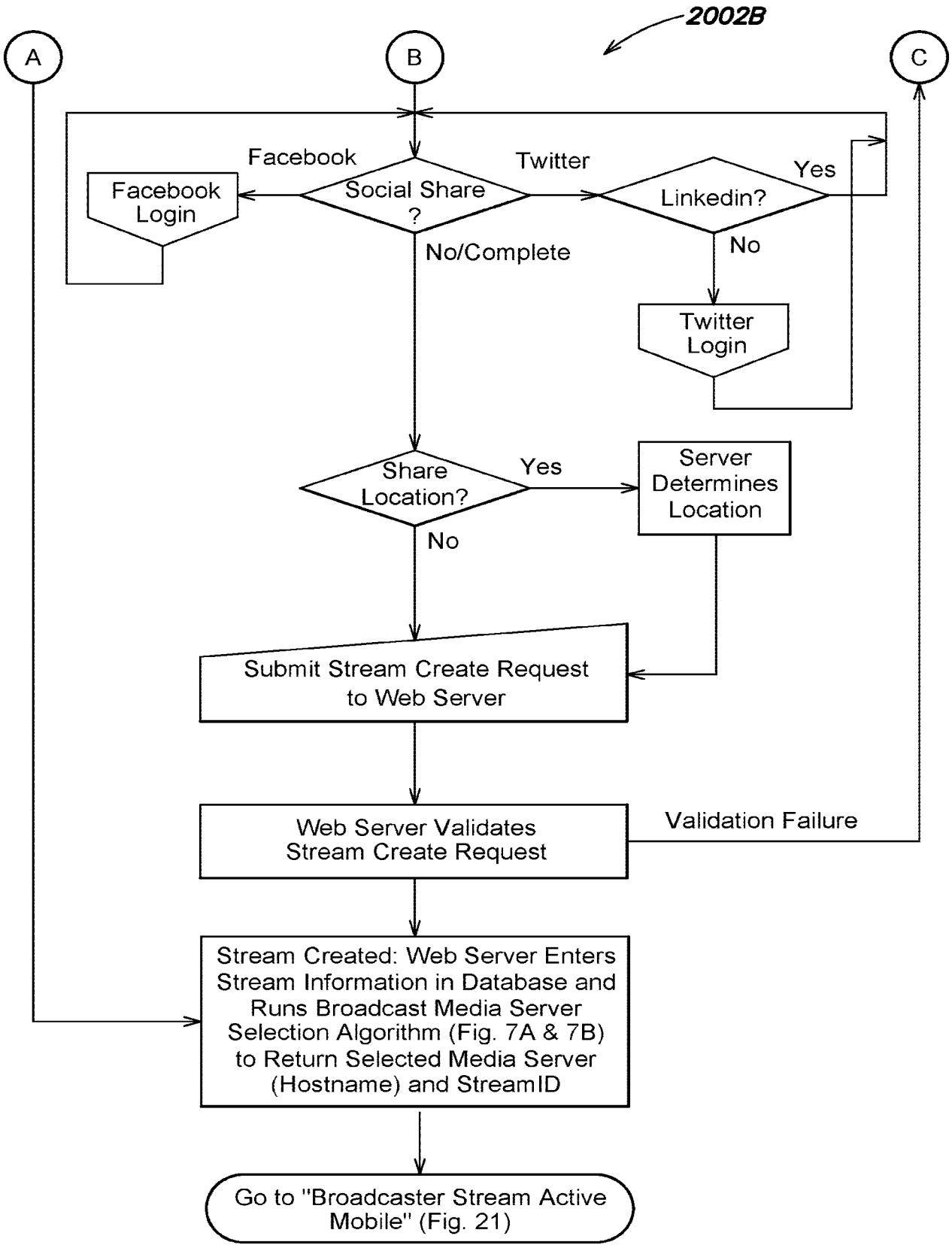

2002B
A
B
C
Facebook
Twitter
Facebook Login
Social Share ?
Linkedin?
Yes
No
No/Complete
Twitter Login
Share Location?
Yes
No
Server Determines Location
Submit Stream Create Request to Web Server
Web Server Validates Stream Create Request
Validation Failure
Stream Created: Web Server Enters Stream Information in Database and Runs Broadcast Media Server Selection Algorithm (Fig. 7A & 7B) to Return Selected Media Server (Hostname) and StreamID
Go to "Broadcaster Stream Active Mobile" (Fig. 21)

FIG. 20B

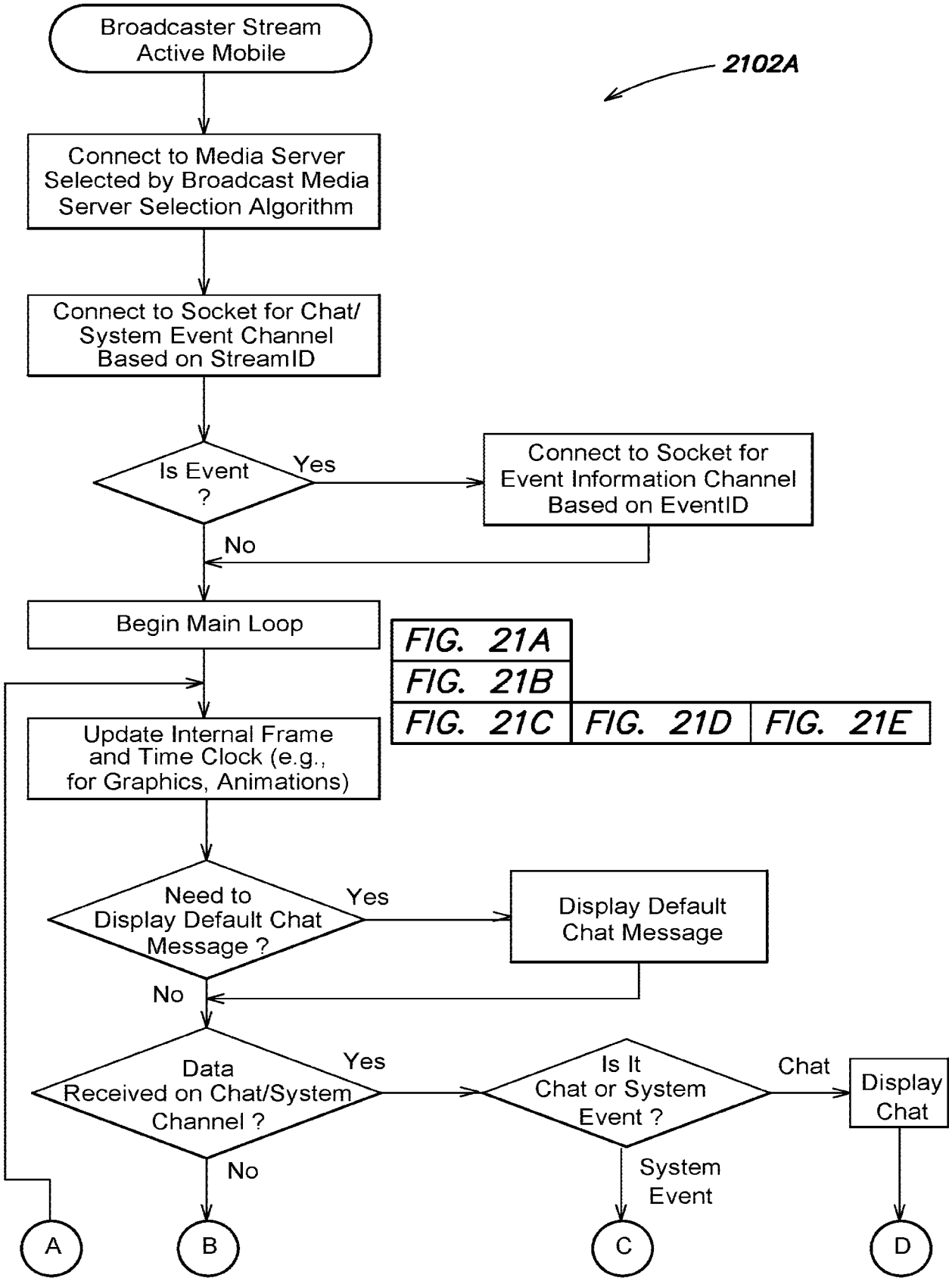

Broadcaster Stream Active Mobile
2102A
Connect to Media Server Selected by Broadcast Media Server Selection Algorithm
Connect to Socket for Chat/ System Event Channel Based on StreamID
Is Event ?
Yes
Connect to Socket for Event Information Channel Based on EventID
No
Begin Main Loop
FIG. 21A
FIG. 21B
FIG. 21C
FIG. 21D
FIG. 21E
Update Internal Frame and Time Clock (e.g., for Graphics, Animations)
Need to Display Default Chat Message ?
Yes
Display Default Chat Message
No
Data Received on Chat/System Channel ?
Yes
Is It Chat or System Event ?
Chat
Display Chat
No
System Event
A
B
C
D

FIG. 21A

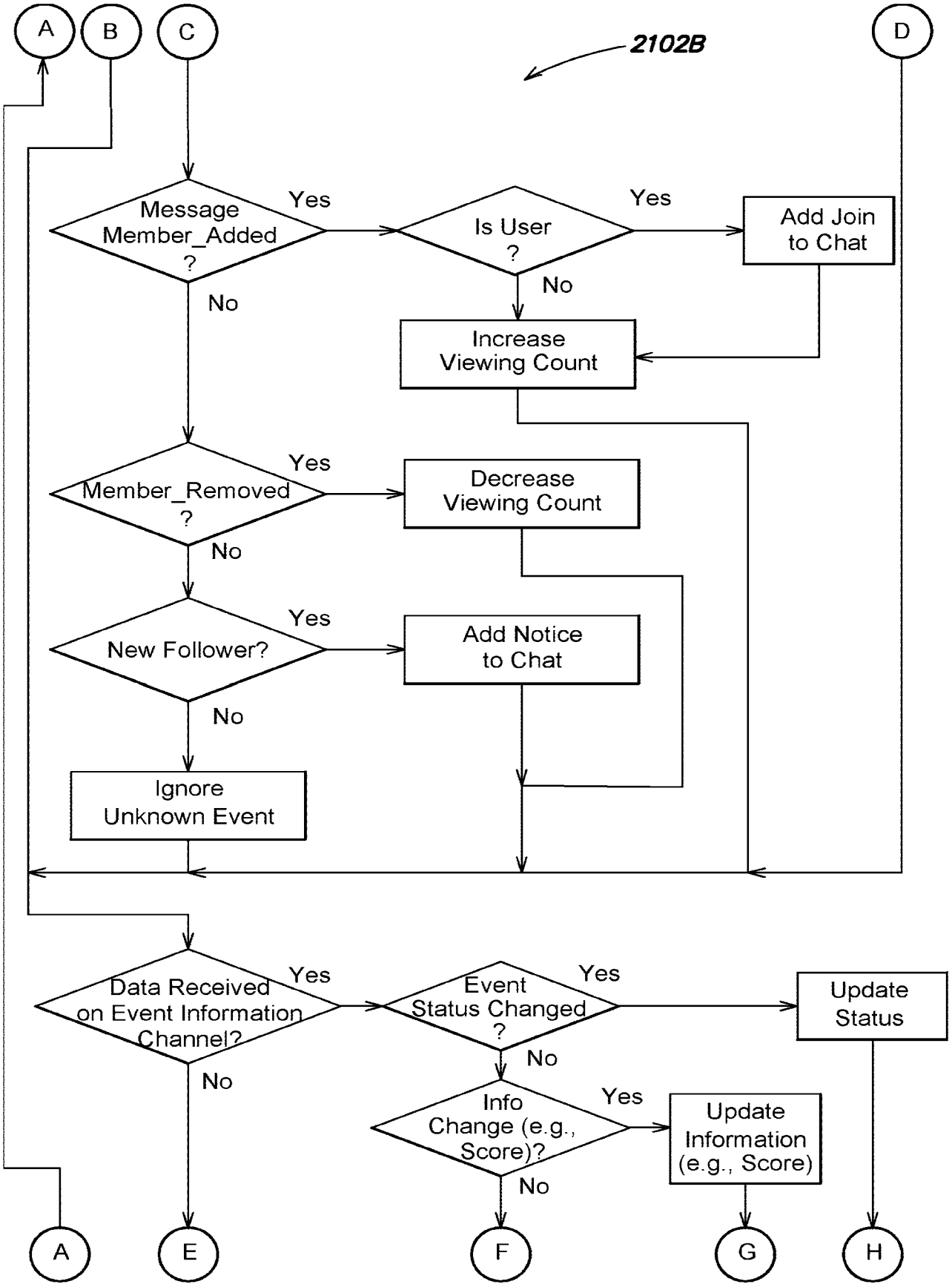

A
B
C
D
2102B
Message Member_Added ?
Yes
Is User ?
Yes
Add Join to Chat
No
Increase Viewing Count
Member_Removed ?
Yes
Decrease Viewing Count
No
New Follower?
Yes
Add Notice to Chat
No
Ignore Unknown Event
Data Received on Event Information Channel?
Yes
Event Status Changed ?
Yes
Update Status
No
Info Change (e.g., Score)?
Yes
Update Information (e.g., Score)
No
A
E
F
G
H

FIG. 21B

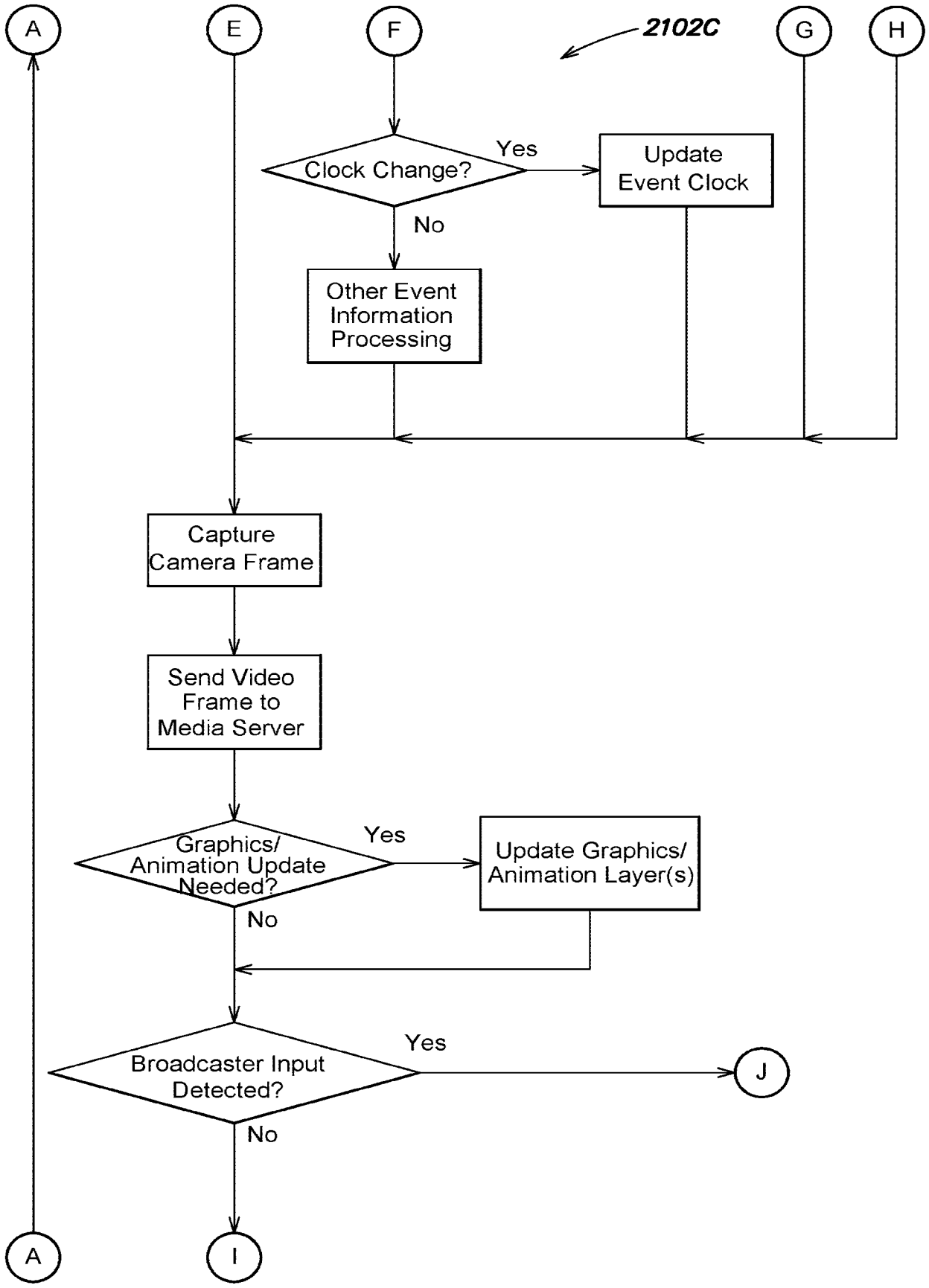

A
E
F
2102C
G
H
Clock Change?
Yes
Update Event Clock
No
Other Event Information Processing
Capture Camera Frame
Send Video Frame to Media Server
Graphics/ Animation Update Needed?
Yes
Update Graphics/ Animation Layer(s)
No
Broadcaster Input Detected?
Yes
J
No
A
I

FIG. 21C

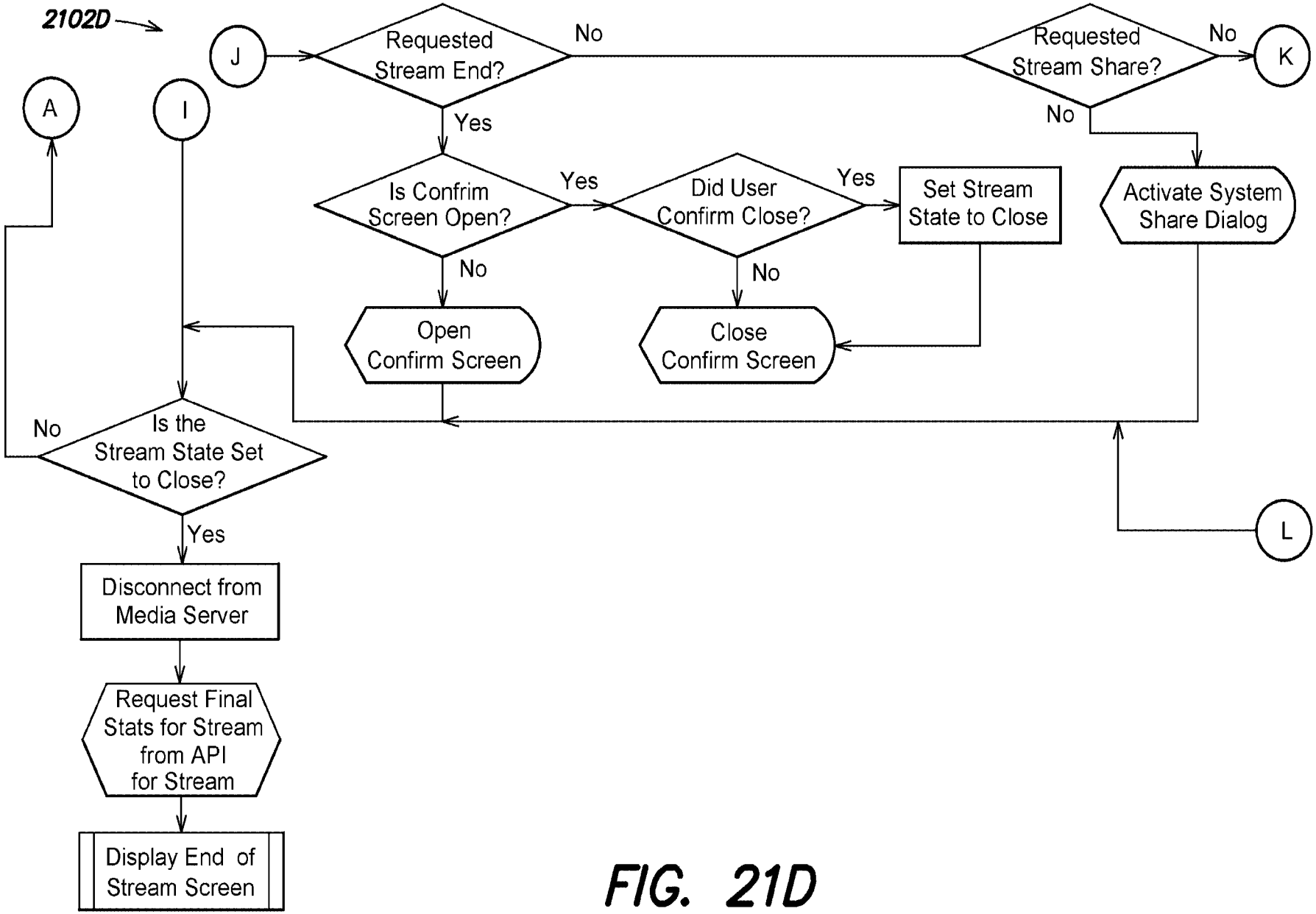

2102D
J
Requested Stream End?
No
Requested Stream Share?
No
K
Yes
No
A
I
Is Confrim Screen Open?
Yes
Did User Confirm Close?
Yes
Set Stream State to Close
Activate System Share Dialog
No
No
Open Confirm Screen
Close Confirm Screen
No
Is the Stream State Set to Close?
Yes
L
Disconnect from Media Server
Request Final Stats for Stream from API for Stream
Display End of Stream Screen

FIG. 21D

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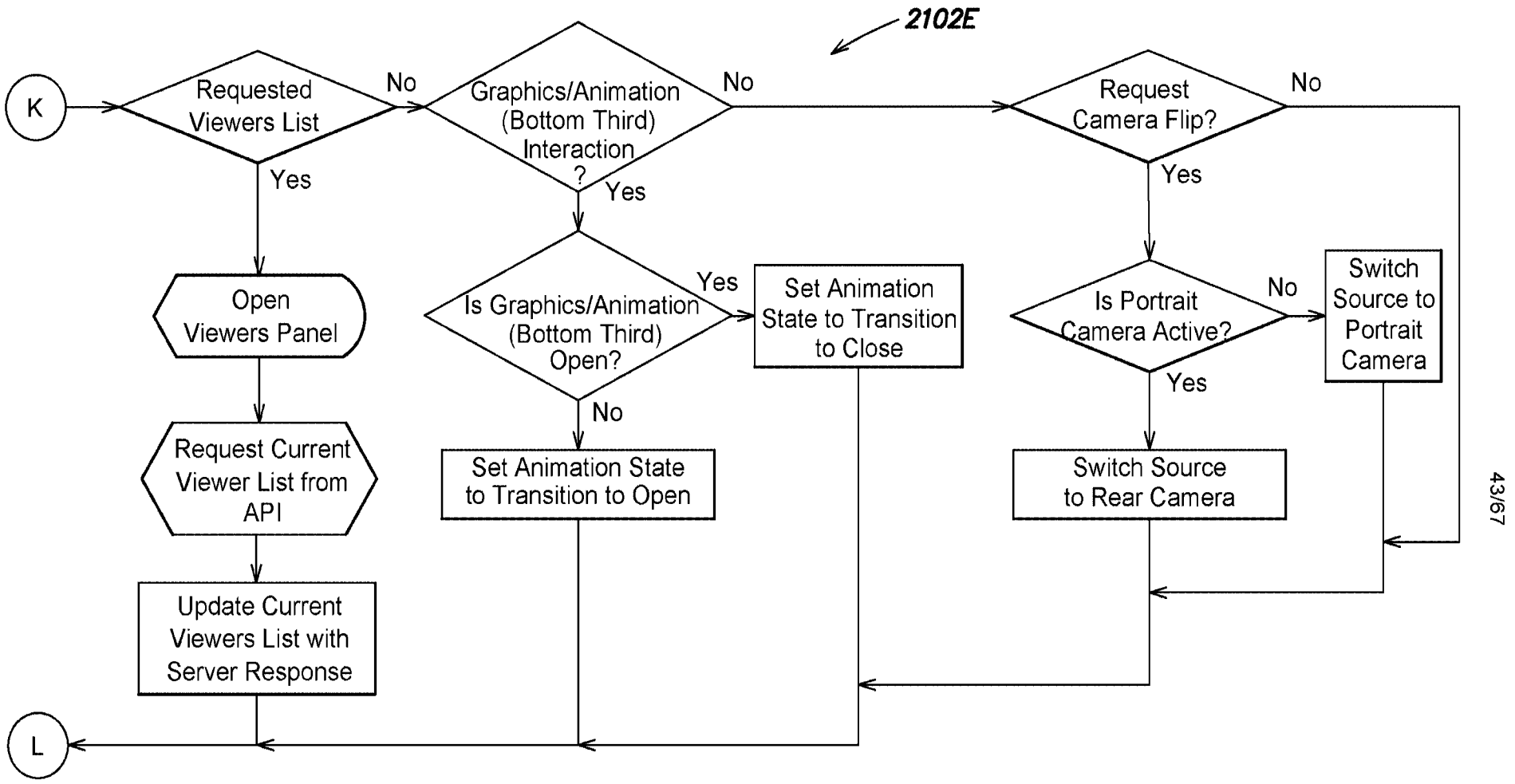

2102E
K
Requested Viewers List
No
Graphics/Animation (Bottom Third) Interaction ?
No
Request Camera Flip?
No
Yes
Yes
Yes
Open Viewers Panel
Is Graphics/Animation (Bottom Third) Open?
Yes
Set Animation State to Transition to Close
Is Portrait Camera Active?
No
Switch Source to Portrait Camera
Yes
No
Request Current Viewer List from API
Set Animation State to Transition to Open
Switch Source to Rear Camera
Update Current Viewers List with Server Response
L
43/67

FIG. 21E

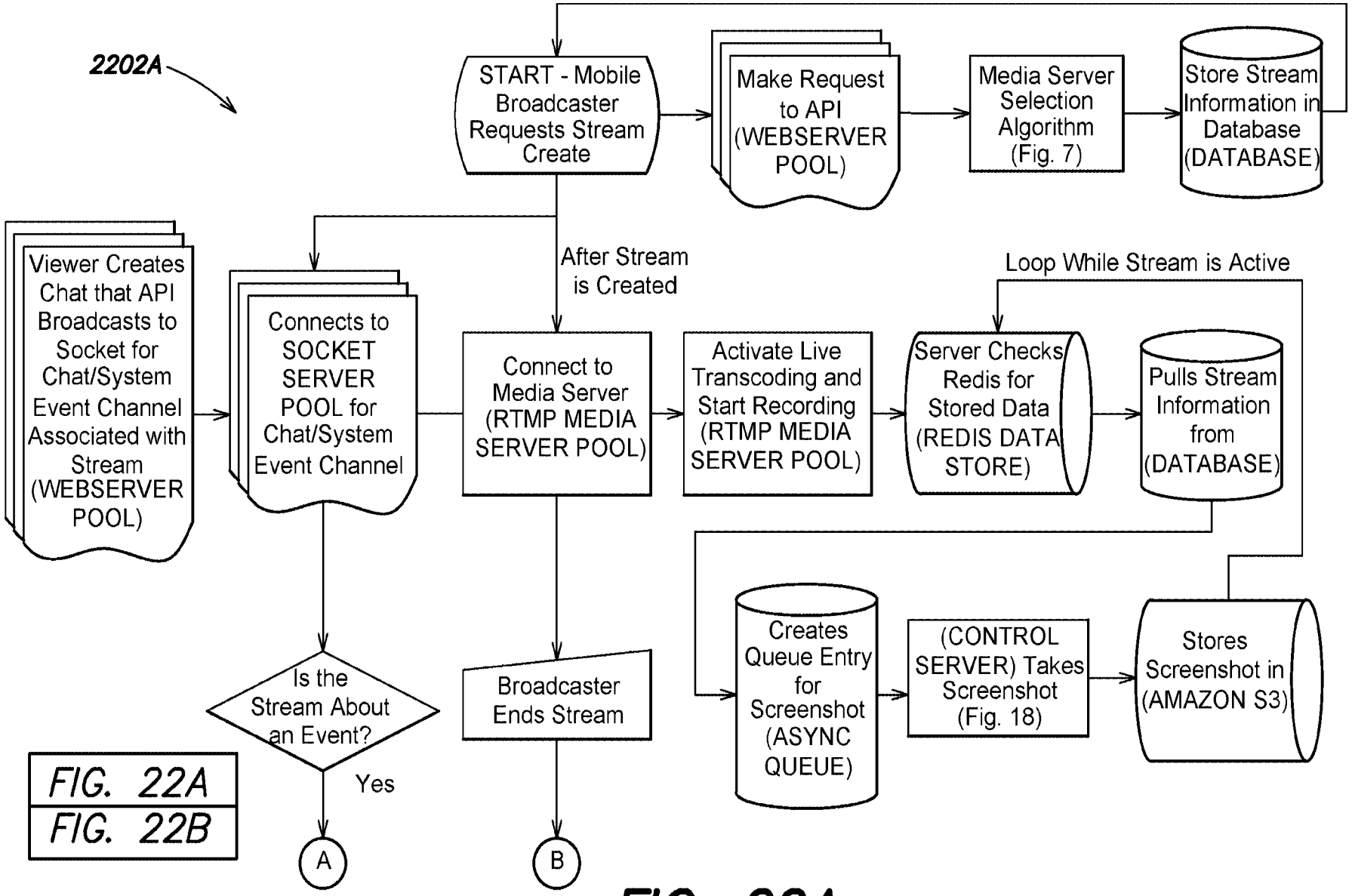


FIG. 22A
FIG. 22B

FIG. 22A

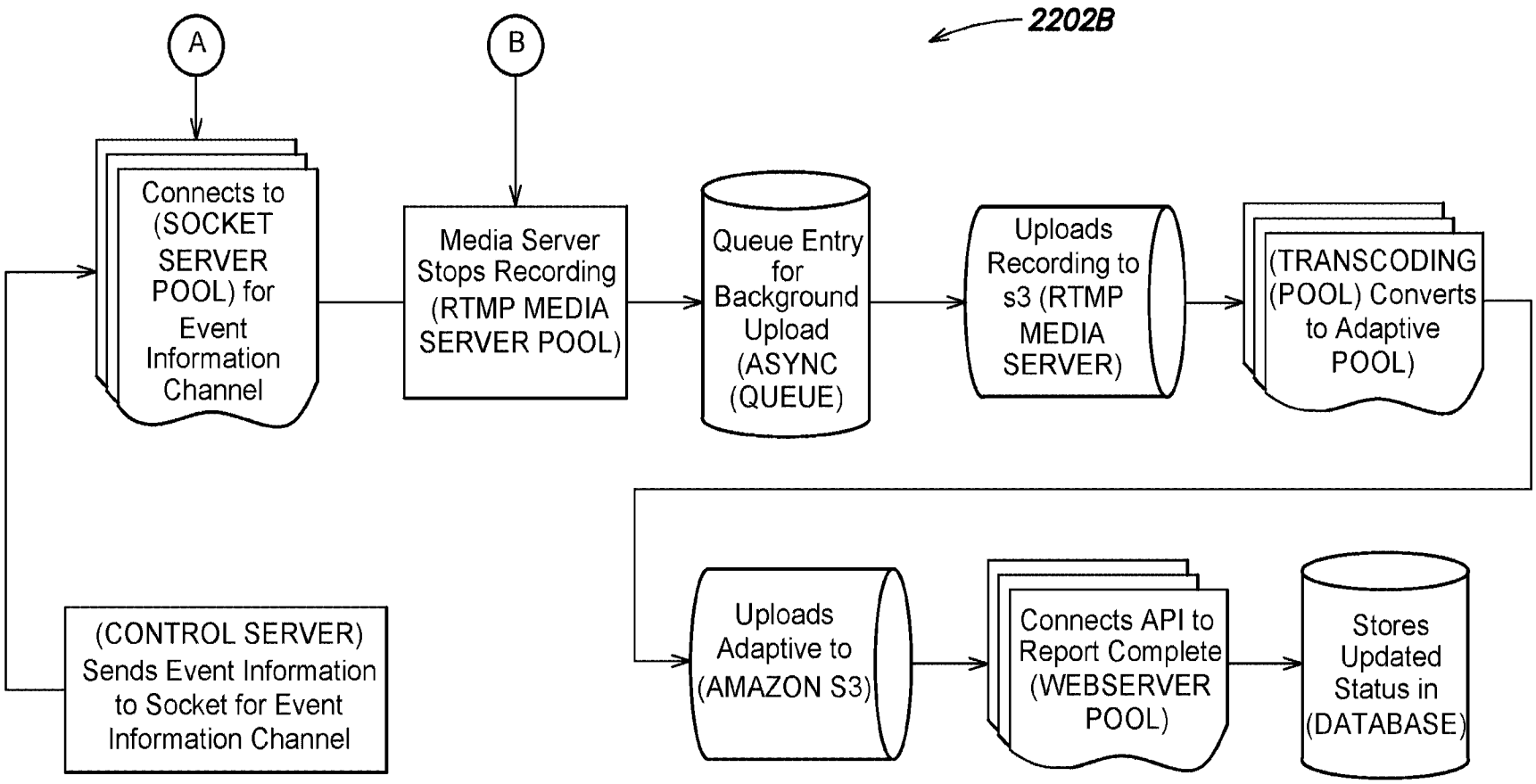

2202B
A
B
Connects to (SOCKET SERVER POOL) for Event Information Channel
Media Server Stops Recording (RTMP MEDIA SERVER POOL)
Queue Entry for Background Upload (ASYNC (QUEUE)
Uploads Recording to s3 (RTMP MEDIA SERVER)
(TRANSCODING (POOL) Converts to Adaptive POOL)
Uploads Adaptive to (AMAZON S3)
Connects API to Report Complete (WEBSERVER POOL)
Stores Updated Status in (DATABASE)
(CONTROL SERVER) Sends Event Information to Socket for Event Information Channel

FIG. 22B

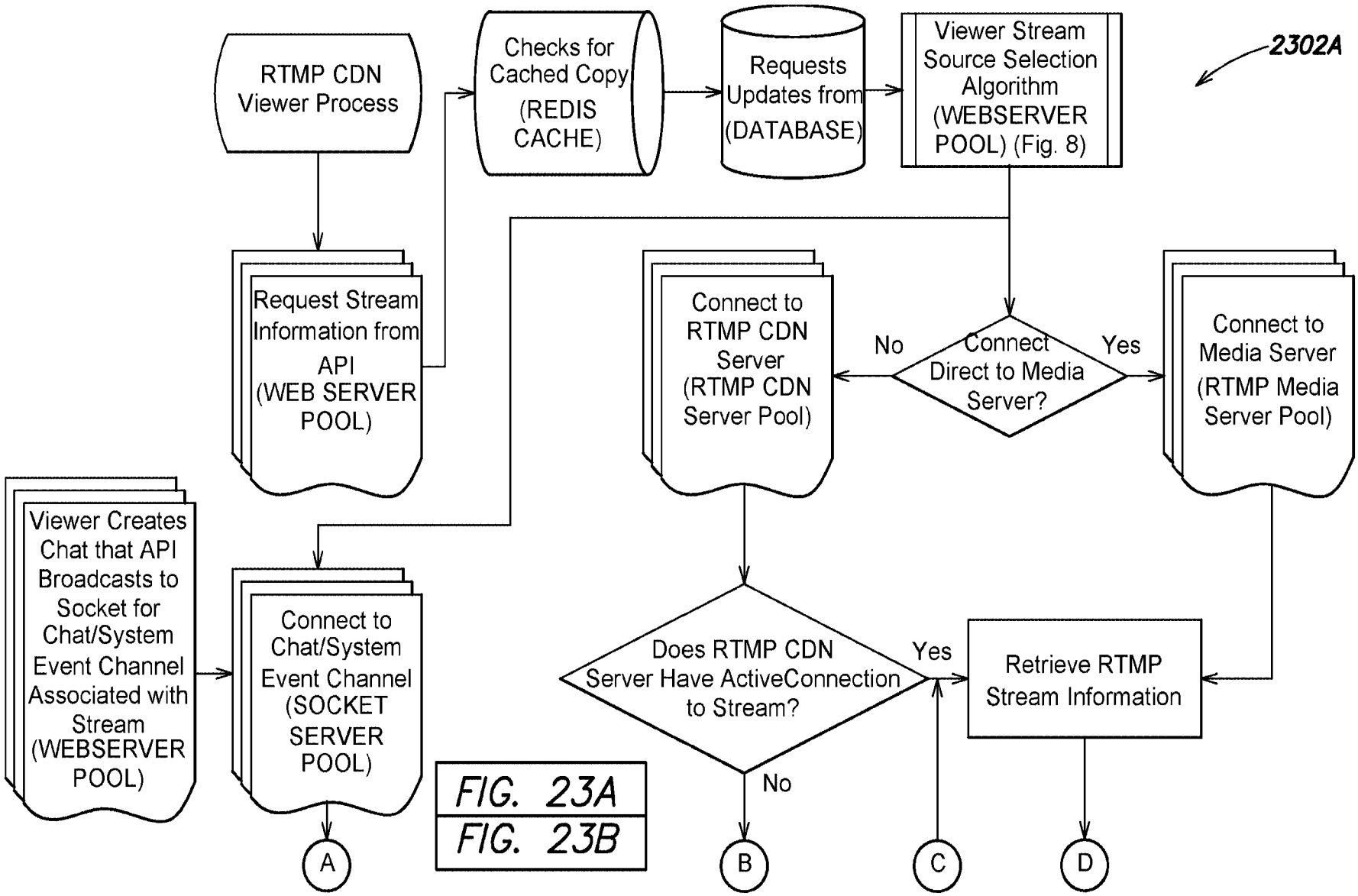


FIG. 23A
FIG. 23B

FIG. 23A

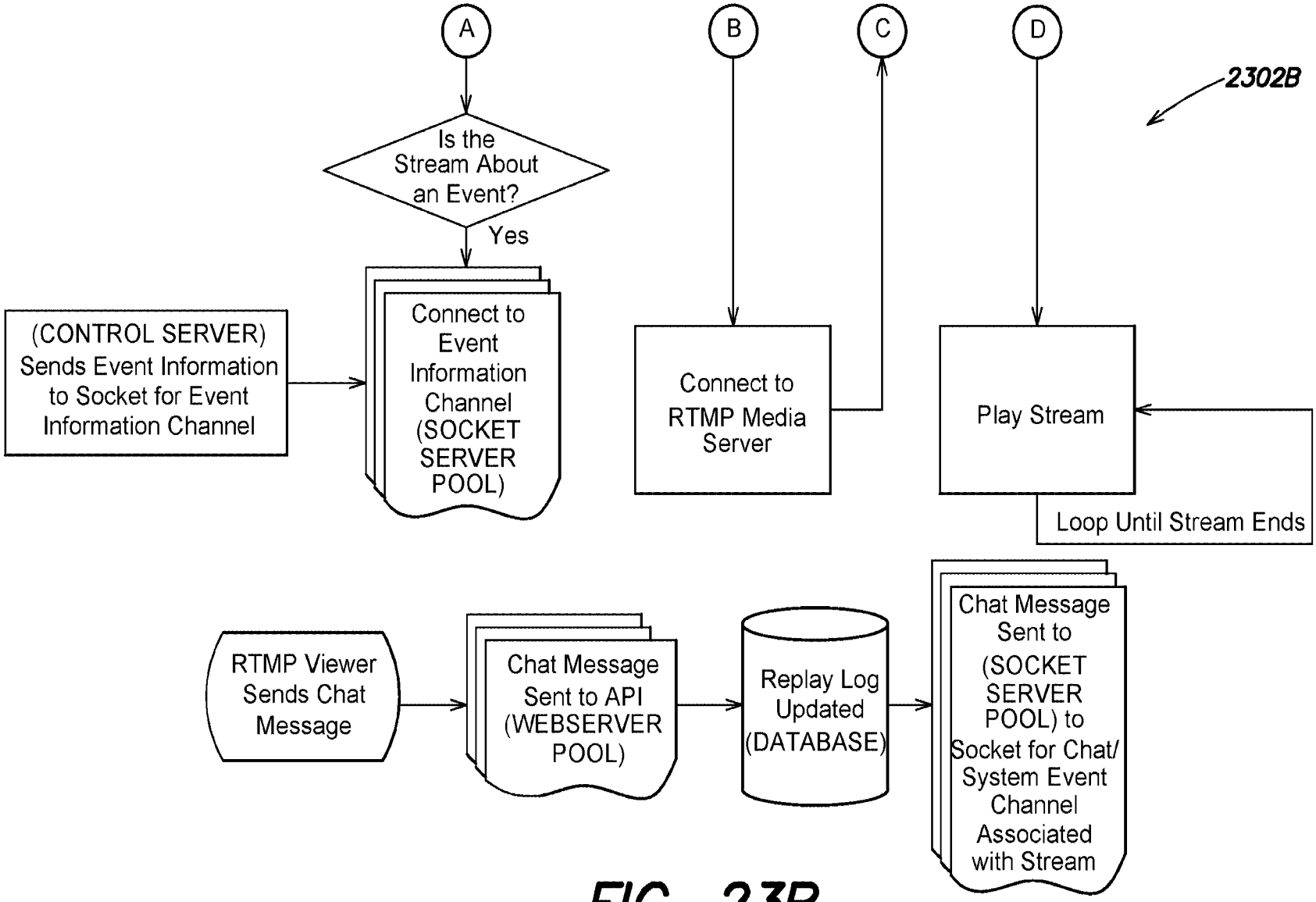

A
B
C
D
2302B
Is the Stream About an Event?
Yes
(CONTROL SERVER) Sends Event Information to Socket for Event Information Channel
Connect to Event Information Channel (SOCKET SERVER POOL)
Connect to RTMP Media Server
Play Stream
Loop Until Stream Ends
RTMP Viewer Sends Chat Message
Chat Message Sent to API (WEBSERVER POOL)
Replay Log Updated (DATABASE)
Chat Message Sent to (SOCKET SERVER POOL) to Socket for Chat/ System Event Channel Associated with Stream

FIG. 23B

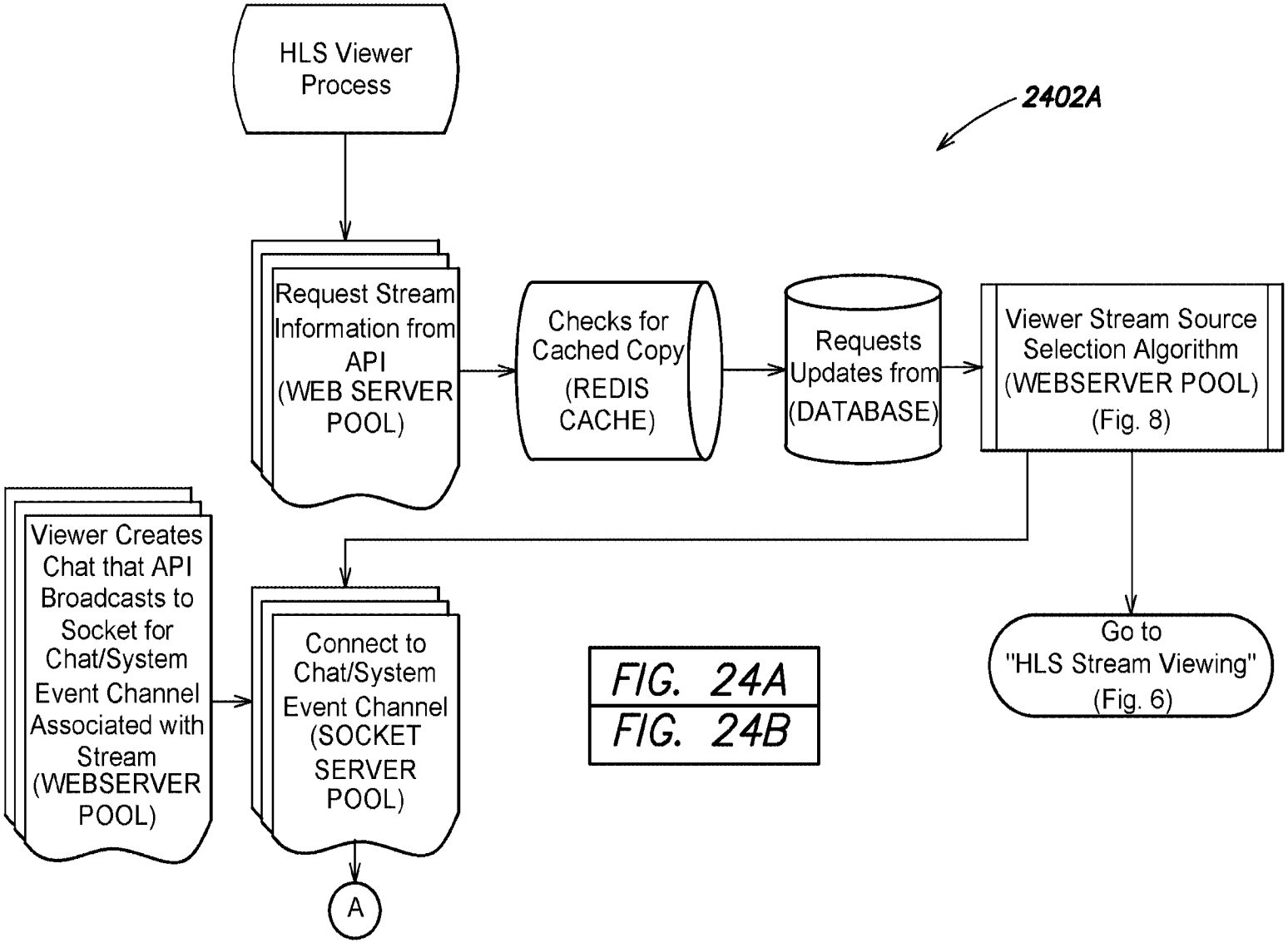


FIG. 24A
FIG. 24B

FIG. 24A

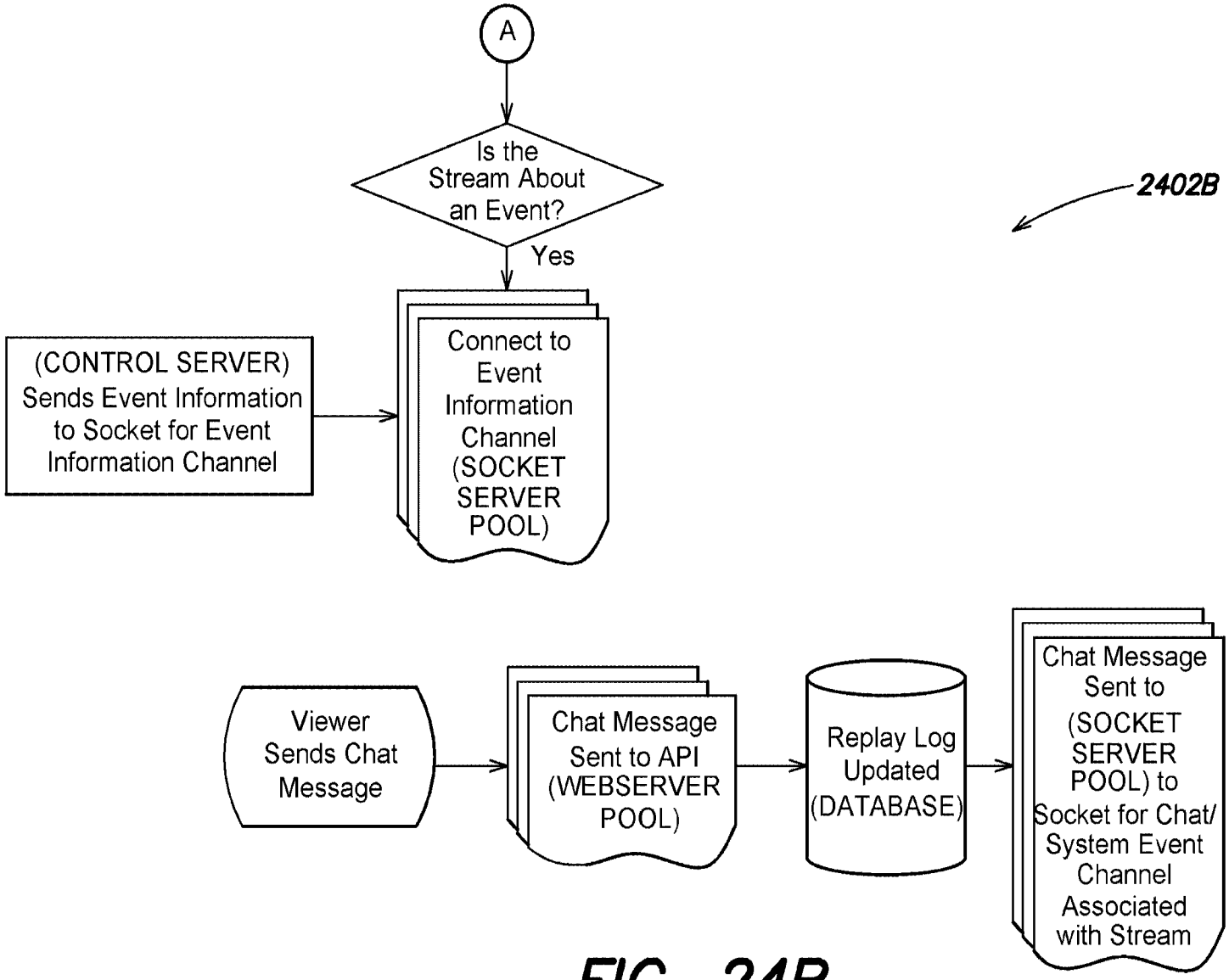

A
Is the Stream About an Event?
Yes
2402B
(CONTROL SERVER) Sends Event Information to Socket for Event Information Channel
Connect to Event Information Channel (SOCKET SERVER POOL)
Viewer Sends Chat Message
Chat Message Sent to API (WEBSERVER POOL)
Replay Log Updated (DATABASE)
Chat Message Sent to (SOCKET SERVER POOL) to Socket for Chat/ System Event Channel Associated with Stream

FIG. 24B

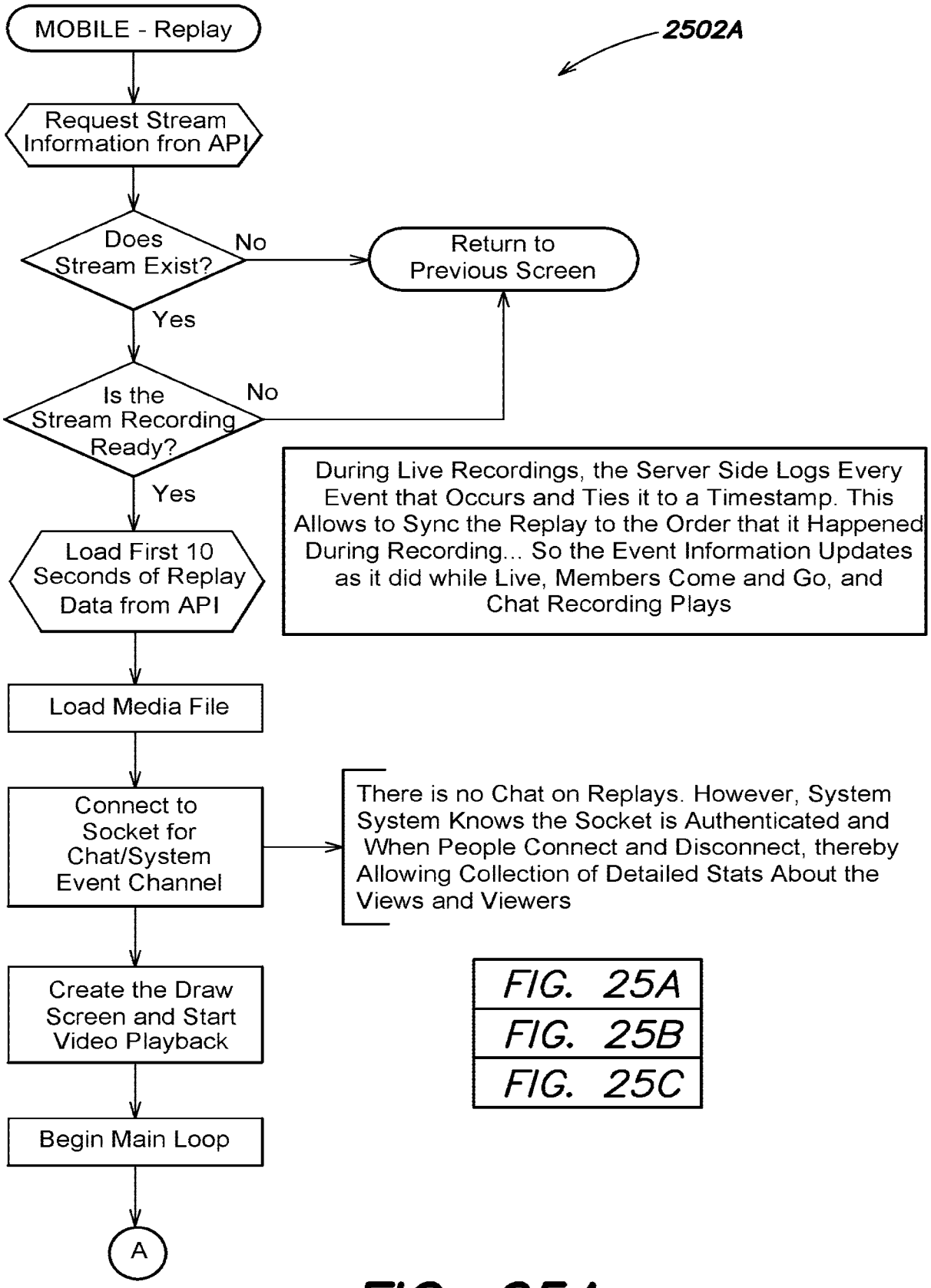


FIG. 25A
FIG. 25B
FIG. 25C

FIG. 25A

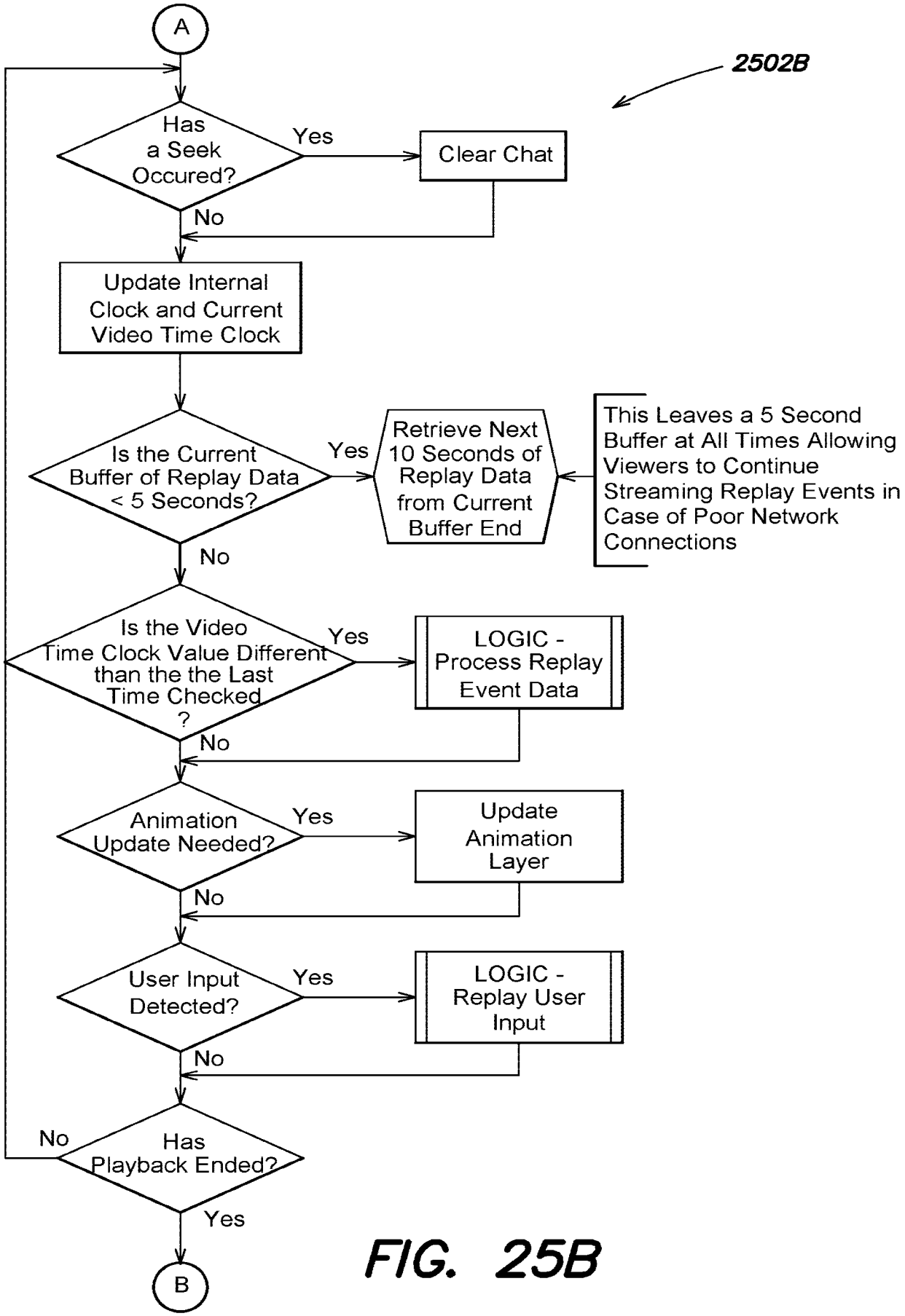

A
2502B
Has a Seek Occured?
Yes
Clear Chat
No
Update Internal Clock and Current Video Time Clock
Is the Current Buffer of Replay Data < 5 Seconds?
Yes
Retrieve Next 10 Seconds of Replay Data from Current Buffer End
This Leaves a 5 Second Buffer at All Times Allowing Viewers to Continue Streaming Replay Events in Case of Poor Network Connections
No
Is the Video Time Clock Value Different than the the Last Time Checked ?
Yes
LOGIC - Process Replay Event Data
No
Animation Update Needed?
Yes
Update Animation Layer
No
User Input Detected?
Yes
LOGIC - Replay User Input
No
Has Playback Ended?
No
Yes
B

FIG. 25B

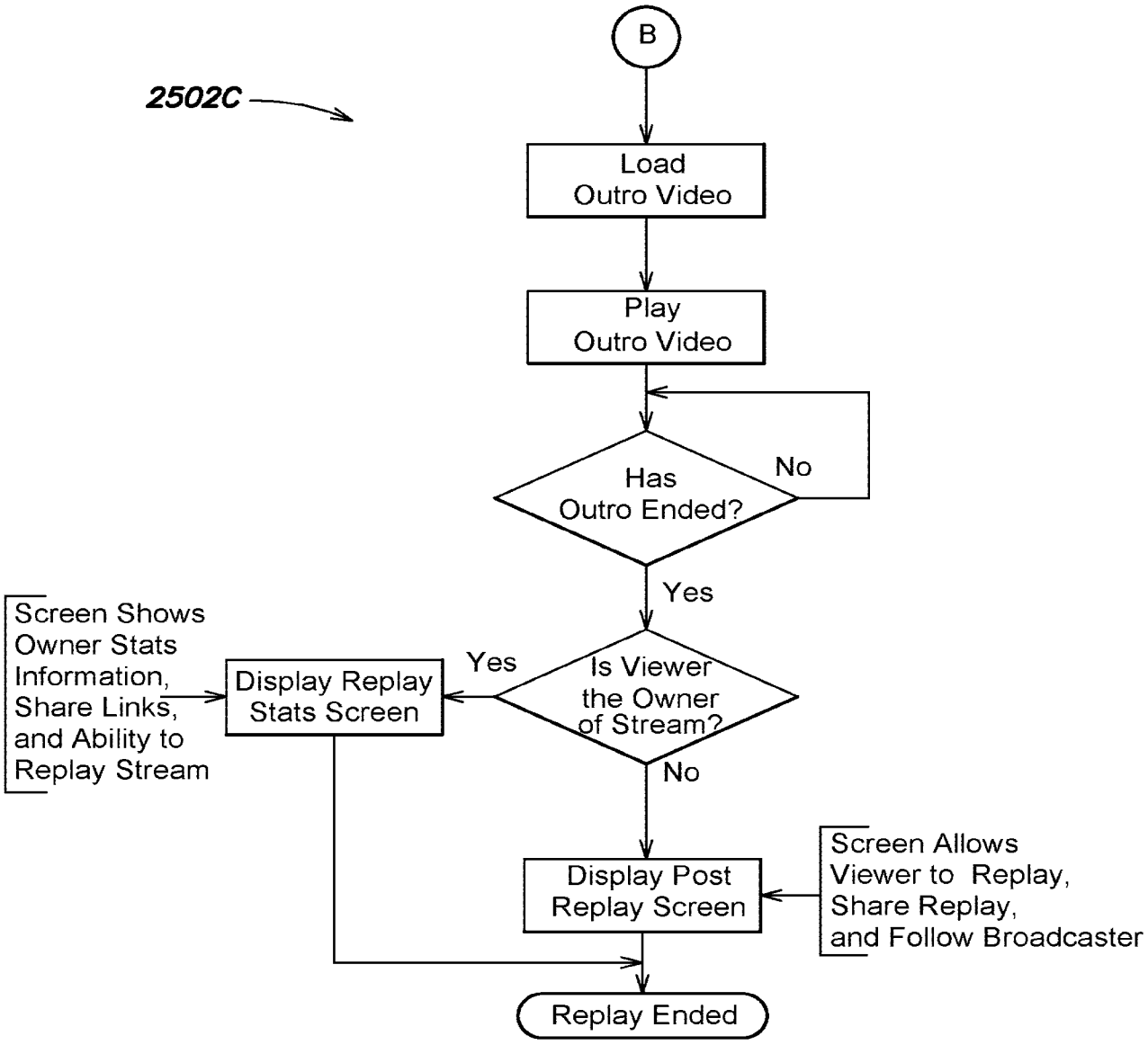

2502C
B
Load Outro Video
Play Outro Video
Has Outro Ended?
No
Yes
Is Viewer the Owner of Stream?
Yes
Display Replay Stats Screen
Screen Shows Owner Stats Information, Share Links, and Ability to Replay Stream
No
Display Post Replay Screen
Screen Allows Viewer to Replay, Share Replay, and Follow Broadcaster
Replay Ended

FIG. 25C

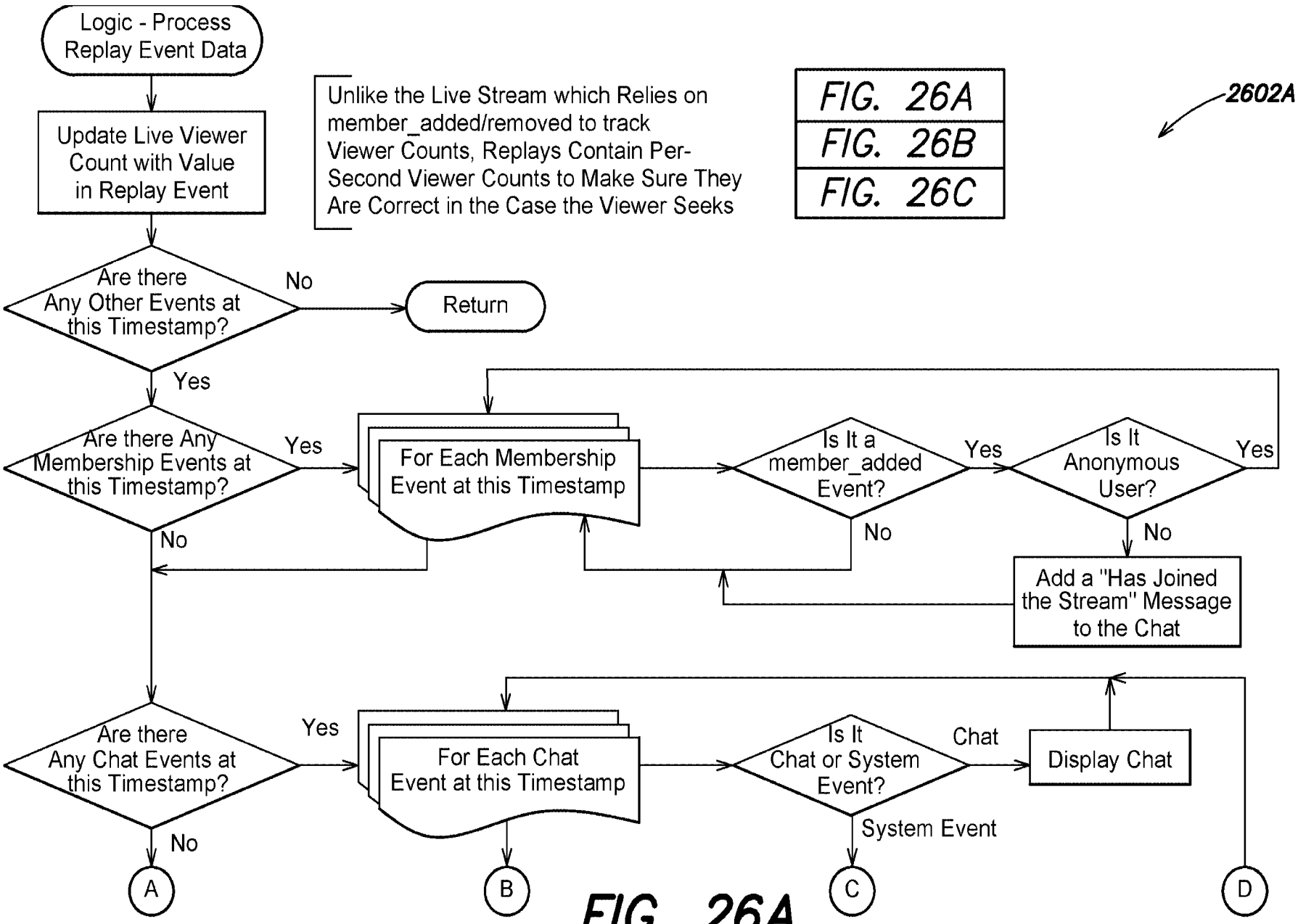

Logic - Process Replay Event Data
Update Live Viewer Count with Value in Replay Event
Unlike the Live Stream which Relies on member_added/removed to track Viewer Counts, Replays Contain Per-Second Viewer Counts to Make Sure They Are Correct in the Case the Viewer Seeks
FIG. 26A
FIG. 26B
FIG. 26C
2602A
Are there Any Other Events at this Timestamp?
No
Return
Yes
Are there Any Membership Events at this Timestamp?
Yes
No
For Each Membership Event at this Timestamp
Is It a member_added Event?
Yes
No
Is It Anonymous User?
Yes
No
Add a "Has Joined the Stream" Message to the Chat
Are there Any Chat Events at this Timestamp?
Yes
No
For Each Chat Event at this Timestamp
Is It Chat or System Event?
Chat
System Event
Display Chat
A
B
C
D

FIG. 26A

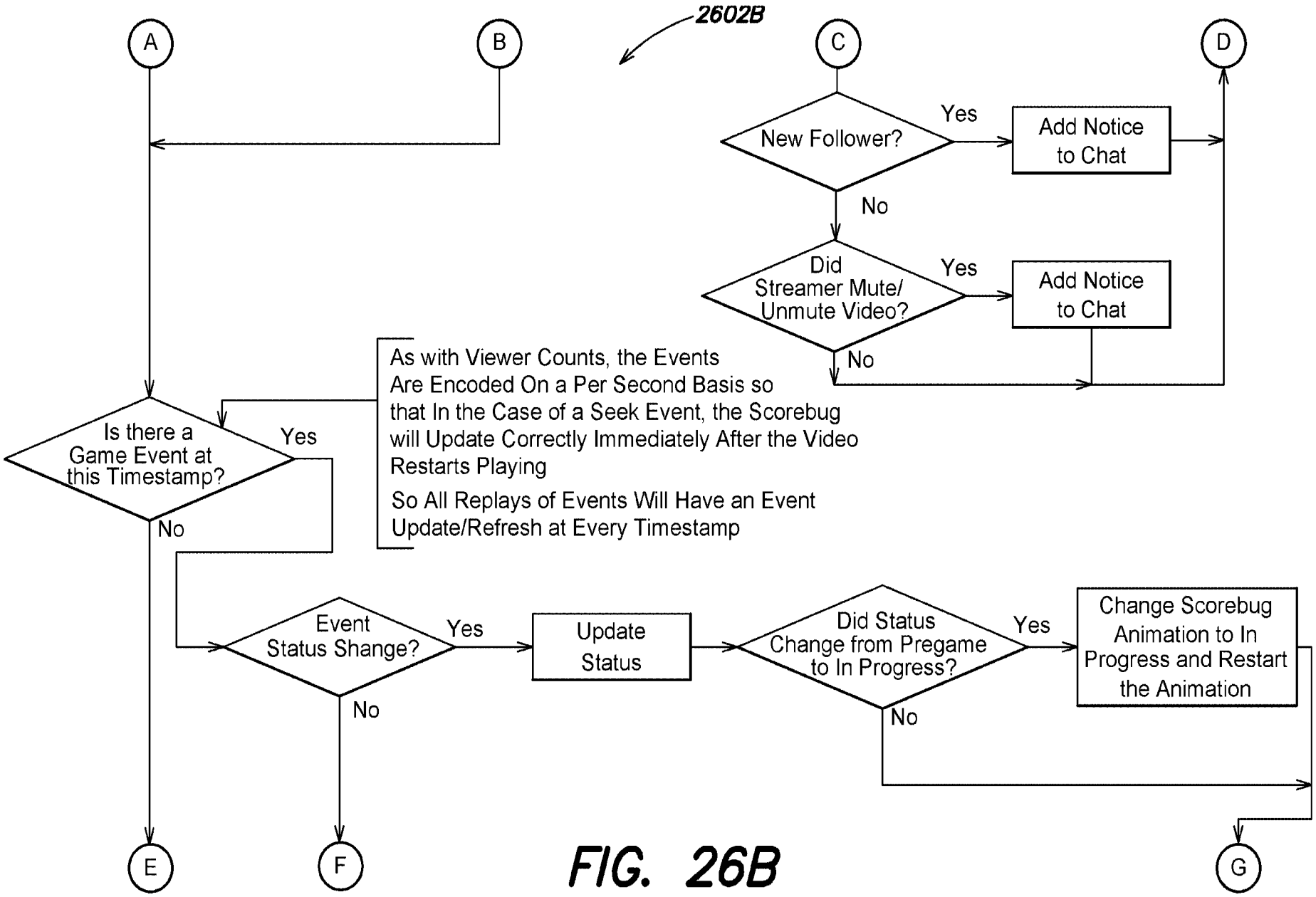

2602B
A
B
C
D
New Follower?
Yes
Add Notice to Chat
No
Did Streamer Mute/ Unmute Video?
Yes
Add Notice to Chat
No
As with Viewer Counts, the Events Are Encoded On a Per Second Basis so that In the Case of a Seek Event, the Scorebug will Update Correctly Immediately After the Video Restarts Playing
So All Replays of Events Will Have an Event Update/Refresh at Every Timestamp
Is there a Game Event at this Timestamp?
Yes
No
Event Status Shange?
Yes
Update Status
Did Status Change from Pregame to In Progress?
Yes
Change Scorebug Animation to In Progress and Restart the Animation
No
No
E
F
G

FIG. 26B

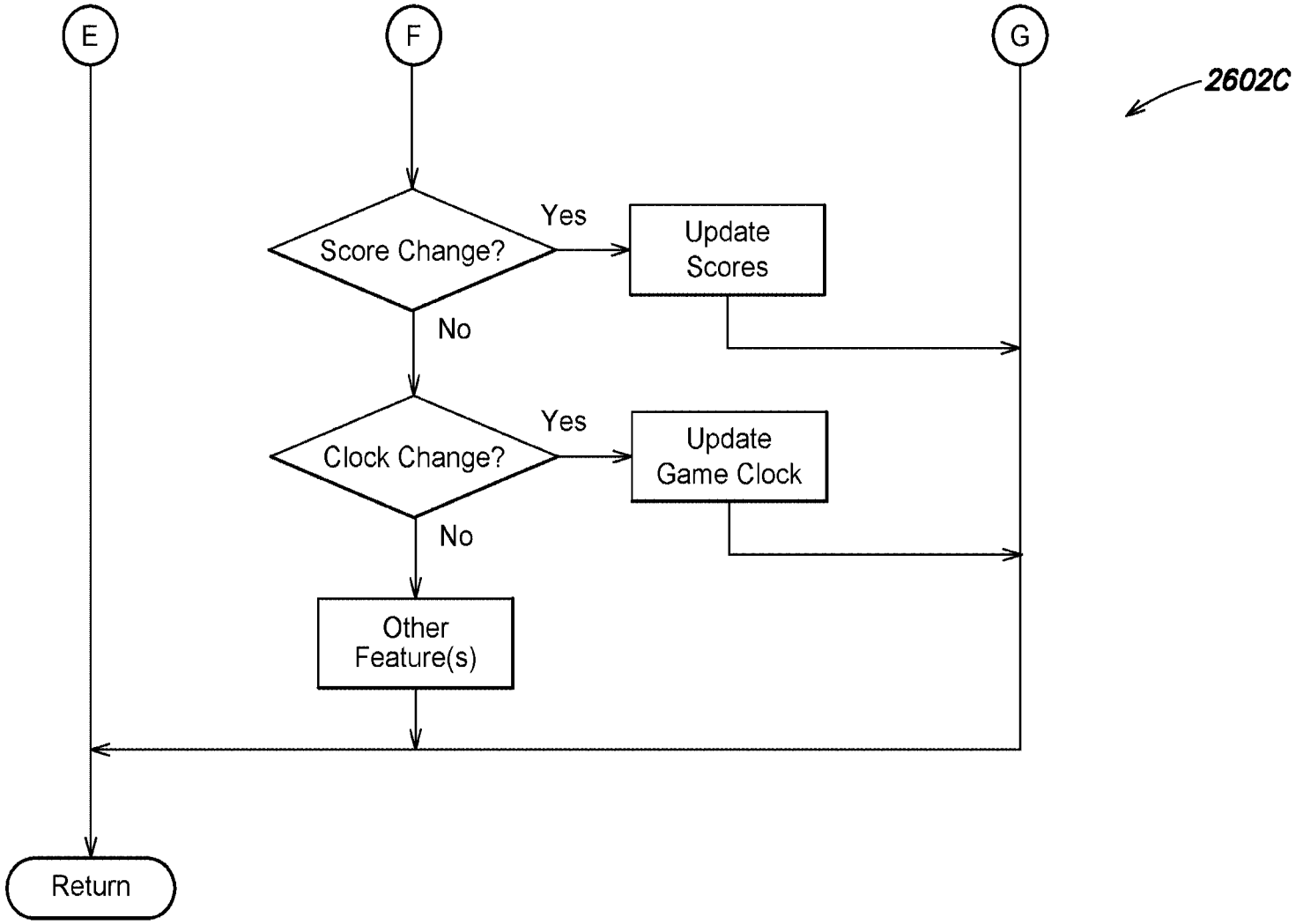

E
F
G
2602C
Score Change?
Yes
Update Scores
No
Clock Change?
Yes
Update Game Clock
No
Other Feature(s)
Return

FIG. 26C

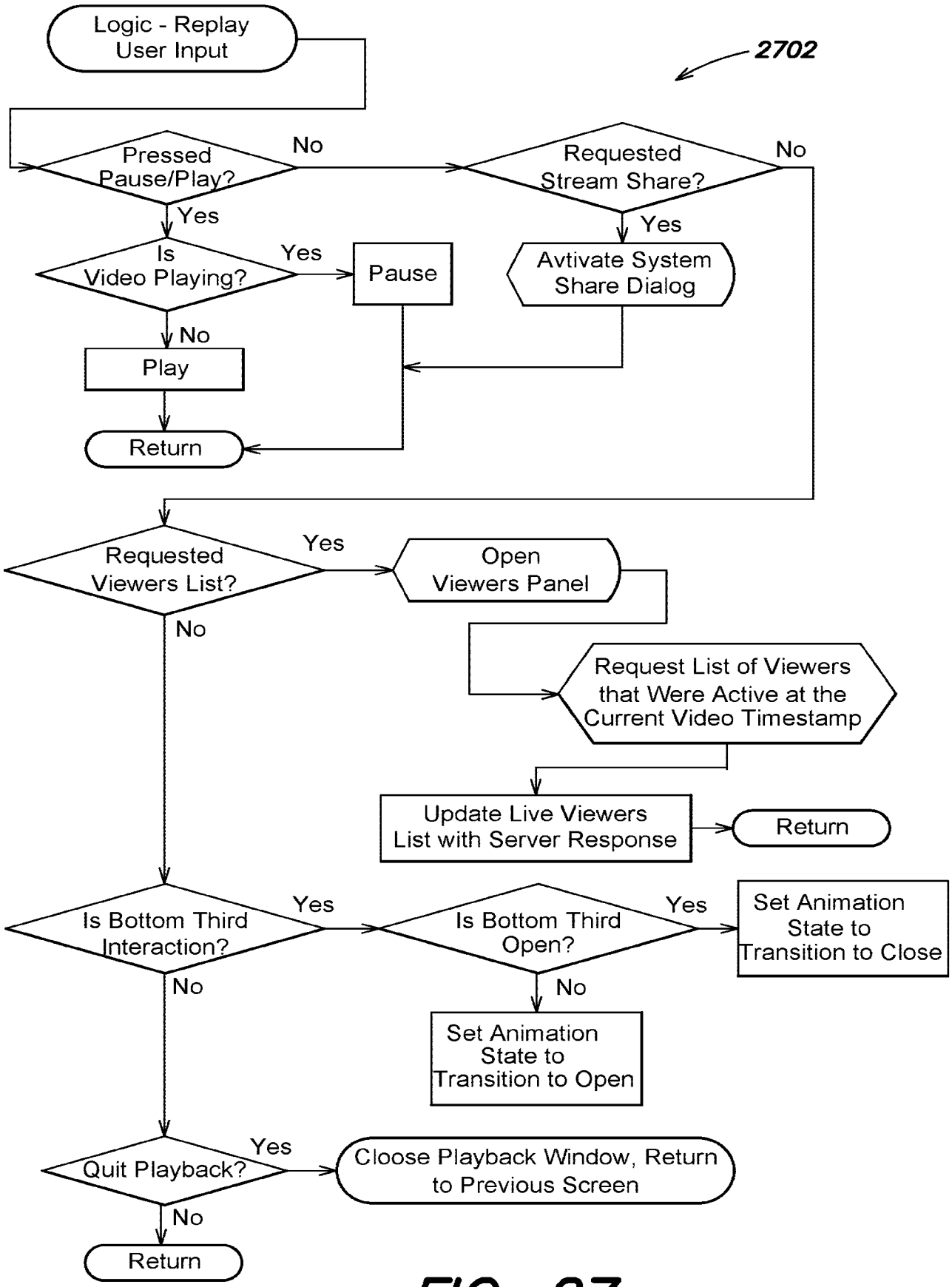

Logic - Replay User Input
2702
Pressed Pause/Play?
No
Yes
Is Video Playing?
Yes
Pause
No
Play
Return
Requested Stream Share?
No
Yes
Avtivate System Share Dialog
Requested Viewers List?
Yes
Open Viewers Panel
No
Request List of Viewers that Were Active at the Current Video Timestamp
Update Live Viewers List with Server Response
Return
Is Bottom Third Interaction?
Yes
No
Is Bottom Third Open?
Yes
No
Set Animation State to Transition to Close
Set Animation State to Transition to Open
Quit Playback?
Yes
No
Cloose Playback Window, Return to Previous Screen
Return

FIG. 27


SportsCastr
254A
NIKO YOUNG
28 OKC 1ST CS 34
252A
KEVIN APRIL
Your camera quality is solid! This is a really great game so far, thanks for broadcasting!
NIKO YOUNG
Everybody liking the broadcast?
KEVIN APRIL
Absolutely! Do you do weekly broadcasts or is it pretty random? I subscribed!
NIKO YOUNG
Sound quality good for everyone?
258A
255
OAKLAND, CA
LIVE FROM ONE OF THE BEST RIVALRIES IN MODERN SPORTS!
Chat with 2.7k others...
258A
258A

FIG. 28

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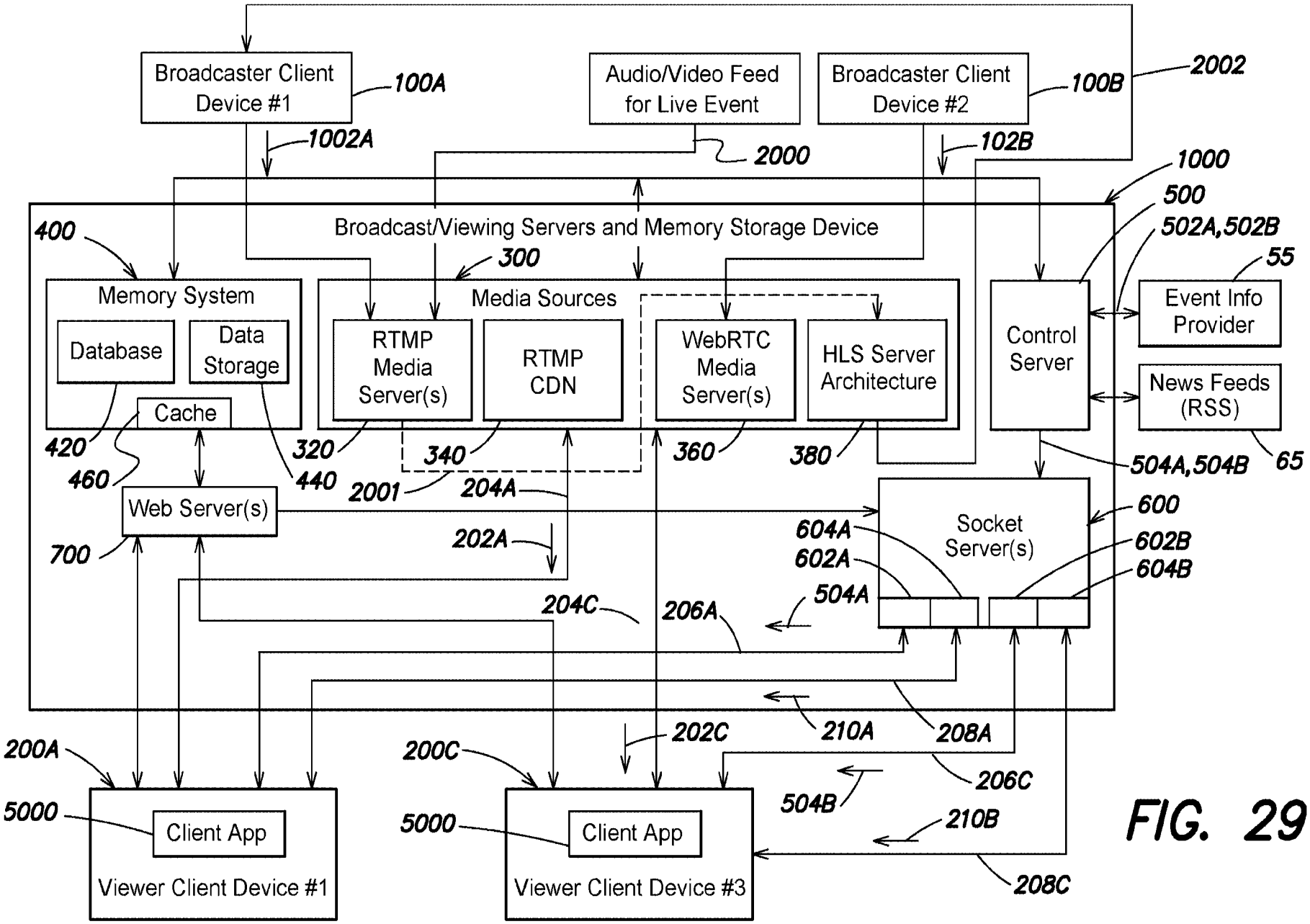

Broadcaster Client Device #1
100A
Audio/Video Feed for Live Event
Broadcaster Client Device #2
100B
2002
1002A
2000
102B
1000
500
502A,502B
55
400
Broadcast/Viewing Servers and Memory Storage Device
300
Memory System
Database
Data Storage
Cache
Media Sources
RTMP Media Server(s)
RTMP CDN
WebRTC Media Server(s)
HLS Server Architecture
Control Server
Event Info Provider
News Feeds (RSS)
420
460
440
320
340
360
380
504A,504B
65
2001
204A
Web Server(s)
700
202A
Socket Server(s)
600
604A
602A
602B
604B
504A
204C
206A
210A
208A
202C
200A
200C
206C
504B
210B
5000
Client App
Viewer Client Device #1
Viewer Client Device #3
208C

FIG. 29

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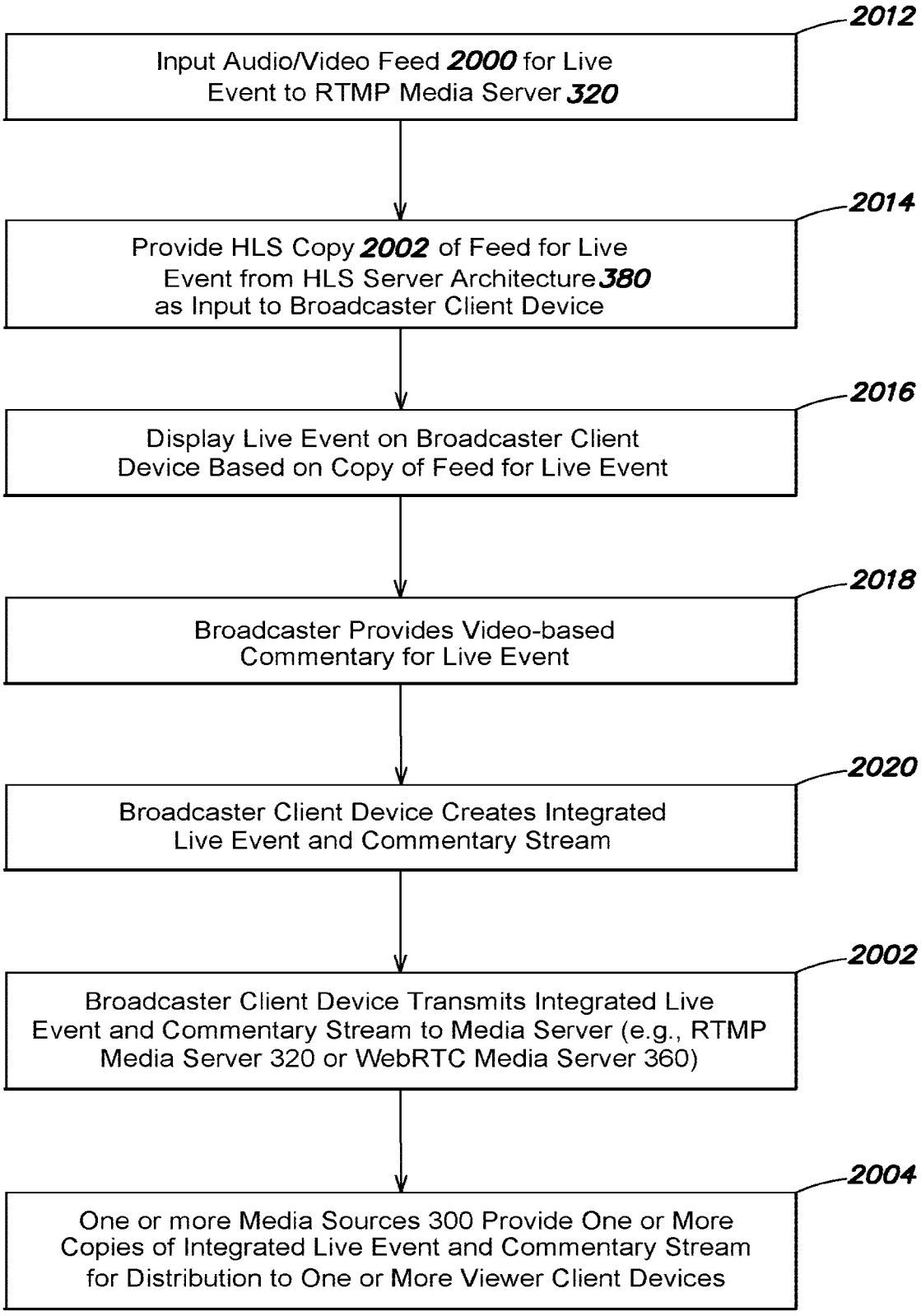

2012
Input Audio/Video Feed 2000 for Live Event to RTMP Media Server 320
2014
Provide HLS Copy 2002 of Feed for Live Event from HLS Server Architecture 380 as Input to Broadcaster Client Device
2016
Display Live Event on Broadcaster Client Device Based on Copy of Feed for Live Event
2018
Broadcaster Provides Video-based Commentary for Live Event
2020
Broadcaster Client Device Creates Integrated Live Event and Commentary Stream
2002
Broadcaster Client Device Transmits Integrated Live Event and Commentary Stream to Media Server (e.g., RTMP Media Server 320 or WebRTC Media Server 360)
2004
One or more Media Sources 300 Provide One or More Copies of Integrated Live Event and Commentary Stream for Distribution to One or More Viewer Client Devices

FIG. 30

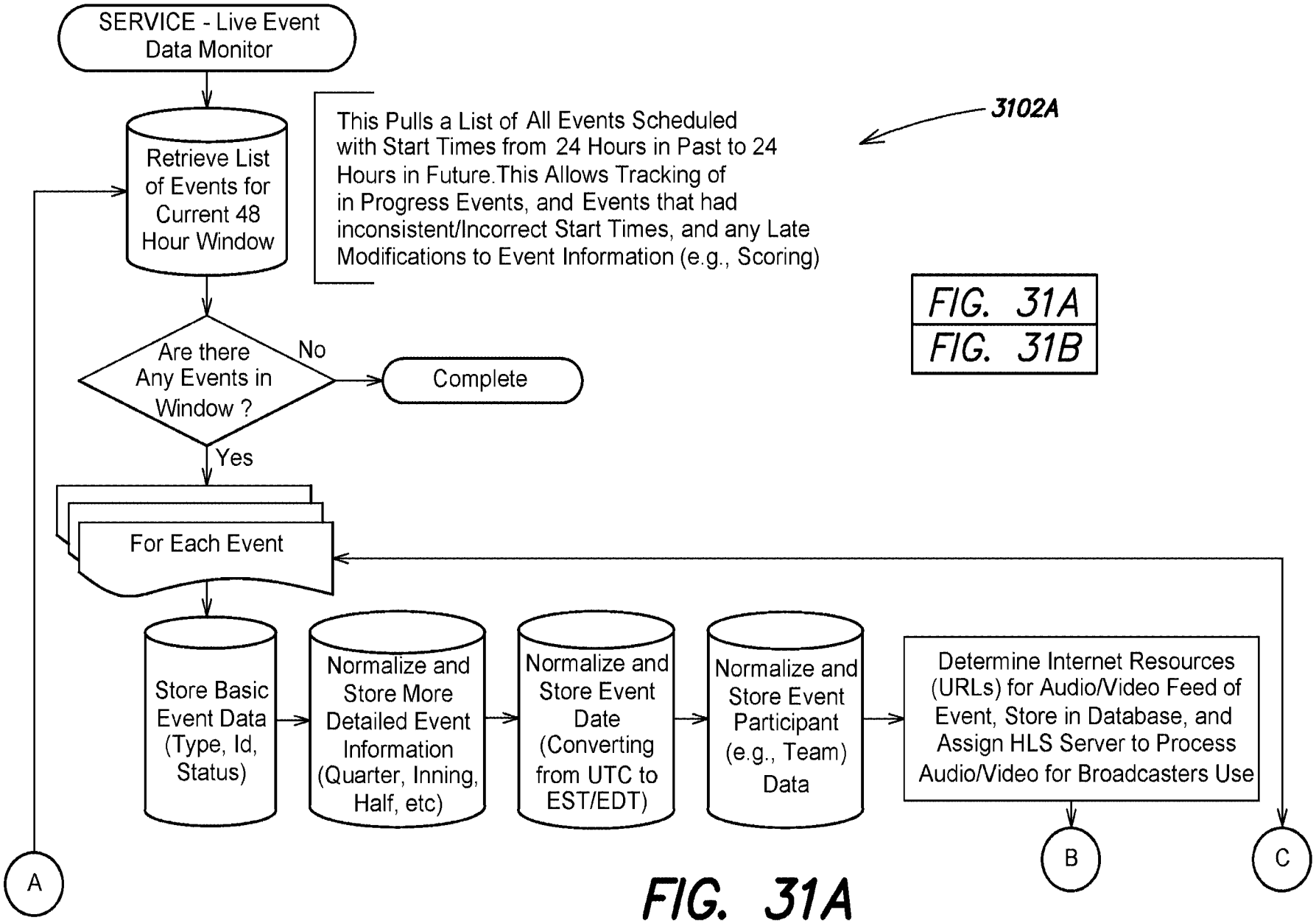


FIG. 31A
FIG. 31B

FIG. 31A

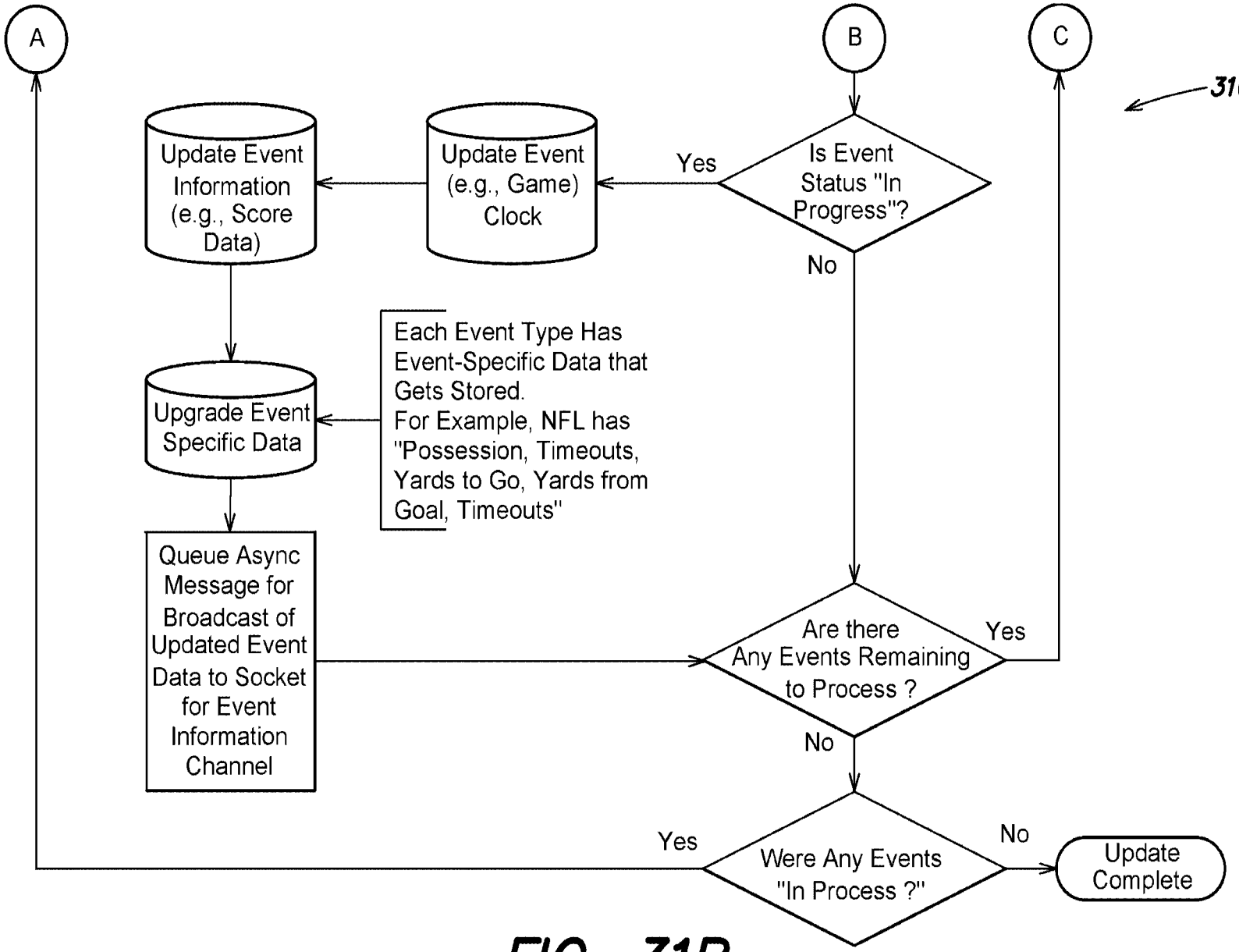

A
B
C
3102B
Update Event Information (e.g., Score Data)
Update Event (e.g., Game) Clock
Yes
Is Event Status "In Progress"?
No
Each Event Type Has Event-Specific Data that Gets Stored.
For Example, NFL has "Possession, Timeouts, Yards to Go, Yards from Goal, Timeouts"
Upgrade Event Specific Data
Queue Async Message for Broadcast of Updated Event Data to Socket for Event Information Channel
Are there Any Events Remaining to Process ?
Yes
No
Yes
Were Any Events "In Process ?"
No
Update Complete

FIG. 31B

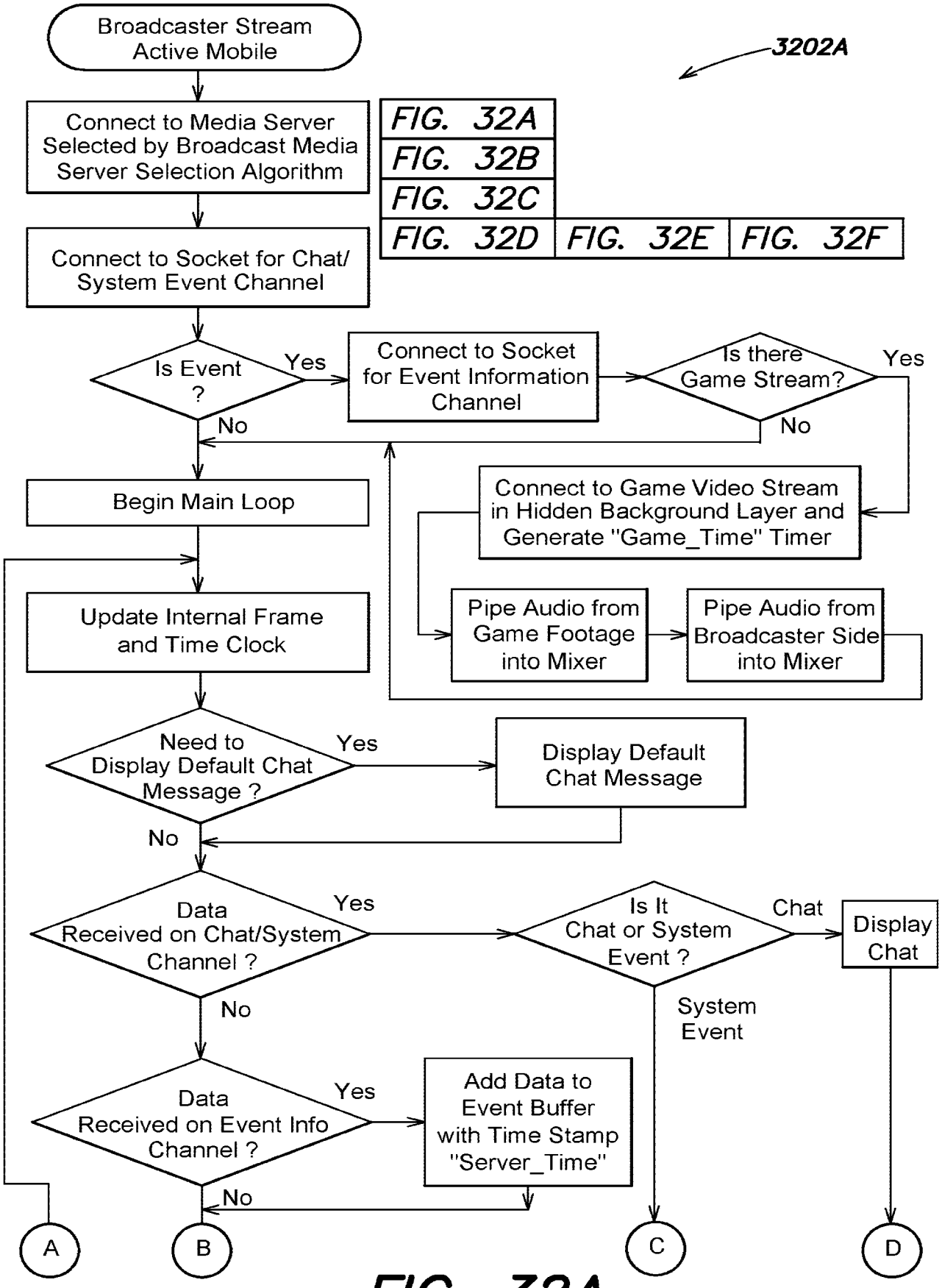


FIG. 32A

FIG. 32B
FIG. 32C
FIG. 32D | FIG. 32E | FIG. 32F

FIG. 32A

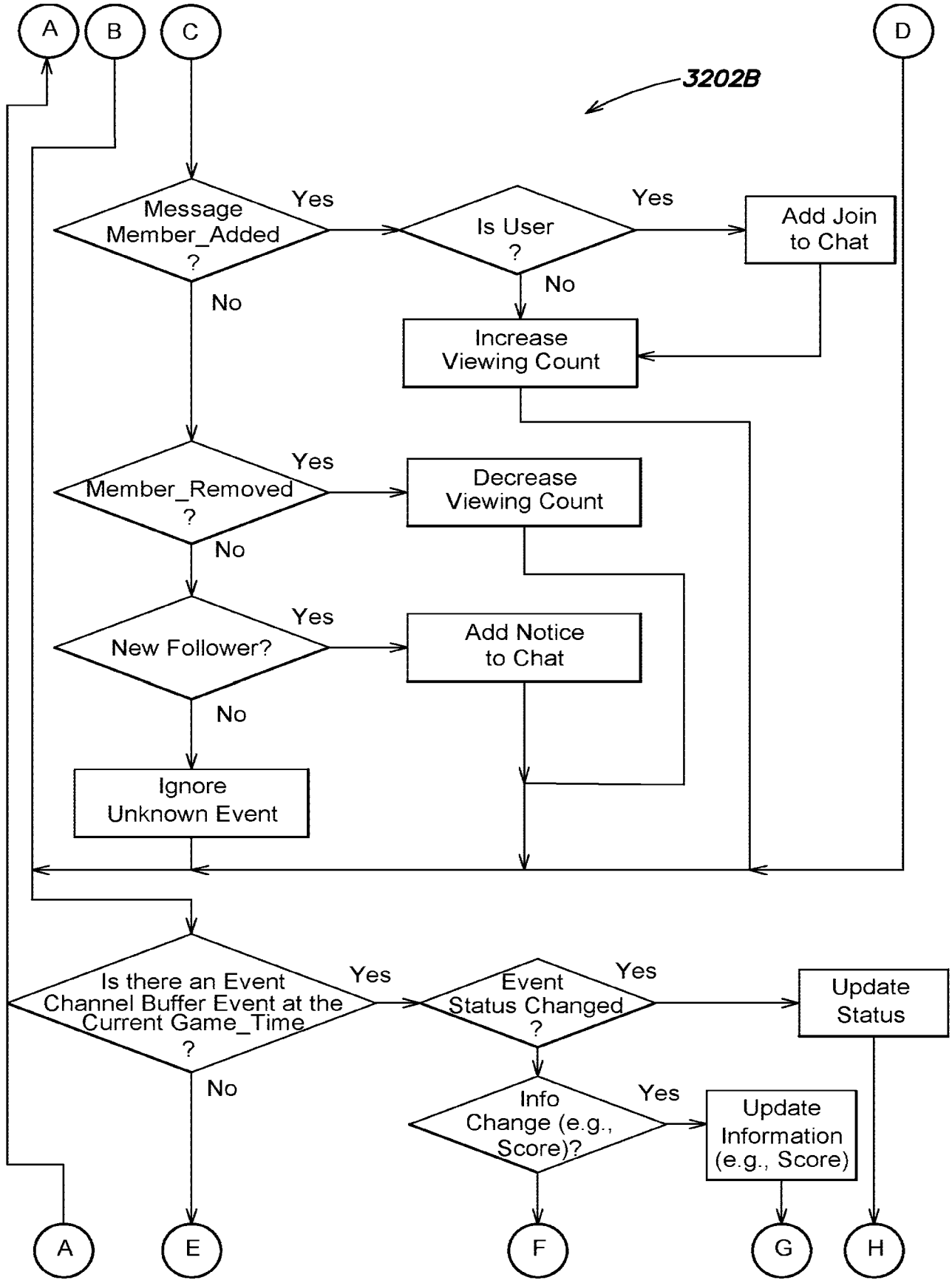

A
B
C
D
3202B
Message Member_Added ?
Yes
Is User ?
Yes
Add Join to Chat
No
Increase Viewing Count
No
Member_Removed ?
Yes
Decrease Viewing Count
No
New Follower?
Yes
Add Notice to Chat
No
Ignore Unknown Event
Is there an Event Channel Buffer Event at the Current Game_Time ?
Yes
Event Status Changed ?
Yes
Update Status
No
Info Change (e.g., Score)?
Yes
Update Information (e.g., Score)
A
E
F
G
H

FIG. 32B

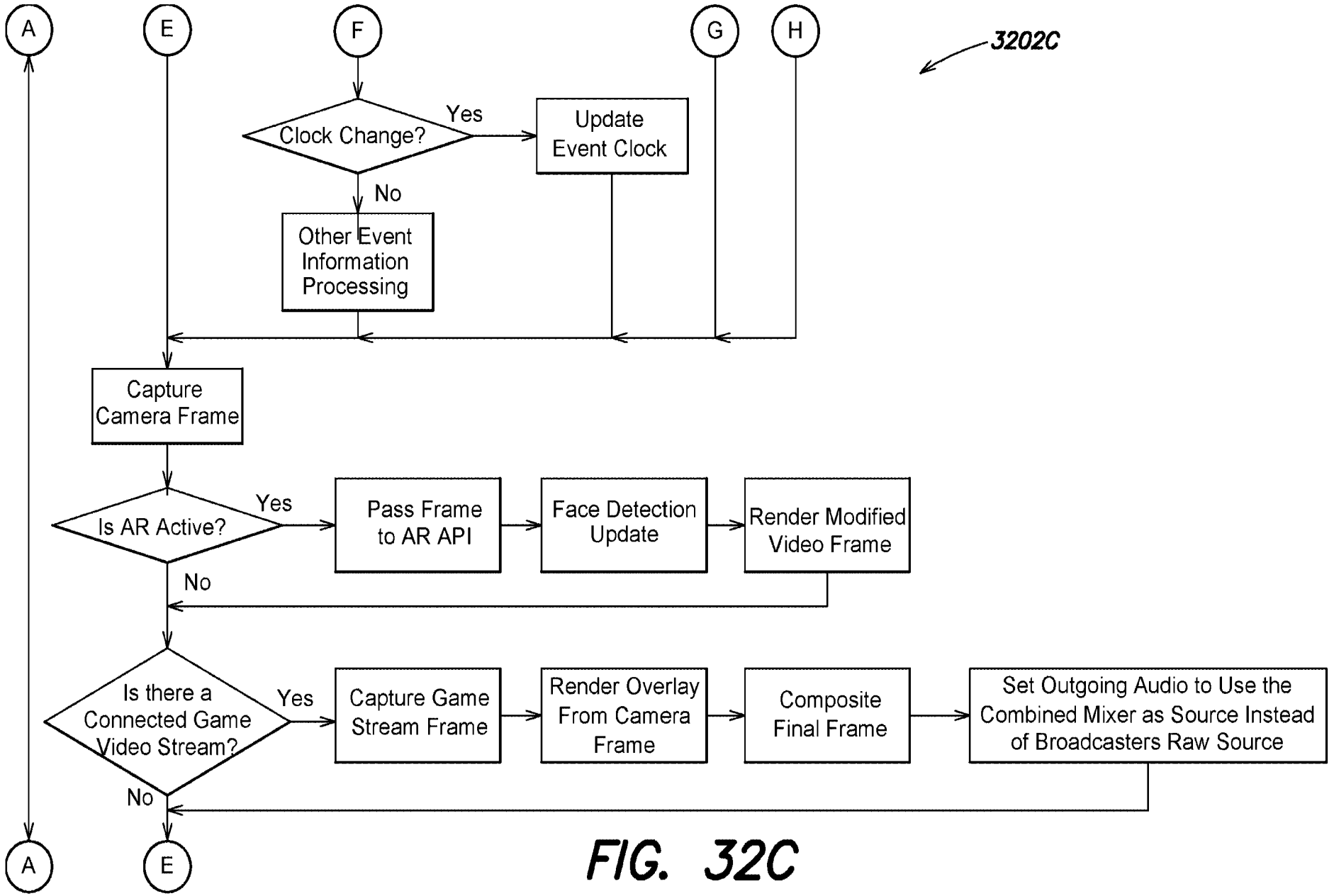

A
E
F
G
H
3202C
Clock Change?
Yes
Update Event Clock
No
Other Event Information Processing
Capture Camera Frame
Is AR Active?
Yes
Pass Frame to AR API
Face Detection Update
Render Modified Video Frame
No
Is there a Connected Game Video Stream?
Yes
Capture Game Stream Frame
Render Overlay From Camera Frame
Composite Final Frame
Set Outgoing Audio to Use the Combined Mixer as Source Instead of Broadcasters Raw Source
No
A
E

FIG. 32C

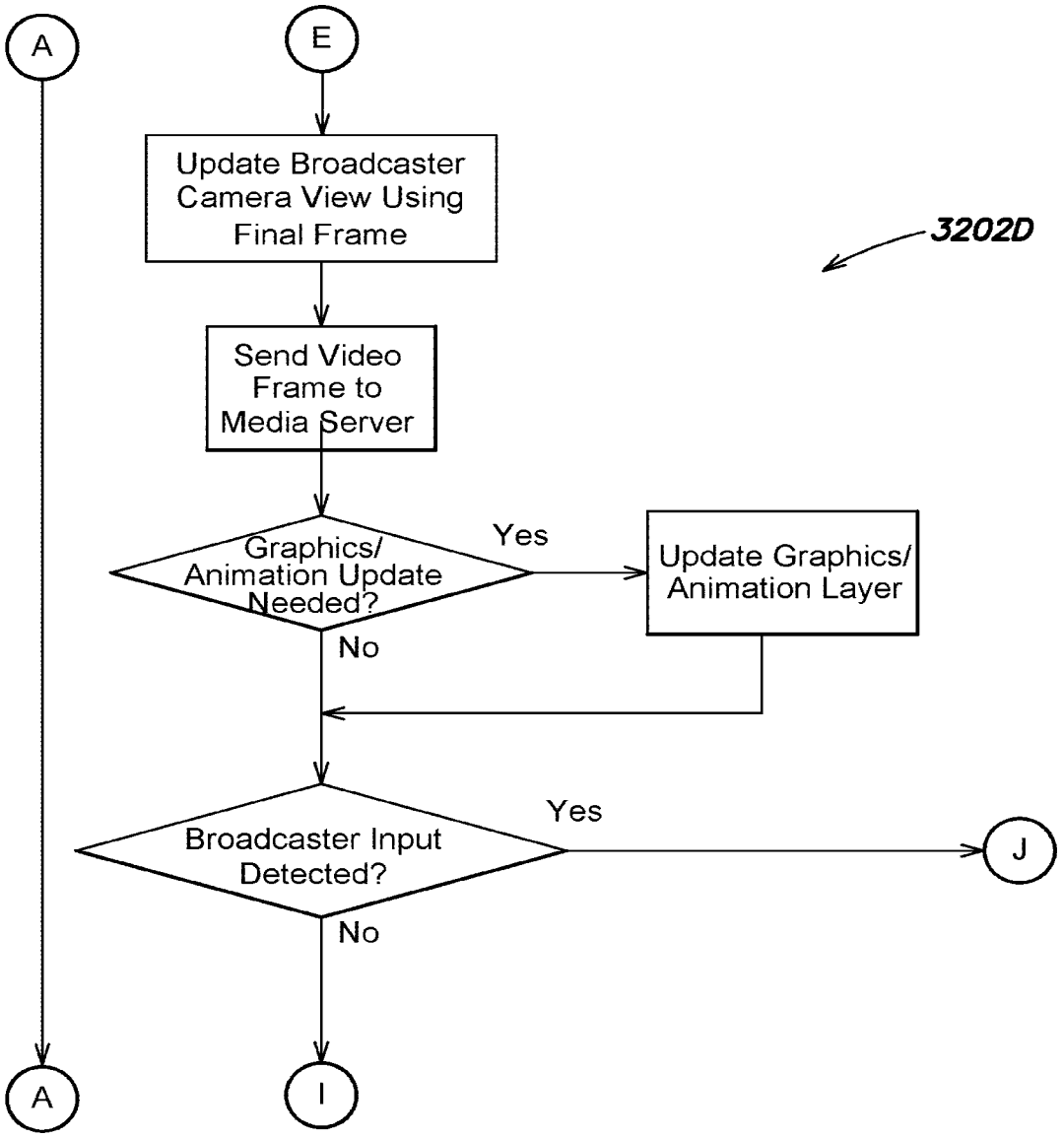

A
E
Update Broadcaster Camera View Using Final Frame
3202D
Send Video Frame to Media Server
Graphics/ Animation Update Needed?
Yes
Update Graphics/ Animation Layer
No
Broadcaster Input Detected?
Yes
J
No
A
I

FIG. 32D

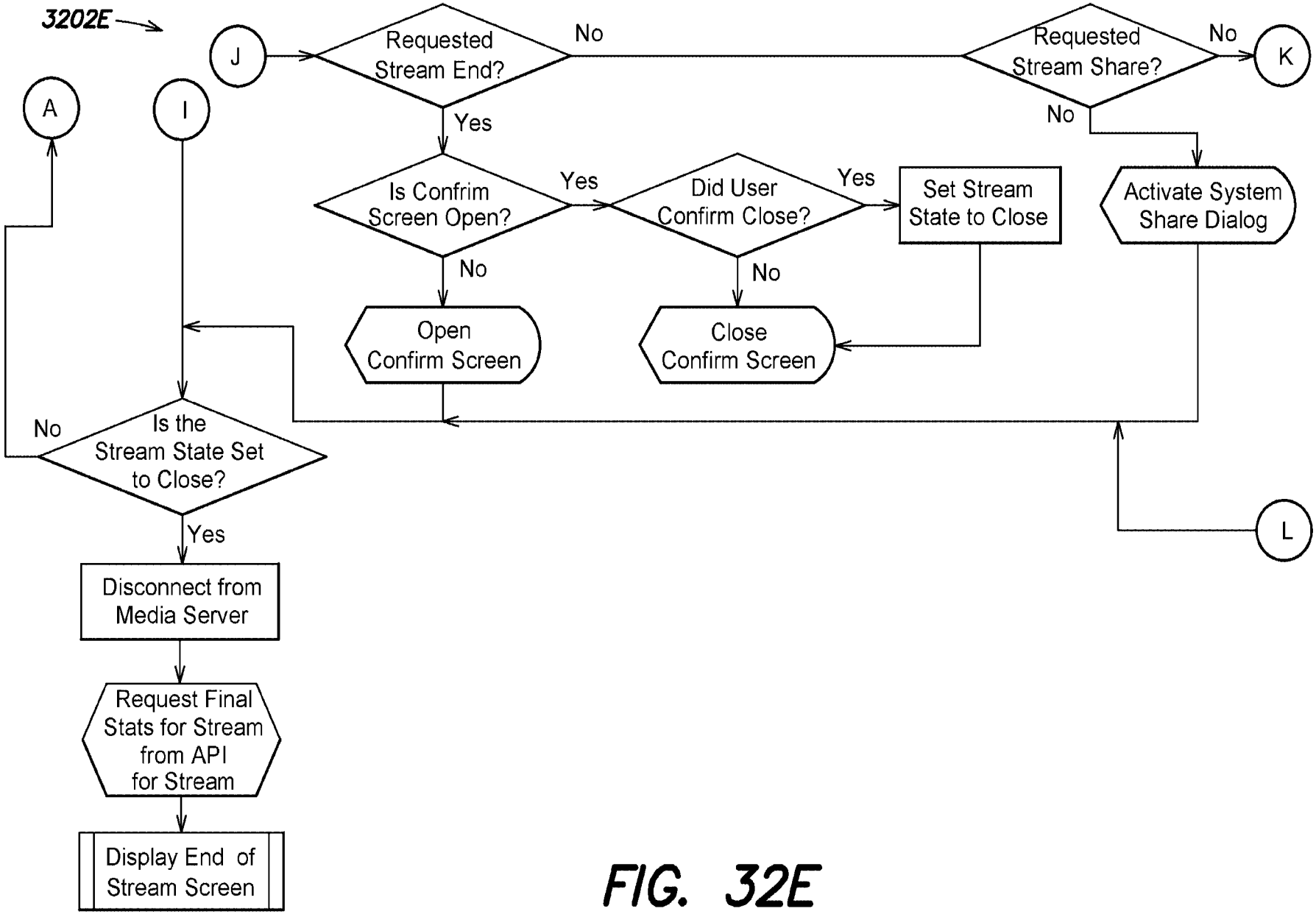

3202E
J
Requested Stream End?
No
Requested Stream Share?
No
K
A
I
Yes
No
Is Confrim Screen Open?
Yes
Did User Confirm Close?
Yes
Set Stream State to Close
Activate System Share Dialog
No
No
Open Confirm Screen
Close Confirm Screen
No
Is the Stream State Set to Close?
Yes
L
Disconnect from Media Server
Request Final Stats for Stream from API for Stream
Display End of Stream Screen

FIG. 32E

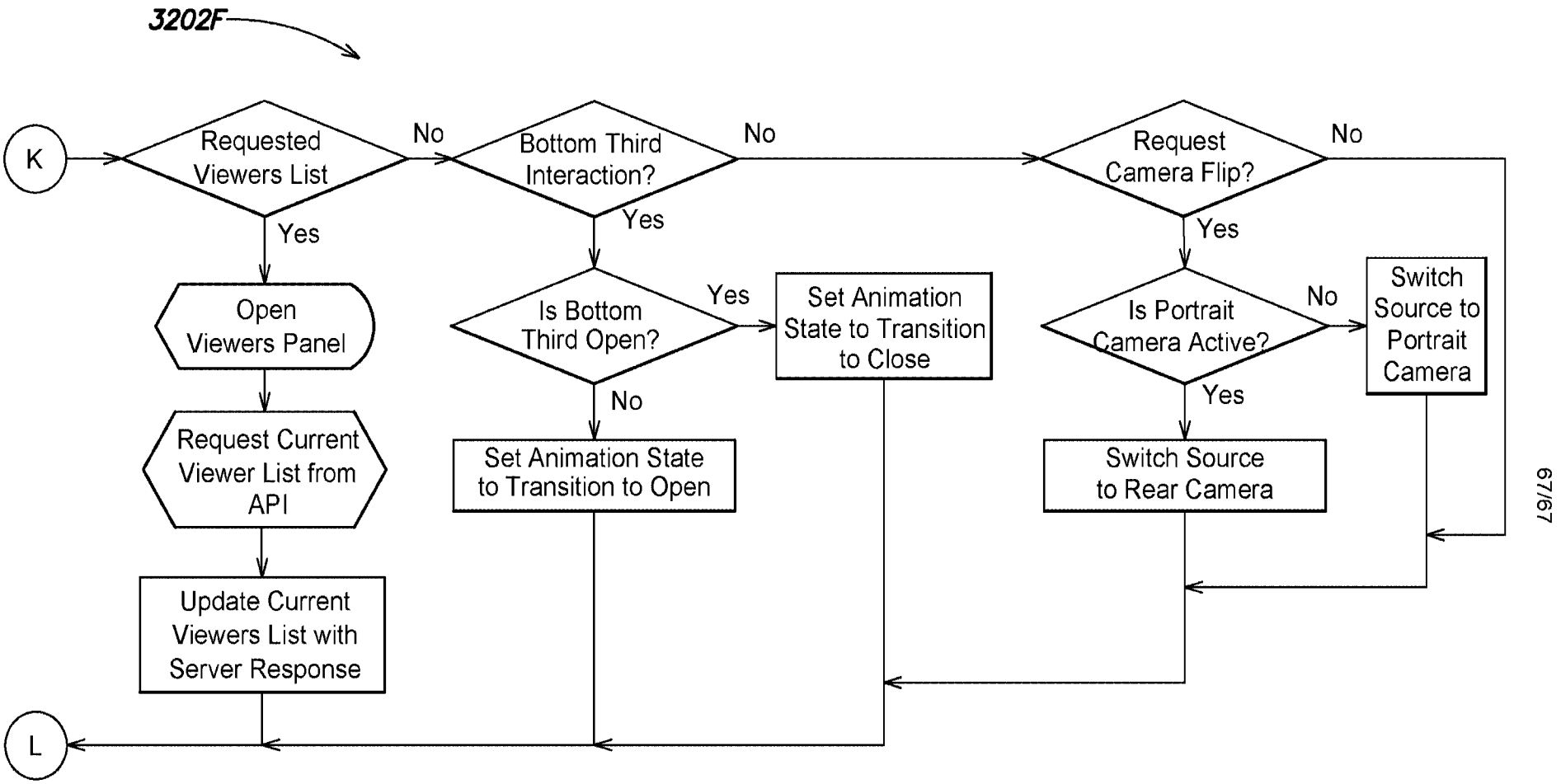

3202F
K
Requested Viewers List
No
Bottom Third Interaction?
No
Request Camera Flip?
No
Yes
Yes
Yes
Open Viewers Panel
Is Bottom Third Open?
Yes
Set Animation State to Transition to Close
Is Portrait Camera Active?
No
Switch Source to Portrait Camera
No
Yes
Request Current Viewer List from API
Set Animation State to Transition to Open
Switch Source to Rear Camera
Update Current Viewers List with Server Response
L
67/67

FIG. 32F

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET CHANNELS

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 16/685,782

filed on 2019-11-15.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

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LEGAL NAME OF INVENTOR

Inventor: Peter AZUOLAS Date (Optional) : 11/22/19

Signature:

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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LEGAL NAME OF INVENTOR

Inventor: Kevin APRIL Date (Optional) : _____

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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LEGAL NAME OF INVENTOR

Inventor: Brian SILSTON Date (Optional) : _____

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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LEGAL NAME OF INVENTOR

Inventor: Philip Nicholas SCHUPAK Date (Optional): 12/3/19

Signature: [signature]

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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EFS ID:	45884471
Application Number:	17833188
International Application Number:	
Confirmation Number:	7083
Title of Invention:	SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET CHANNELS
First Named Inventor/Applicant Name:	Peter AZUOLAS
Customer Number:	149890
Filer:	Joseph Teja/Marie Spakowski
Filer Authorized By:	Joseph Teja
Attorney Docket Number:	SGIC-002US02
Receipt Date:	06-JUN-2022
Filing Date:	
Time Stamp:	15:18:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	SGIC-002US02_USPTO_AIA14_.pdf	2278233 6f2e16d0139e7227846f2553f77520a403cf8d66	no	10

Warnings:

Information:					
2	Drawings-other than black and white line drawings	SGIC-002US01_Figures.pdf	4108191 ce755955d56ad19c4e57760b2eab091ec2348b53	no	67
Warnings:					
Information:					
3		SGIC-002US02_-_Application.pdf	743866 5f667ea47049b607c764ac1391984ce000169fd1	yes	94

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	92
Claims	93	93
Abstract	94	94

Warnings:					
Information:					
4	Appendix to the specification	SGIC-002US01_Appendix_A.pdf	679714 97160a4cf3a7e22d25dc7d96f883608b6d3d677d	no	40
Warnings:					
Information:					
5	Oath or Declaration filed	SGIC-002US01_Declarations-EXECUTED.pdf	4623848 d21f331c7da534e96e90cd3eeb65bfc87478cb02	no	4
Warnings:					
Information:					
		Total Files Size (in bytes):	12433852		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/833,188	06/06/2022		0.00	SGIC-002US02	1	1

CONFIRMATION NO. 7083

FILING RECEIPT

149890
SMITH BALUCH LLP
376 BOYLSTON ST
STE 401
BOSTON, MA 02116

OC000000134497378

Date Mailed: 06/15/2022

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Peter AZUOLAS, Las Vegas, NV;
Kevin APRIL, Kenilworth, IL;
Brian SILSTON, New York, NY;
Philip Nicholas SCHUPAK, Brooklyn, NY;

Applicant(s)

SportsCastr, Inc., Las Vegas, NV;

Assignment For Published Patent Application

SportsCastr, Inc., Las Vegas, NV

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 16/685,782 11/15/2019 PAT 11356742
which is a CON of PCT/US2018/033016 05/16/2018
which claims benefit of 62/627,859 02/08/2018
and claims benefit of 62/542,729 08/08/2017
and claims benefit of 62/507,158 05/16/2017

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 06/13/2022

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/833,188**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No
** **SMALL ENTITY** **
Title

SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET CHANNELS

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign

patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/833,188	06/06/2022	Peter AZUOLAS	SGIC-002US02

CONFIRMATION NO. 7083

149890
SMITH BALUCH LLP
376 BOYLSTON ST
STE 401
BOSTON, MA 02116

FORMALITIES LETTER

OC000000134497377

Date Mailed: 06/15/2022

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
- The application search fee must be submitted.
- The application examination fee must be submitted.
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **80** basic filing fee.
- $ **210** for **49** electronically equivalent pages in excess of **100** application size fee.
- $ **80** surcharge.
- $ **350** search fee.
- $ **400** examination fee.
- $(**0**) previous unapplied payment amount.
- $ **1120** TOTAL FEE BALANCE DUE.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

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Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/tnguyen/

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/833,188

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	80		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	350		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	400		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	1 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 240 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			210			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	1040		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	17833188
Filing Date	2022-06-06
First Named Inventor	Peter AZUOLAS
Art Unit	
Examiner Name	
Attorney Docket Number	SGIC-002US02

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	10425697	B2	2019-09-24	April et al.	Entire Document
	2	10484743	B2	2019-11-19	Cox	Entire Document
	3	10721543	B2	2020-07-21	Huske et al.	Entire Document
	4	10740305	B2	2020-08-11	Barthel et al.	Entire Document
	5	10805687	B2	2020-10-13	April et al.	Entire Document
	6	10848792	B2	2020-11-24	Evans	Entire Document
	7	11039218	B1	2021-06-15	April et al.	Entire Document
	8	11356742	B2	2022-06-07	AZUOLAS et al.	Entire Document

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17833188
	Filing Date	2022-06-06
	First Named Inventor	Peter AZUOLAS
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SGIC-002US02

	9	6434621	B1	2002-08-13	Pezzillo et al.	Entire Document
	10	8128503	B1	2012-03-06	Haot et al.	Entire Document
	11	8341662	B1	2012-12-25	Bassett et al.	Entire Document
	12	8549574	B2	2013-10-01	Perlman et al.	Entire Document
	13	8595186	B1	2013-11-26	Mandyam et al.	Entire Document
	14	8874778	B2	2014-10-28	Xu et al.	Entire Document
	15	9055271	B2	2015-06-09	Verna et al.	Entire Document
	16	9106934	B2	2015-08-11	Horen et al.	Entire Document
	17	9149682	B2	2015-10-06	Dornbush et al.	Entire Document
	18	9251852	B2	2016-02-02	Burns	Entire Document
	19	9288278	B2	2016-03-15	Panje et al.	Entire Document

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17833188
	Filing Date	2022-06-06
	First Named Inventor	Peter AZUOLAS
	Art Unit	
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	Attorney Docket Number	SGIC-002US02

	20	9509793	B2	2016-11-29	Brown et al.	Entire Document
	21	9516390	B2	2016-12-06	Lau et al.	Entire Document
	22	9584858	B2	2017-02-28	Vinson et al.	Entire Document
	23	9591054	B2	2017-03-07	Thornburgh et al.	Entire Document
	24	9641566	B1	2017-05-02	Hiremath	Entire Document
	25	9654844	B2	2017-05-16	Kim et al.	Entire Document
	26	9692800	B2	2017-06-27	Gaunt et al.	Entire Document
	27	9706443	B2	2017-07-11	Oyman et al.	Entire Document
	28	9878243	B2	2018-01-30	Lockton et al.	Entire Document

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17833188
	Filing Date	2022-06-06
	First Named Inventor	Peter AZUOLAS
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SGIC-002US02

	1	20010001160	A1	2001-05-10	Shoff et al.	Entire Document
	2	20010039209	A1	2001-11-08	DeWeese et al.	Entire Document
	3	20040003101	A1	2004-01-01	Roth et al.	Entire Document
	4	20080022347	A1	2008-01-24	Cohen	Entire Document
	5	20080062318	A1	2008-03-13	Ellis et al.	Entire Document
	6	20080168493	A1	2008-07-10	Allen et al.	Entire Document
	7	20090222754	A1	2009-09-03	Phillips et al.	Entire Document
	8	20100299703	A1	2010-11-25	Altman	Entire Document
	9	20110083144	A1	2011-04-07	Bocharov et al.	Entire Document
	10	20110086144	A1	2011-04-14	Arampongpun et al.	Entire Document
	11	20110090960	A1	2011-04-21	Leontaris et al.	Entire Document

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	First Named Inventor	Peter AZUOLAS
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	Examiner Name	
	Attorney Docket Number	SGIC-002US02

	12	20110280540	A1	2011-11-17	Woodman	Entire Document
	13	20120069131	A1	2012-03-22	Abelow	Entire Document
	14	20120072845	A1	2012-03-22	John et al.	Entire Document
	15	20120210348	A1	2012-08-16	Verma et al.	Entire Document
	16	20130222597	A1	2013-08-29	Brink et al.	Entire Document
	17	20130227596	A1	2013-08-29	Pettis et al.	Entire Document
	18	20130297706	A1	2013-11-07	Arme et al.	Entire Document
	19	20140129680	A1	2014-05-08	Mukherjee	Entire Document
	20	20140359075	A1	2014-12-04	Amidei et al.	Entire Document
	21	20150163562	A1	2015-06-11	Leventhal et al.	Entire Document
	22	20160037215	A1	2016-02-04	Cardona	Entire Document

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Peter AZUOLAS
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	Attorney Docket Number	SGIC-002US02

	23	20160249108	A1	2016-08-25	SEXTON	Entire Document
	24	20160360261	A1	2016-12-08	Makhlouf	Entire Document
	25	20170034237	A1	2017-02-02	Silver	Entire Document
	26	20170099516	A1	2017-04-06	Barbulescu et al.	Entire Document
	27	20170188054	A1	2017-06-29	Ma et al.	Entire Document
	28	20200162796	A1	2020-05-21	AZUOLAS et al.	Entire Document
	29	20210168462	A1	2021-06-03	April et al.	Entire Document

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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	Attorney Docket Number	SGIC-002US02

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Analyze & Optimize. Maestro 2020. Accessed at https://info.maestro.io/analyze-and-optimize on April 21, 2021. 2 pages.	
	2	Around-the-clock action for you sportsbook. BetGenius Brochure. Accessed at https://geniussports.com/sportsbook/content/streaming/ on March 19, 2021. 1 page.	
	3	Betradar Live Streaming Brochure 2021. Accessed at https://www.betradar.com/wp-content/uploads/sites/4/2014/11/Betradar-Live-Streaming-Brochure.pdf on April 29, 2021. 7 pages.	
	4	Betradar Product Brochure 2021. Accessed at https://www.betradar.com/wp-content/uploads/sites/4/2021/02/Betradar-Product-Brochure-2021.pdf on April 29, 2021. 24 pages.	
	5	BETRADAR. Sportradar. Accessed at https://www.betradar.com/ on April 21, 2021. 2 pages.	
	6	Customize & Control. Maestro 2020. Accessed at https://info.maestro.io/customize-and-control on April 21, 2021. 2 pages.	
	7	EMPSON, Baseball's Digital Trifecta and How America's Pastime is Setting the Pace for Sports Online. TechCrunch November 4, 2013. Accessed at https://techcrunch.com/2013/11/04/baseballs-digital-trifecta-and-how-americas-pastime-is-setting-the-pace-for-sports-online/. 10 pages.	
	8	Engage & Monetize. Maestro 2020. Accessed at https://info.maestro.io/engage-and-monetize on April 21, 2021. 3 pages.	
	9	Esports - Take your fan experience to the next level and build community. Maestro 2020. Accessed at https://info.maestro.io/esports on April 21, 2021. 4 pages.	
	10	Genius Sports Group Analyst Day Presentation January 2021. Accessed at https://s27.q4cdn.com/552951210/files/doc_downloads/GSG_Analyst_Day_Presentation_January_2021_vFF_2.pdf on April 29, 2021. 52 pages.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Examiner Name	
	Attorney Docket Number	SGIC-002US02

	11	Genius Sports Group Investor Presentation October 2020. Accessed at https://news.geniussports.com/wp-content/uploads/2020/10/GSG-Investor-Presentation.pdf on April 29, 2021. 29 pages.	
	12	HA, Major League Baseball's "At Bat" App Gets updated to Supported Expanded Instant Replay. TechCrunch March 31, 2014. Accessed at https://techcrunch.com/2014/03/31/mlb-at-bat-expanded-instant-replay/. 4 pages.	
	13	HASHEMIZADEHNAEINI, Transcoding H.264 Video via FFMPEG encoder. Corso di Laurea Magistrale in Ingegneria delle Telecomunicazioni POLITECNICO DI MILANO. Thesis, 2015, p. 1-100	
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	15	International Search Report and Written Opinion in International Patent Application No.: PCT/US2018/033016 mailed August 6, 2018 (Atty. Docket No.: SGIC-002WO01), 29 pages.	
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	17	MLB App. MLB 2021. Accessed at https://www.mlb.com/apps/mlb-app on April 21, 2021. 1 page.	
	18	PEREZ, Live Video Viewing up 86% over last year in MLB's At Bat app, thanks for Addition of multitasking. TechCrunch April 15, 2016. Accessed at https://techcrunch.com/2016/04/15/live-video-viewing-up-86-over-last-year-in-mlbs-at-bat-app-thanks-to-addition-of-multitasking/. 4 pages.	
	19	PEREZ, MLB.com At Bat and NHL are first to Launch Personalized App Icons on iOS 10.3. TechCrunch March 28, 2017. Accessed at https://techcrunch.com/2017/03/28/mlb-com-at-bat-and-nhl-are-first-to-launch-personalized-app-icons-on-ios-10-3/. 5 pages.	
	20	Sports - Personalized fan-first experiences that go beyond the field. Maestro 2020. Accessed at https://info.maestro.io/sports on April 21, 2021. 3 pages.	
	21	Sports Betting. Sportradar. Accessed at https://sportradar.us/betting-services/ on April 21, 2021. 4 pages.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17833188
	Filing Date	2022-06-06
	First Named Inventor	Peter AZUOLAS
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SGIC-002US02

	22	Streaming. BetGenius Product Deck. Accessed on December 3, 2020. 2 pages.
	23	WASHINGTON, Betgenius launches live streaming service for sportsbooks. Genius Sports October 8, 2019. Accessed at https://news.geniussports.com/betgenius-launches-live-streaming-service-for-sportsbooks/ on April 30, 2021. 5 pages.

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17833188
	Filing Date	2022-06-06
	First Named Inventor	Peter AZUOLAS
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SGIC-002US02

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Dhruv Sud/	Date (YYYY-MM-DD)	2022-08-22
Name/Print	Dhruv Sud	Registration Number	80,578

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Attorney Docket No.: SGIC-002US02 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of: Peter AZUOLAS	Confirmation No.: 7083
Application No.: 17/833,188	Group Art Unit:
Filed: 2022-06-06	Examiner:

FOR: **SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET CHANNELS**

VIA EFS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.56, 1.97, AND 1.98

In accordance with the duty of disclosure set forth in 37 C.F.R. §1.56, Applicant hereby submits the following information in conformance with 37 C.F.R. §§1.97 and 1.98. It is respectfully requested that the information be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

☐ Pursuant to 37 C.F.R. §1.98, a copy of each non-US patent document cited in the attached Form PTO/SB/08 is enclosed.

☐ No copies of any U.S. Office Actions cited on the accompanying Form PTO/SB/08 are being provided because they are available on PAIR. Copies will be provided to the Examiner upon request.

☒ No copies of the publications listed on the attached Form used in lieu of PTO/SB/08 are being provided pursuant to 37 C.F.R. §1.98(d) because the publications were previously cited by or submitted to the Office in prior Application Serial No(s). 16/685,782 to which the above-identified application claims priority under 35 U.S.C. §120.

☐ No copies of any U.S. patents or U.S. patent application publications listed on the attached Form PTO/SB/08 are being provided pursuant to 37 C.F.R. §1.98.

☐ Publications ____ listed on the attached Form PTO/SB/08 were cited in a foreign search or examination report corresponding to application serial no. ____ and mailed on ____.

☐ Enclosed is a copy of a non-English publication(s) _____ Pursuant to §609 of the M.P.E.P., Applicant submits the attached foreign search or examination report, which cites such non-English language publication(s).

☐ Enclosed is a copy of a non-English publication(s) _____ English language publication _____ (copy enclosed) claims priority from this non-English publication.

☐ Enclosed is an explanation of non-English publication(s) ____ for which an English translation is not available.

☐ Enclosed is an English translation of non-English publication(s) _____ cited in the attached Form used in lieu of PTO/SB/08.

☐ Enclosed is a copy of pending patent Application Serial No. _____.

☐ Applicants wish to make the Examiner aware of the following co-pending U.S. patents/publications/applications:

Application No.:	**Filing Date**	**Inventor**	**Atty. Docket No.**

In accordance with **37 C.F.R. §1.97(b)**, no additional fee for submission of this Information Disclosure Statement is required, as it is filed within any one of the following time periods:

☐ within three months from the filing date of this national application other than a CPA under 37 C.F.R. § 1.53(d);

☐ within three months from the date of entry of the national stage as set forth in 37 C.F.R. §1.491 in this international application;

☒ before the mailing date of a first office action on the merits; or

☐ before the mailing of a first office action after the filing of a request for continued examination under 37 C.F.R. § 1.114.

In accordance with 37 C.F.R. § 1.97(g), this Information Disclosure Statement shall not be construed as to mean that a search has been made.

In accordance with 37 C.F.R. § 1.97(h), the filing of this Information Disclosure Statement shall not be construed to be an admission that the information cited in the statement is, or is considered to be material to patentability as defined by 37 C.F.R § 1.56(b).

Remarks

It is respectfully requested that the Examiner consider the above-noted information and return an initialed copy of the attached Form used in lieu of PTO/SB/08 to the undersigned.

The Director is hereby requested and authorized to charge any deficiency or credit any overpayment in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 60-1876 which the undersigned is authorized to draw.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Dated: August 22, 2022

Respectfully submitted,
SMITH BALUCH LLP

SMITH BALUCH LLP
376 Boylston St., Suite 401
Boston, MA 02116

Tel: (314) 917-1241

By: /Dhruv Sud/
Dhruv Sud
Reg. No.: 80,578

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/833,188	**08/22/2022 10:11:52 AM ET**	**SGIC-002US02**

Title of Invention

SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET CHANNELS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7083	FILED BY	Linda Doyle
PATENT CENTER #	60892840	FILING DATE	06/06/2022
CUSTOMER #	149890	FIRST NAMED INVENTOR	Peter AZUOLAS
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Dhruv Sud

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
SGIC002US02-SB08-08-16-2022.pdf	11	Information Disclosure Statement (IDS) Form (SB08)	1255 KB
SGIC-002US02_IDSTransmittal_20220816.pdf	3	Transmittal Letter	130 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

SGIC002US02-SB08-08-16-2022.pdf	9280D9B1F1315D34B03BE8810D3B68E329A2DB1402A2EDC6D695B496A7FECA55ACF4CF16EB27E0D423FF0861A961D693DE81444F46418D43FF091C120CA58B91
SGIC-002US02_IDSTransmittal_20220816.pdf	5E7025375275C974B9E35EC33DFD34F5192B09010A2042A5C52533BB0DC0BC519622760A241F2FA1C3B875BBE1A4F9BAEE94581DDC600973B6641360CB95CDA9

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

COPY

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/833,188	06/06/2022	Peter AZUOLAS	SGIC-002US02

CONFIRMATION NO. 7083

149890
SMITH BALUCH LLP
376 BOYLSTON ST
STE 401
BOSTON, MA 02116

FORMALITIES LETTER



Date Mailed: 06/15/2022

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
- The application search fee must be submitted.
- The application examination fee must be submitted.
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **80** basic filing fee.
- $ **210** for **49** electronically equivalent pages in excess of **100** application size fee.
- $ **80** surcharge.
- $ **350** search fee.
- $ **400** examination fee.
- $(**0**) previous unapplied payment amount.
- $ **1120** TOTAL FEE BALANCE DUE.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/tnguyen/

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P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/833,188	**01/13/2023 11:25:54 AM ET**	**SGIC-002US02**

Title of Invention

SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET CHANNELS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7083	FILED BY	Marie Spakowski
PATENT CENTER #	61433171	FILING DATE	06/06/2022
CUSTOMER #	149890	FIRST NAMED INVENTOR	Peter AZUOLAS
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Joseph Teja

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
SGIC-002US02 COPY of Notice to File Missing Parts.pdf	2	Applicant Response to Pre-Exam Formalities Notice	618 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
SGIC-002US02 COPY of Notice to File Missing Parts.pdf	D500BEFD7B6F6B44794F5A93D7AB5DC04548ED0F4AC286316 F4B32772F991D5BA881C3CC6A4EB041567FCD1485C4CEE741

529FD044829E5B05C8B393671FBB30

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/833,188	01/13/2023 11:25:54 AM ET	SGIC-002US02

Title of Invention

SYSTEMS, APPARATUS, AND METHODS FOR SCALABLE LOW-LATENCY VIEWING OF INTEGRATED BROADCAST COMMENTARY AND EVENT VIDEO STREAMS OF LIVE EVENTS, AND SYNCHRONIZATION OF EVENT INFORMATION WITH VIEWED STREAMS VIA MULTIPLE INTERNET CHANNELS

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APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7083	FILED BY	Marie Spakowski
PATENT CENTER #	61433171	AUTHORIZED BY	Joseph Teja
CUSTOMER #	149890	FILING DATE	06/06/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Peter AZUOLAS

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1006	E20231CB27073846	Marie Spakowski

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2051	SURCHARGE- LATE FILING FEE, SEARCH FEE, EXAMINATION FEE, INVENTOR'S OATH OR DECLARATION, OR APPLICATION FILED WITHOUT AT LEAST ONE CLAIM OR BY REFERENCE	64.00	1	64.00
2111	UTILITY PATENT APPL. SEARCH FEE	280.00	1	280.00
4011	BASIC FILING FEE- UTILITY	64.00	1	64.00

2311	EXAMINATION OF ORIGINAL PATENT APPLICATION	320.00	1	320.00
2255	EXTENSION FOR RESPONSE WITHIN THE FIFTH MONTH -	1264.00	1	1264.00
2081	UTILITY APPL. SIZE FEE > THAN 100 PAGES (FEE X PAGES >= 101 IN 50 PAGE INCREMENTS)	168.00	1	168.00
			TOTAL AMOUNT:	**$2,160.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	17833188
Filing Date	2022-06-06
First Named Inventor	Peter AZUOLAS
Art Unit	
Examiner Name	
Attorney Docket Number	SGIC-002US02

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	10226698	B1	2019-03-12	Lockton et al.	Entire Document
	2	11451883	B2	2022-09-20	Huske et al.	Entire Document
	3	5251294	A	1993-10-05	Abelow	Entire Document
	4	5999908	A	1999-12-07	Abelow	Entire Document
	5	6529146	B1	2003-03-04	Kowalski et al.	Entire Document
	6	6701383	B1	2004-03-02	Wason et al.	Entire Document
	7	6834371	B1	2004-12-21	Jensen et al.	Entire Document
	8	6839059	B1	2005-01-04	Anderson et al.	Entire Document

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17833188
	Filing Date	2022-06-06
	First Named Inventor	Peter AZUOLAS
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SGIC-002US02

	9	6922702	B1	2005-07-26	Jensen et al.	Entire Document
	10	7133834	B1	2006-11-07	Abelow	Entire Document
	11	7729940	B2	2010-06-01	Harvey et al.	Entire Document
	12	8000993	B2	2011-08-16	Harvey et al.	Entire Document
	13	8002618	B1	2011-08-23	Lockton et al.	Entire Document
	14	8112301	B2	2012-02-07	Harvey et al.	Entire Document
	15	8149530	B1	2012-04-03	Lockton et al.	Entire Document
	16	8376855	B2	2013-02-19	Lockton et al.	Entire Document
	17	8738694	B2	2014-05-27	Huske et al.	Entire Document
	18	8813112	B1	2014-08-19	Cibula et al.	Entire Document
	19	8870639	B2	2014-10-28	Lockton et al.	Entire Document

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	20	9511287	B2	2016-12-06	Lockton et al.	Entire Document
	21	9716918	B1	2017-07-25	Lockton et al.	Entire Document
	22	9919210	B2	2018-03-20	Lockton	Entire Document

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040177002	A1	2004-09-09	Abelow	Entire Document
	2	20070043632	A1	2007-02-22	Abelow	Entire Document
	3	20100070345	A1	2010-03-18	Abelow	Entire Document
	4	20120058808	A1	2012-03-08	Lockton	Entire Document
	5	20120295686	A1	2012-11-22	Lockton	Entire Document
	6	20130225285	A1	2013-08-29	Lockton	Entire Document

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	Art Unit	
	Examiner Name	
	Attorney Docket Number	SGIC-002US02

	7	20150131845	A1	2015-05-14	Forouhar et al.	Entire Document
	8	20160086108	A1	2016-03-24	Abelow	Entire Document
	9	20170264961	A1	2017-09-14	Lockton	Entire Document
	10	20180025586	A1	2018-01-25	Lockton	Entire Document
	11	20200111325	A1	2020-04-09	Lockton et al.	Entire Document
	12	20210397847	A1	2021-12-23	Jayaram et al.	Entire Document
	13	20220254379	A1	2022-08-11	Chang et al.	Entire Document
	14	20220327830	A1	2022-10-13	Chang et al.	Entire Document
	15	20220335720	A1	2022-10-20	Chang et al.	Entire Document

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	17833188
	Filing Date	2022-06-06
	First Named Inventor	Peter AZUOLAS
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SGIC-002US02

	1	2015222869	AU	B2	2019-07-11	Chang et al.	Entire Document	
	2	1991012583	WO	A1	1991-08-22	Abelow	Entire Document	
	3	2011149558	WO	A3	2012-03-22	Abelow	Entire Document	

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Art Unit	
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	Attorney Docket Number	SGIC-002US02

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Joseph Teja, Jr./	Date (YYYY-MM-DD)	2023-01-13
Name/Print	Joseph Teja, Jr.	Registration Number	45157

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
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PCT

(10) International Publication Number
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61/396,644 28 May 2010 (28.05.2010) US
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(72) Inventor; and
(71) Applicant : **ABELOW, Daniel, H.** [US/US]; 3788 Watercrest Drive, Longwood, FL 32779 (US).

(74) Agent: **FEIGENBAUM, David, L.**; Fish & Richardson P.C., P.O. Box 1022, Minneapolis, MN 55440-1022 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

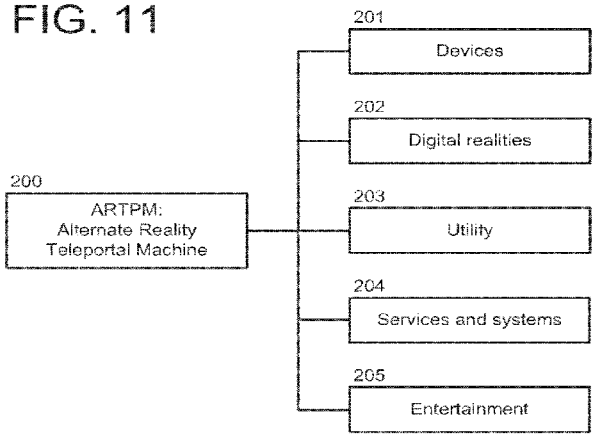
— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
22 March 2012

(54) Title: REALITY ALTERNATE

FIG. 11



(57) Abstract: The invention reconceptualizes current and new technology to provide an Alternate "human success" Reality - the "Expandaverse"- in which individual personal success and economic prosperity are accelerated and expanded. This "Alternate Reality" includes reconceptualized machines, devices, systems, personal identities, networks, infrastructure, etc. that comprise an Alternate Reality Teleportal Machine (ARTPM). In some examples the glass window is reinvented as a digital "Teleportal" (TP) that turns the world and near-space outside the Earth into one room (the Teleportal Machine or TPM), with direct "always on" access to a plurality of people, places, tools, entertainment, etc. Exceeding the many new fiction concepts that required later inventing to became real, it is an object of this ARTPM to enable the new engineering concept that human digital reality is created and chosen and not mandated, to initiate an Expandaverse of collective and personal aspirations:"If you want a better reality, choose it and enjoy it."

WO 2011/149558 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/000985

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06T15/00 (2012.01)
USPC - 715/757
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - G06F3/048, G06F17/30, G06Q 30/00, G06T15/00 (2012.01)
USPC - 345/419, 705/27.2, 715/756, 715/757

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, IEEE Xplore

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	BROLL. DWTP—an Internet protocol for shared virtual environments. 1998. Symposium on the Virtual Modeling Language 1998 (VRM '98) ACM, ACMSIGGRAPH [retrieved on 2011-11-01] Retrieved from the Internet: <URL:http://dl.acm.org/citation.cfm?id=274370> entire document	1-32, 117, 124, 126, and 504-518
Y	US 2009/0106671 A1 (OLSON et al) 23 April 2009 (23.04.2009) entire document	1-32, 117, 124, 126, and 504-518
Y	US 2006/0062564 A1 (DALTON et al) 23 May 2006 (23.05.2006) entire document	7-11, 20, 124, 126, 510-514
Y	US 2007/0298401 A1 (MOHANTY et al) 27 December 2007 (27.12.2007) entire document	19-23
Y	US 2003/0182177 A1 (GALLAGHER et al) entire document	29-30
Y	US 5,503,040 A (WRIGHT) 02 April 1996 (02.04.1996) entire document	117
A	US 6,052,123 A (LECTION et al) 18 April 2000 (18.04.2000) col 1, line 63 to col 2, line 52	1-32, 117, 124, 126, and 504-518

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 January 2012	01 FEB 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/000985

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Continuation of Box III.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-32, 117, 124, 126, 504-518, drawn to a method comprising providing services that include selecting items for presentation , the selecting based on expressed goals or interests of the recipients and variable boundary principles that encompass boundary preferences derived from both sources of the items of content and from the recipients.
Group II, claims 33-72, 437-503, drawn to a method comprising using a place management facility to manage and present item of content in a manner to maintain virtual places, each of which is persistent and at least partially local and at least partially remote.
Group III, claims 73-96, drawn to a method comprising operating an active knowledge management facility with respect to participants who have at least one expressed goal related to at least one common activity, to accumulate information about performance of the common activity and information about the success of the participants in achieving the goal; and to adjust guidance information that guides participants on how to reach the goal, based on the accumulated information.
Group IV, claims 97-114, 155-160, drawn to a method, computer implemented method and apparatus, comprising accepting from, delivering to, and communicating information expressed in accordance with conventions that are predefined to facilitate altering a reality perceived by the participants.
Group V, claims 115-116, 118-123, 125, 127-154, 368, drawn to a computer-implemented method comprising enabling a person to define characteristics of an altered reality for the person or one or more identities associated with the person.
Group VI, claims 161-171, 180-190, 369-425, drawn to an apparatus and computer implemented method, comprising maintaining a real time shared presence of a local user with one or more remote users; and communicating network alternate reality content that represents one or more features of a sharable alternative reality.
Group VII, claims 172-179, 231-252, 256-280, drawn to a computer implemented method and apparatus, comprising enabling a user at a single electronic device to simultaneously control features and functions of a possibly changing set of other electronic devices.
Group VIII, claims 191-197, 281-290, 333-342, drawn to a computer implemented method comprising maintaining a market for a set of coherent digital realities, the market including mechanisms for compensating creators and charging users.
Group IX, claims 198-207, 366-367, drawn to a computer implemented method comprising potentially varying remote reality which includes sounds or views that have been derived at a remote place, the remote reality being representative of actual experiences of a remote user, sensing changes in the local context in which the user at the local place is experiencing the remote reality, and varying the presentation of the remote reality of the local user based on the actual experience of the person at the remote place.
Group X, claim 208, drawn to a computer implemented method comprising automatically maintaining an awareness of a potentially changing direction in which a person in the locale of an electronic device is facing, and automatically and continuously changing a direction of a real time image or video content presented by the electronic device to the person to correspond to the changing direction of the person in the locale.
Group XI, claims 209-214, drawn to a computer implemented method comprising automatically sensing a state of susceptibility of the user to presentation of the alternative reality at the local place, and automatically controlling the state of presentation based on the sensed state of susceptibility.
Group XII, claims 215, drawn to a computer implemented method comprising as a person approaches an electronic device, automatically identifying the person; powering up the electronic device in response to identifying the person, automatically determining when the person is no longer in the vicinity, and powering down the electronic device in response to the determining.
Group XIII, claims 216-220, drawn to a computer implemented method comprising providing a content broadcast facility enabling users to find and access broadcasts of real time content that represent portions of alternative realities that are alternative to actual realities of the users.
Group XIV, claims 221-226, drawn to a computer implemented method comprising enabling live video discussion between two persons at separate locations, and automatically determining language differences between the two people based on their live speech during the video discussion, and automatically translating the speech of one or the other or both of the two people in real time during the video discussion.
Group XV, claims 227-230, drawn to a computer implemented method comprising using the recognized speech to enable the user to participate in an alternate reality of the user, any of the multiple identities of the user, and/or presence of the user in a virtual place.
Group XVI, claims 253-255, 426-431, drawn to a computer implemented method comprising enabling multiple users at different places to locate and simultaneously control different services available on multiple other devices, wherein the local electronic devices and multiple other devices are configured to operate using incompatible protocols.
Group XVII, claims 291-297, drawn to enabling a user who is located in a territory that is under repressive control of a territorial authority, and whose real world existence is repressed by the authority, to use the electronic device as a non-repressed identity in an alternative reality that extends beyond the territory, the enabling including managing the presence of the user to reduce impact on the real-world existence of the user.
Group XVIII, claims 298-332, drawn to a computer implemented method comprising entertaining a user by presenting aspects of an entertainment alternative reality which is presented in a mode in which the user need not be a participant or have a presence in the alternative reality or in a place where the alternative reality is housed.
Group XIX, claims 343-349, drawn to a computer implemented method comprising acquiring information associated with images captured by users of image-capture equipment, determining guidance to be provided to users of image capture equipment based on current contexts in which the users are capturing the additional images, and making the guidance available for delivery electronically to users in connection with their capturing of the additional images.
Group XX, claims 350-355, drawn to a computer implemented method comprising dynamically generating an interface for each user, when electronic devices have incompatible platforms.
Group XXI, claims 356-365, drawn to a computer implemented method comprising maintaining information about personal, individual, specific and detailed actions, behavior and characteristics of users, making the information publically available to users, and enabling the users to use the publically available information to improve their performance or reduce their failures with respect to identified goals.
Group XXII, claims 432-436, drawn to a computer implemented method comprising using a presence facility to derive and distribute presence information about the presence of the participants.

Continuation of Box III (con't)

The inventions listed as Groups I-XXII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: providing services that include selecting items for presentation , the selecting based on expressed goals or interests of the recipients and variable boundary principles as claimed therein is not present in the invention of Groups II-XXII. The special technical feature of the Group II invention: a place management facility to manage and present item of content in a manner to maintain virtual places, each of which is at least partially local and at least partially remote as claimed therein is not present in the invention of Groups I, III-XXII. The special technical feature of the Group III invention: operating an active knowledge management facility with respect to participants who have at least one expressed goal related to at least one common activity, to accumulate information about performance of the common activity and information about the success of the participants in achieving the goal; and to adjust guidance information that guides participants on how to reach the goal, based on the accumulated information as claimed therein is not present in the invention of Groups I, II, IV-XXII. The special technical feature of the Group IV invention: accepting from, delivering to, and communicating information expressed in accordance with conventions that are predefined as claimed therein is not present in the invention of Groups I, II, III or V-XXII. The special technical feature of the Group V invention: enabling a person to define characteristics of an altered reality for the person or one or more identities associated with the person as claimed therein is not present in the invention of Groups I-IV, VI-XXII. The special technical feature of the Group VI invention: maintaining a real time shared presence of a local user with one or more remote users; and communicating network alternate reality content that represents one or more features of a sharable alternative reality as claimed therein is not present in the invention of Groups I-V, VII-XXII. The special technical feature of the Group VII invention: enabling a user at a single electronic device to simultaneously control features and functions of a possibly changing set of other electronic devices as claimed therein is not present in the invention of Groups I-VI or VIII-XXII. The special technical feature of the Group VIII invention: maintaining a market for a set of coherent digital realities, the market including mechanisms for compensating creators and charging users as claimed therein is not present in the invention of Groups I-VII, IX-XXII. The special technical feature of the Group IX invention: remote reality which includes sounds or views that have been derived at a remote place, the remote reality being representative of actual experiences of a remote user, sensing changes in the local context in which the user at the local place is experiencing the remote reality, and varying the presentation of the remote reality of the local user based on the actual experience of the person at the remote place as claimed therein is not present in the invention of Groups I-VIII, X-XXII. The special technical feature of the Group X invention: automatically maintaining an awareness of a potentially changing direction in which a person in the locale of an electronic device is facing, and automatically and continuously changing a direction of a real time image or video content presented by the electronic device to the person to correspond to the changing direction of the person in the locale as claimed therein is not present in the invention of Groups I-IX, XI-XXII. The special technical feature of the Group XI invention: automatically sensing a state of susceptibility of the user to presentation of the alternative reality at the local place, and automatically controlling the state of presentation based on the sensed state of susceptibility as claimed therein is not present in the invention of Groups I-X, XII-XXII. The special technical feature of the Group XII invention: as a person approaches an electronic device, automatically identifying the person; powering up the electronic device in response to identifying the person, automatically determining when the person is no longer in the vicinity, and powering down the electronic device in response to the determining as claimed therein is not present in the invention of Groups I-XI, XIII-XXII.

The special technical feature of the Group XIII invention: providing a content broadcast facility enabling users to find and access broadcasts of real time content as claimed therein is not present in the invention of Groups I-XII, XIV-XXII. The special technical feature of the Group XIV invention: enabling live video discussion between two persons at separate locations, and automatically determining language differences between the two people based on their live speech during the video discussion, and automatically translating the speech of one or the other or both of the two people in real time during the video discussion as claimed therein is not present in the invention of Groups I-XIII, XV-XXII. The special technical feature of the Group XV invention: using the recognized speech to enable the user to participate in an alternate reality as claimed therein is not present in the invention of Groups I-XIV, XVI-XXII. The special technical feature of the Group XVI invention: enabling multiple users at different places to locate and simultaneously control different services available on multiple other devices, wherein the local electronic devices and multiple other devices are configured to operate using incompatible protocols as claimed therein is not present in the invention of Groups I-XV, XVII-XXII. The special technical feature of the Group XVII invention: enabling a user who is located in a territory that is under repressive control of a territorial authority, and whose real world existence is repressed by the authority, to use the electronic device as a non-repressed identity in an alternative reality that extends beyond the territory, the enabling including managing the presence of the user to reduce impact on the real-world existence of the user as claimed therein is not present in the invention of Groups I-XVI, XVIII-XXII. The special technical feature of the Group XVIII invention: entertaining a user by presenting aspects of an entertainment alternative reality which is presented in a mode in which the user need not be a participant or have a presence in the alternative reality or in a place where the alternative reality is housed as claimed therein is not present in the invention of Groups I-XVII, XIX-XXII. The special technical feature of the Group XIX invention: acquiring information associated with images captured by users of image-capture equipment, determining guidance to be provided to users of image capture equipment based on current contexts in which the users are capturing the additional images, and making the guidance available for delivery electronically to users in connection with their capturing of the additional images as claimed therein is not present in the invention of Groups I-XVIII, XX-XXII. The special technical feature of the Group XX invention: dynamically generating an interface for each user, when electronic devices have incompatible platforms as claimed therein is not present in the invention of Groups I-XIX, XXI-XXII.

The special technical feature of the Group XXI invention: maintaining information about personal, individual, specific and detailed actions, behavior and characteristics of users, making the information publically available to users, and enabling the users to use the publically available information to improve their performance or reduce their failures with respect to identified goals as claimed therein is not present in the invention of Groups I-XX, XXII. The special technical feature of the Group XXII invention: a presence facility to derive and distribute presence information about the presence of the participants as claimed therein is not present in the invention of Groups I-XXI.

Groups I to XXII lack unity of invention because even though the inventions of these groups require the technical features of a computer implemented method comprising creating, enabling and communicating an alternative reality which allows users to define virtual identities and to share the experiences of their virtual identities in a virtual world, the users at different geographical locations and on different types of electronic devices, the sharing including video and audio, this technical feature is not a special technical feature as it does not make a contribution over the prior art in view of US 6,052,123 A (LECTION et al) 18 April 2000 (18.04.2000) column 1, line 63 to column 2, line 52; and also BROLL. DWTP—an Internet protocol for shared virtual environments. 1998. Symposium on the Virtual Modeling Language 1998 (VRM '98) ACM, ACMSIGGRAPH. pp. 49-56.

Since none of the special technical features of the Group I to XXII inventions are found in more than one of the inventions, unity of invention is lacking.

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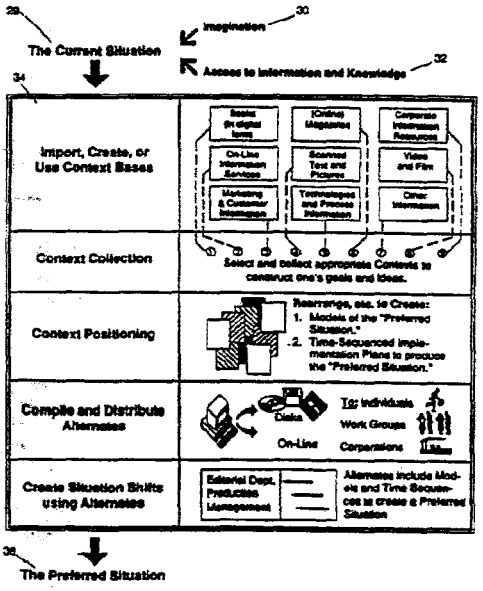
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(57) Abstract

A new category of computer software and the like provides a bridge between imagination (30) and reality. This new type of software helps its users improve, create, or transform (34) specific situations for an individual, work group, business unit, or organization. The software provides a new type of interactive information environment in which users can invent unique micro- and macro-constructs of existing or proposed situations, processes, and products, especially those that cause or are affected by change. One aspect of the software, the "Contextualizer", serves as en "engine" whose users (1) locate and collect current or desired Contexts and sub-Contexts, (2) rearrange the collected Contexts into "Alternates", which are preferred or idealized situations, (3) time-sequence the preferred Contexts into implementation plans, and (4) merge or link Alternates to create larger combinations that are named "Situation Shifts". Thus, the "Contextualizer" is tool-making software, while the "Alternates" are the tools that are constructed.



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CONTEXTUALIZER AND ALTERNATES

Background of the Invention

This invention relates to computer-based systems for assembling, organizing, and distributing information.

Conventionally, as outlined in Luconi, Malone, and Morton, (Fred L. Luconi, Thomas W. Malone, and Michael S. Scott Morton, "Expert Systems and Expert Support Systems: The Next Challenge for Management," in John F. Rockart and Christine V. Bullen, ed., The Rise of Managerial Computing: The Best of the Center for Information Systems Research, Sloan School of Management, MIT (Homewood, IL: Dow Jones-Irwin, 1986), pp. 365-371), computers are used to solve problems using several different paradigms. In traditional data processing, the input, output, and procedure for generating the output from the input are well-defined and thus suited to conventional programming.

A second paradigm, decision support systems, uses the decision making ability of people to control the problem solving goals of the computer.

A third paradigm of computing, expert systems, is directed to even less structured problems.

The fourth, closely related, paradigm of computing, expert support systems, closely resembles expert systems. They actively process knowledge, draw conclusions, and make recommendations, thereby supporting experts rather than replacing them.

Other problems exist that do not fit into one of the four paradigms. These problems 40, shown in the upper right quarter of Figure 4, are highly unstructured, complex, and often involve new or rapidly changing products, competitors, markets, technologies, employees, and procedures. Multiple objectives overlap and sometimes conflict, such as the market share of established products, launching next generation products, lowering costs, and profitability.

Software applications are available that permit the creation of novel projections and models, such as spreadsheets which are used to project "what if" financial models. Simulations permit computerized modeling of real phenomena where the computer simulation can be compared to a natural event such as weather (a thunderstorm) or a scientific experiment where the outcome is unknown (DNA splicing). Industrial design illustrates how imagined constructs can be simulated on computers (air flow over a new airplane wing design or the performance of an integrated chip schematic). In many situations, favorable results on the computer result in real-world implementations.

A highly structured example is project management software, which permits a series of tasks to be named in a sequence, resources and personnel allocated to them, and their implementation tracked. One of these systems is the critical path method (CPM), in which a network of activities is created that shows the sequence of operations and the interdependencies of a manufacturing process. A variation of this basic

method is PERT (Project Evaluation and Review Technique) which uses multiple estimates to provide a probabilisitic output. These systems are frequently computerized and searched to find the critical item; i.e., the item that is, in effect, the latest, and which determines the final completion date. Project management software establishes a schedule of activities, assigns a time duration estimate to each activity, and establishes baseline dates for the start and completion of each activity.

Computer technologies increasingly permit the nature of work and planning to be originated in mental and abstract concepts. Software to accomplish this includes Computer Aided Design (CAD) which allows new mechanical or electronic conceptions to be constructed on the computer screen. Some CAD software is integrated with manufacturing machinery, indicating the potential for rapidly manufacturing and marketing certain types of computer-expressed ideas. CAD's approach has also been extended into areas like software design, engineering design, and architectural drafting. Imaginative ideas that have been designed on computers have been introduced and developed successfully in a variety of fields.

HyperCard is a new kind of software application that can create information linkages in which individual titles, words, pictures, and parts of pictures are each linked to a related screen of information. Each of these screens must be designed, written, and created; together they form the HyperCard "stack" that can be

accessed by an individual application. The HyperCard links are individual "buttons" that are fixed on each screen and each link is individually programmed to call a specific screen in a "stack" of screens. Good examples of flexible software applications are word processing and spreadsheets, which permit users both broad scope and ease of use.

Known software applications to aid learning include on-line help, Expert Systems, Computer Aided Instruction (CAI), and Computer Based Training (CBT).

On-line help is used to teach software applications to computer users when they need guidance. Its rapidly accessed instructions help users read the steps they should take in using the software; by trying the steps they may be able to learn unfamiliar parts of the software quickly.

Expert Systems are used to capture expertise and deliver it via the computer. Expert Systems have succeeded in enabling computers to reason from knowledge within specific domains, and they have been applied to specialized areas like medicine, geology, and financial planning. The power of an Expert System depends on the quality of the decision-making rules used to construct its inferences, and the breadth of its knowledge base. Because the knowledge is stored in active, rule-based form, there is an unfortunate relationship between the quantity of knowledge, the number of rules, and the resulting search time. The greater the scope of an Expert System, the more complicated its programming and the slower the response time.

Computer Aided Instruction (CAI) and Computer Based Training (CBT) are uses of the computer for education and training. Unlike on-line help or Expert Systems, with CAI and CBT one stops work and uses the computer to learn, then returns to work. CAI and CBT are typically separated from an ongoing situation.

Summary of the Invention

In general, in one aspect, the invention features assembling a body of stored information by selecting segments from a larger available group of information segments, by (a) displaying a set of tokens, each token indicating the content of a corresponding one of the segments in the available group, (b) enabling a user to point to a succession of tokens in the set using an electronic pointing technique, (c) for each token to which the user points, immediately and simultaneously displaying the corresponding segment to the user, and (d) assembling the body in response to selections made by a user.

In general, in another aspect, the invention features assembling such a body by steps (a) and (b) and (c) for each token to which the user points, displaying the corresponding segment to the user, and (d) simultaneously while displaying the segment corresponding to the token to which the user is pointing, displaying a segment corresponding to a token to which the user had previously pointed.

Preferred embodiments of the invention include the following features. Simultaneously while displaying the set and the segment to which the user is pointing, a

second set is displayed comprising an accumulation of tokens to which the user has previously pointed. There are a plurality of available groups of information, and, for each group, an associated set of tokens is displayed. The second set comprises a user selected or independently developed accumulation of tokens corresponding to selections made with respect to all of the groups. The second set is organized either by the user or independently in accordance with a model, such as a hierarchy (e.g., an outline) of at least two levels. or a time sequence. In response to a user's commands, the organization of the tokens in the second set may be revised to modify the model. Also in response to commands of a user, the content of the tokens in the second set may be changed. The group of information segments may be available on-line from a remote location. Only the segments corresponding to the tokens in the second set are compiled into the body of stored information. In response to commands of a user, a token may be eliminated at a higher level of the hierarchy. The second set may be displayed by placing each token in a visual position (e.g., indented) which reflects its position in the model relative to the visual positions of other tokens. In response to commands of a user, either the set or the second set may selectively be made active to said user. The set, the second set, and the segments may be displayed in windows. The proportions of the display occupied respectively by the windows.may be altered. Multiple models of the second set may be established and displayed selectively to the user. The tokens comprise textual phrases that are organized, such as into

heirarchies, lists, and time sequences. Multiple bodies of stored information may be assembled, each body being assembled by selecting segments from a larger available group of information segments; a name is assigned to each body of stored information, and the names are displayed in an organized model.

In general, in another aspect, the invention features production of an annotated body of stored information by (a) specifying keys each of which may appear within the body of stored information, (b) searching the body of stored information for instances of each of the keys, (c) defining boundaries of segments of the stored information, each segment including at least one of said instances, (d) assigning to each segment a token based on a key found within the segment, (e) displaying each segment to a user, (f) in response to commands from the user, adjusting the boundaries of at least one of the segments.

Preferred embodiments of the invention include the follwing features. The boundaries are defined on the basis of criteria specified by the user. The keys comprise textual phrases. The stored information comprises text and other forms of data. The boundaries may be, e.g., beginnings and ends of paragraphs. In response to user commands, selected segments and corresponding tokens are compiled, each token indicating the content of the corresponding segment.

In general, in another aspect, the invention features aiding a user in accessing a body of stored information which includes segments of related

information by (a) displaying a set of tokens, each token indicating the content of a corresponding one of the segments, the tokens being displayed in an organized hierarchical model reflecting relationships among the corresponding segments, (b) enabling a user to point to a succession of tokens in the model using an electronic pointing technique, and (c) for each token to which the user points, immediately and simultaneously displaying the corresponding segment to the user.

Preferred embodiments of the invention include the following features. In some embodiments,. the user may be prevented from changing the order or content of the set of tokens or the content of the segments. In other embodiments the order or content of the set or the content of the segments is altered based on user commands. One of the tokens may comprise another set of tokens which itself corresponds to other segments of stored information.

In general, in another aspect, the invention features storage containing a body of information comprising segments, the storage also containing a set of tokens, each token indicating the content of a corresponding one of the segments, the tokens being arranged in an organized model reflecting relationships among corresponding segments, and software for displaying the model and for enabling a user to access a selected segment by invoking a corresponding token in the model.

In general, in another aspect, the invention features providing assistance to a user of an application program by (a) in response to a user requesting assistance in the course of using the program, displaying a set of tokens, each token indicating the content of a corresponding segment of assistance information, the tokens being displayed in an organized model, and (b) simultaneously while displaying the set of tokens, displaying a segment of assistance information corresponding to one of the tokens selected by the user.

In general, in another aspect, the invention features aiding a user to scan a set of displayed data items while simultaneously performing another interactive task using the display, portions of the set being expressible at two levels of detail, some of the items being included at one level of detail and excluded at the other level of detail. Selective portions of the set are displayed at different levels of detail in response to user commands, while simultaneously displaying other information and responding to the user with respect to the other interactive task.

Preferred embodiments include the following features. A controllable range indicator is displayed which indicates a range within the set for which the display is at one level of detail, and the span of the indicator is adjusted in response to user commands. A marker is provided within the range which indicates a user selection of a data item in the set.

In general, in another aspect, the invention features facilitating the organization, distribution, and use of digital information of the kind that can be displayed on a computer, by (a) dividing the information into discrete segments, various segments being represented respectively by incompatible digital representational schemes, (b) providing the segments to a user in accordance with a unified digital representational scheme, (c) associating with each segment a token indicative of the content of the segment, (d) collecting a set of segments that are related by subject matter, (e) organizing the tokens associated with the segments in accordance with a model based on the content of the segments, (f) distributing the collected segments and model to a second user, (g) displaying the collected segments to the second user, and (h) altering the organization of the tokens in accordance with a revision of the model in response to the second user.

Other advantages and features will become apparent from the following description of the preferred embodiment and from the claims.

Description of the Preferred Embodiment

We first briefly describe the drawings.

Figures 1 through 3 illustrate principles of the invention.

Figure 4 shows the types of software needed to satisfy different types of business needs.

Figure 5 shows a current computing paradigm.

Figures 6 and 7 show this invention's leverage points for improving corporate and global economic performance.

Figure 8 illustrates a new relationship between imagination and computing.

Figure 9 shows the traditional lag between hardware and software development.

Figure 10 illustrates the new evolution of "imagination-driven computing".

Figures 11 through 14 show the Main Menu.

Figure 15 shows the on-line Alternate.

Figures 16 through 38 show the operation of Context Collection.

Figures 39 through 52 show the operation of the Context Positioning.

Figures 53 through 65 show the operation of running an Alternate.

Figures 66 and 67 show the Cognitive Window.

Figures 68 through 75 show the operation of Management of Alternates.

Figures 76 through 87 show the operation of Create Context Bases.

Figures 88 and 89 show alternative models.

Figures 90 and 91 illustrate the new information enviroment proposed by the invention.

Figures 92 through 95 and 112, show menus and menu operations.

Figures 96 through 98, 122, and 123 show Context Collection.

Figures 99, 100, 102 through 106, and 124 show Context Positioning.

Figures 101 and 107 through 111, show Time-Sequencing.

Figures 113 through 121 show Alternates.

Figures 125 through 126, and 142 show Managing Alternates, including Outline Modeling and Time-Sequencing Situation Shifts.

Figures 127 through 131 show Cognitive Windows.

Figures 132 through 136 show the creation of Context Bases and information sources.

Figures 137 through 139 show the control of screen displays.

Figure 140 shows the Copyright Payment System.

Figure 141 shows the on-line Context System (i.e., the on-line Alternate).

Principles of the Contextualizer

The new computing paradigm of the present invention starts from a new kind of world view: A global economy is emerging with rapid flows of capital, knowledge, products, and competitive pressures. A growing number of companies and industries face new needs to leapfrog their limits and become effective competitors on a global level, transforming their performance, productivity, adaptation, and innovation capabilities. Is it possible for a single leverage point to help fill part of these needs?

Figure 6 illustrates the proposed leverage point 50 for the global economy, while Figure 7 illustrates this leverage point 60 for a single corporation.

The leverage point is a so-called Contextualizer which can be embodied as a single mass-manufactured product that can be distributed through established marketing channels to those who might want to use it to transform their situation.

The Contextualizer operates in a fundamentally new way, and empowers its users to employ imagination-driven computing in the best ways to create their Preferred Situations. It assumes that modern society has developed sufficient knowledge and know-how that many desirable ends might be imagined and implemented, and it provides a tool to express desires, along with a method to reach our preferred situations. In a phrase, this software shifts the origin of reality to our imaginations.

Referring to Fig. 5, in the conventional computing paradigm, managers and users of computing 48 apply software technology 41 on top of existing organizations, manufacturing processes, services, office work, and situations 42, 43, 44, 45, 46, 47. In the new computing paradigm of the invention, the starting point is the active conception of new goals and combinations. The computer becomes a tool used to express and implement the transformations desired. With the Contextualizer, users create so-called "Alternates" interactively and those Alternates may be used to produce material transformations in the world, in organizations, and in relationships.

Turning now to Figure 8, in this new computing paradigm, computers 72 are used as a tool to express and

produce shifts from current situations to preferred situations. At a computer workstation 72 running this software and offering sufficient on-line Contexts, one or more users 70 might interactively formulate a transformation of the current situation. The "Contexts" are collected from so-called Context Bases 74, 76, 78, 80, 82, 84 and re-arranged into imagination-driven arrangements called Alternates 84. This is a transformation in which the imagination of the user directs the re-assembly of elements and knowledge from the existing world, as well as novel creations, to create Preferred Situations.

Some of the objectives of the Alternates 84 created by this invention's imagination-driven computing might include: improve personal, group, or organizational performance; solve various types of personal, operating, or group problems; respond to rapid technological or social change; initiate advantageous changes in an organization; and create and introduce innovations in a situation. The Alternates 84 may be ordered in a sequence to create a Situation Shift 86. The Alternates 84 are distributed to the end users on disk, on-line, or by other digital media (88).

At one end of the spectrum, some of the preferred situations may resemble existing situations while introducing only small improvements. At the other end of the spectrum, users may attempt to shift the Contextual rearrangement into an entirely imagined situation. Regardless of where a transformation lies on this spectrum, the invention may be used to conceive

novel combinations of Contexts, and implement specific, concrete innovations.

The invention may be useful in transforming materials (manufacturing based), products (design or R&D based), organizations (organization based or relationship based), markets (marketing based), overall situations ("Situation Shifting"), people (individual goal based), and may provide other imagination-driven opportunities.

In all these cases, the Contextualizer may provide a growing opportunity for individuals, employees, and organizations to create transformations in one or more dimensions, including: their material transformations; their structure and processes; the organization's structure and relationships; their performance and productivity; their adaptation to new situations and responsibilities; their ability to create and implement innovation; and new ways to provide imagination-driven information products and services.

This new type of software is defined by its novel purposes: the improvement or fabrication of reality based on its users' ideas and imaginations.

The following outline of terms and concepts will aid the reader's understanding. (A) The Contextualizer: An interactive development "engine" used to collect Contexts, arrange and link them appropriately, plan and schedule their implementation, compile Alternates for distribution, and modify the Alternates.

(1) Contexts: The elements of a situation (segments of a body of information) that may be stored in a digital format and used in Alternates, including skills, methods, tasks, goals, internal and external relationships, tactics, explanations, graphics, pictures, video, audio and other essential factors communicated in various types of data. Contexts may either resemble the current situation (the "current situation"), or they may express a goal (the "preferred situation"). The transition is achieved by "situation shifting". The current or preferred situation may apply to an individual, group, job category, department, business unit, corporation, or organization.

(2) Contexts Selected: The Contextualizer is used to collect Contexts.

(3) Origin of Contexts:

(a) If a Context has been computerized and imported into the Contextualizer, it can be directly selected and used to develop Alternates.

(b) If a Context has been computerized but not imported into the Contextualizer it can be imported and "templated" using the "Create Context Bases" features.

(c) If a Context has not been computerized, two options are available: First, it may be scanned or typed, thus computerizing it. Then it can be imported into the Contextualizer and "templated" using the "Create Context Bases" feature. Second, a "placeholder" and a note may be included in the Alternate instead of the Context. These may offer

information such as the title of the Context and where to find its contents.

(4) Context Bases: The following sources of Contexts are available or can be developed using the "Create Context Bases" tools (discussed below):

(a) Previously created Alternates may be accessed as sources of Contexts to create or modify other Alternates. This permits rapid sharing of information, Contexts, Outline Models, or Time-Sequence Models between many different users of Alternates.

(b) Many corporations already have word processor files and data bases containing an array of internal manuals, reports, memos, and data used in many jobs.

(c) Many trade publications cover individual industries and professions in detail, and the full text of hundreds of these are available on-line, searchable to locate specific information.

(d) On-line databases offer rapid access to an enormous range of specialized information and publications.

(e) Future sources: Modern societies publish vast amounts of Contextual information including "how-to" skills, analyses, data, and explanations covering a vast array of industries, jobs, personal improvements, and many other types of situations. As computer technology evolves, it may be possible for an increasing variety of books, magazines, and other publications to continue growing in on-line

availability or on computer-readable media. (Most publications are already captured electronically by their creation in word processing or their production in typesetting. The question of rapid availability is answered by market demand and vendor development. The technological barriers are significant but not as great.) Related technologies are improving, such as distribution of large volumes of information via optical (CD) discs, OCR text scanning, and automated text parsing.

(5) Context Collection: This is a simplified way to search Context Bases and collect Contexts. While this was developed for the Contextualizer, it may have wider application. Here it is used to examine and collect Contexts.

(6) Context Positioning: Once appropriate Contexts have been collected, they can be rearranged into an Alternate. This is a flexible process that includes two independent parts: Rearranging and Time-Sequencing Modeling. First, the Contexts can be Rearranged into Alternates based on current or preferred situations, as imagined by the user. Second, they can be Time-Sequenced to schedule their implementation or use. While Context Positioning was developed for the Contextualizer, it may have wider application then rearranging the items found from searches of large Context Bases. Here it is used to rearrange Contexts to create Alternates.

(B) (An) Alternate: An Alternate is a free-standing computer program that includes collected contexts and may include a software "engine"

for accessing the Contexts collected and organized within the Alternate. The Alternate's goal may be to improve one part of a current situation, several parts of a situation, or transform the situation. An Alternate may have up to three components which together define its structure, access, content, and implementation:

(1) (The) Model: The Model is the structure and layout of an Alternate that has been interactively created or modified by a user. The Model is also the access pattern to its Context Clusters and single Contexts. A Model may be an Outline Model, arranged hierarchically, a Time-Sequence Model, or another kind of Model.

(2) (The) Guide: The guide is the text and graphics (graphics, pictures, video, etc.) in each Context.

(3) (The) Time-Sequence Model: The Time-Sequence Model is the implementation plan for shifting from the current situation to the preferred situation. Time-Sequence Models are interactively created or modified by a user.

(C) Situation Shifting: The process of using the Contextualizer and Alternates to transform the Current Situation into a Preferred Situation.

(1) Computing Infrastructure and Distribution System: Contextualizer software is intended to run on current and faster computer systems, including the next generation of microcomputers.

Software development generally lags behind hardware development in each generation of computer technology (see Figure 9); this invention may leapfrog that cycle and create a potentially productive new type of computing that takes advantage of faster CPU speeds and the increased capacity from optical disc storage and other types of massive data storage and retrieval systems.

Alternates may be (a) run on the same computers that run the Contextualizer, (b) distributed on-line, or (c) distributed or sold on floppy disks to run on older generation computers, including widely installed business microcomputers. This harnesses the majority of the rapidly growing computer infrastructure as a distribution system for the potential improvement of situations according to the imagination and desires of people who utilize this type of computing.

(D) Create Context Bases: At this time, computer-readable sources of Contexts are significant but limited. This is a separate component of the Contextualizer developed to overcome this limitation. Its specific domain is semi-automating the templating of Contexts into Context Bases to make them suitable for the Contextualizer.

(E) Copyright Tracking: This was created so users may take advantage of many valuable copyrighted Context Bases. This tracks the use, amounts due, and payments for copyrighted information. Including it in the software protects intellectual property and it may also stimulate some publishers to

make some Context Bases available for developing Alternates.

The present invention is specifically a system for users to rapidly collect and rearrange a wide variety of specific Contexts into flexible, imagination-driven patterns and then to access them rapidly for guidance when needed to improve performance or to transform situations. The present invention both captures new ideas in "how-to" arrangements and provides access to this know-how. This invention seeks to give a wide variety of casual users the capacity to interactively capture learning and apply it to improve their performance or transform their situation. It permits these unique constructs to, in turn, be used as sources if Contexts, Outline Models, or Time-Sequence Models to be used in creating or modifying other imaginative constructions. This permits the rapid sharing of imagination patterns of information, time-sequence implementation plans, how-to guidance, etc. on a large scale.

One example of a user of the invention may be an executive or a staff specialist in the headquarters of a corporation or another type of organization. That person might use the invention from the "top down" to develop Alternates centrally, then distribute them to users who run them locally to improve or change their situations. In this "top down" pattern, central management implements specific sequences of Alternates to achieve the Situation Shifts they desire. Where economies of scale are important, similar or related

Alternates can be deployed across departments. This approach mirrors the conventional top-down management of some managers. It supports their centralized control despite the decentralizing influence of information systems.

A second example user creates Alternates locally, where external conditions (such as market proximity or the rate of technological innovation) are crucial, i.e., where decentralized or "bottom up" use is preferred. In local situations, the Contextualizer may be used by individuals and work groups to make themselves more effective leaders, competitors, and innovators. "Decentralized" individuals know the local bottlenecks in products, services, customer response, or ineffective links between divisions of a company. They might construct and share Alternates and implementation sequences that include local "how to" skills, methods, analyses, and other types of targeted procedures that transform performance, products, or the situation. With the Contextualizer, on-the-spot individuals or groups might use their local knowledge more effectively to imagine and plan small or large breakthroughs, while shifting their situation step-by-step.

With software that more closely connects imagination with reality, it may be possible to increase the creative potentials of key people and groups in many organizations. Today, the ability to remain in the lead economically means creating innovations and reshaping organizations to commercialize them successfully. In our age of innovation, the value of the creative

imagination and on-the-spot adaptation may be growing. This invention may help people master new situations and leverage available human and financial resources to achieve the higher level of performance required today.

Five additional examples illustrate possible ways to apply the invention to personal, business, and non-profit needs.

The first example is personal use by a new employee in a new job, or by that employee's manager. The invention is used to assemble and compile one or more Alternates that provide on-the-fly access to skills, relationships, explanations, underlying technology, performance guides, and background information that is specific for the new employee's job. As is typical in many corporations, that employee's responsibilities may change often. As new responsibilities are added and old ones dropped, the Contextualizer may be used to modify the employee's current Alternate(s). In this manner, the Alternate functions as a learning tool that operates at the edge of the employee's new knowledge and performance, providing guidance and support in becoming productive earlier when each new responsibility is added. The design of the employee's tool may be directed by management, by the employee, or by blending their combined insights and experience.

The next example is personal use by an independent professional such as a corporate attorney who repeatedly encounters new situations and Contexts, for example, in drafting agreements with foreign

corporations, defending against unexpected product liability lawsuits, or spinning off a high technology work group as a separate company that markets new information systems. This attorney may modify his Alternate to include the Contexts he needs in each new legal project, to boost his productivity in the unfamiliar areas. If a rush project arises, he might rapidly create a new Alternate for that project, collecting the preferred Contexts he needs and rapidly organizing them into a framework for both early progress and later rapid advance to sophisticated results.

Two examples of corporate uses illustrate the two sides of technology-based competition. One example is of a company that wants to drive innovation; the second is of a company that must respond to it.

The first example is a business unit dedicated to doubling the life of small consumer batteries while cutting their price in half (this is comparable to what has been achieved in many products, with numerous examples in consumer electronics). This battery business unit is attempting to use innovation strategically, to leapfrog its industry with a next-generation product and establish itself as the leading company while defeating its competition. To succeed, it might use the Contextualizer both centrally and locally to create and manage a time-phased transformation of its situation first internally and then externally. This begins with developing Alternates that start from the present skills and relationships in each department: research and development (R&D),

product design and marketing, manufacturing, distribution channel control, etc. The Alternates introduce initial situation shifts in each department, with successive Alternates introduced to stimulate a comprehensive transformation to the preferred situation: research, developing and manufacturing the new products, market testing, launching them to establish market share, and capitalizing on every type of competitive advantage that they imagine. Thus, this invention might help companies leapfrog their competitors by developing and commercializing new technologies.

The next example illustrates how competitors might use the Contextualizer to respond to the new battery technology quickly to avoid losing market share (as happened when products like radial tires were introduced by Michelin, faster supercomputers by Cray Research, Ready Asset Accounts by Merrill Lynch, etc.). To accelerate their response, the Contextualizer might be used to develop Alternates that include the new skills, procedures, internal and external relationships, and implementation sequences needed to respond in key jobs and departments. To increase the speed of response and provide enhanced performance at an earlier date from many key areas throughout the corporation, the Alternates may be distributed and accessed on local microcomputers or terminals at employees' desks. Thus, this invention might help the organization accelerate its adaptation to sudden technological attacks.

A final example is a nonprofit environmental group which wants to launch a new program of setting up wildlife shelters for injured animals outside of major cities across America. It uses the Contextualizer to access Context Bases to collect Contexts it needs about non-profit organization fund raising and growth, wildlife feeding and habitats, veterinary care, ecology, and zoo management. It then rearranges the Contexts into appropriate Alternates: volunteer recruitment, fund raising and membership drives, animal helpers (veterinarians, daily staff, and part-time volunteers), zoological management, and Alternates for other functions needed to develop this new program.

Built on the foundation of these examples, the larger vision is clearer. The capabilities of individuals, groups, and organizations are often underestimated. In virtually every kind of situation, people display competence and creativity in dealing with both routine and novel difficulties. An extraordinary richness of talent is advancing a wide diversity of interests in modern societies. Extensive personal and organizational abilities create and drive the changes.

The invention is useful as a practical tool for those who lead or are involved in personal, group, or organizational change -- especially adjustments or alterations based on new types of goals or new technologies. The users of the Contextualizer project (1) what they prefer their situation to be, and (2) how they want to model and implement the changes. The Contextualizer may be used in free-form exploratory

ways, or it might be applied via structured methodologies. The Contextualizer is flexible in empowering the forces of individual imagination and belief.

Consider the potential role of imagination in a rationally managed business that is (partly) planned and developed using this new software. First, managers determine the preferred situation for the business. This includes defining goals and understanding the factors that cause various strategies to succeed in reaching the goals. With this in mind, models can be built to implement situation shifting. Once a conceptual model is developed, operating procedures and implementation sequences are specified along with systems to measure results and compare the outcome to milestones. If the outcome is above or below reasonable limits, new situations must be imagined and new models constructed to shift into them. If the outcome approximates what was desired, management succeeded in creating their preferred situation. A process like this might merge the imaginations of individuals, the belief systems of groups, the implementation talents of organizations, and traditional management sciences.

The invention will help extend the span of control over change itself to individuals and organizations which may prove useful in an age of rapid and strategic innovation.

Referring to the top of Figure 10, it is clear that the conventional software development 102 and predictions for future software development 106, 108

include only three of these four circles; the imagination circle 104 is only minimally included and its potential contribution is not explicitly supported by software 102. The invention specifically recognizes, includes, and empowers the fourth circle 104; the human imagination is intimately merged with information technology and economic activity 109 until it increasingly becomes a potential source of everyday improvements in reality.

It is proposed that this new synthesis may become essential as the process of innovation and commercialization of new technologies increasingly merge to drive global competition. While science and technology are widely recognized as the foundation for global economic leadership and geopolitical power, it is "the differential ability of nations to carry out and capitalize on the results of R&D" that determines global leadership.

The imagination is a central part of this process, but this process has not been explicitly developed as a software application, nor has the imagination been empowered as the central feature of such software prior to this invention. A key element for modern commercial success may not be whether a company has powerful information processing systems, but whether information technology extends employees' abilities to transform the organization and the world by expressing and implementing new ideas and learning.

While this new type of software may move the origin of reality toward people's imaginations, may also

produce greater control over the process of change. Since Alternates are designed in a flexible mental space (the imagination) that is represented on the computer's screen, many Alternates will start with the current situation and move incrementally, by a series of small situation shifts, to create the preferred situation. Other Alternates may leap ahead to the preferred situation, and attempt to design and introduce it as rapidly as possible. Alternates may or may not be realistic; it is up to each user to determine the preferred situations that are viable, when they should be implemented, by whom, and why. Though this invention may empower the imagination to shape reality, our dreams are kept reasonable by what is possible, desirable, and morally right for each user in each situation.

Executives, for example, normally work on a job in parallel by including many sources of information that may come from people, on paper, or from the computer screen. While the Contextualizer offers more Context Bases, it also provides tools for quickly narrowing what is collected, and rapidly focusing it into an Alternate that models the preferred situation, prioritizes tasks and sequences its implementation. Thus, it might make some contribution to concentrating the stream of parallel activities and controlling planned transformations.

The key situation shift that may be stimulated by this invention is a shift from being acted upon to acting on. Individuals, groups, and organizations in a variety of situations may be empowered to select

more important or more appropriate goals and develop Alternates that may help them shift into their preferred situations. In a dynamic and free society, this is potentially a valuable capability for rapid progress, economic performance, and many types of human improvements. This may also be a strategic advantage that is only available to free societies. Cultures that support individual freedom may gain new personal and economic potentials from "imagination-driven" computing, and this may not be available to those that are organized to restrict and control human beings.

Implementation Example

Referring to Figure 1 imagine that a new Editorial Assistant 10 has been hired at a magazine publisher. This publisher is reorganizing itself to launch a major new magazine. Throughout the publishing company and in the Editorial Department, a series of shifts in operations are planned to accomplish the creation and launching of a new magazine with the current staff and resources. Conventional ways to teach and train the new Assistant are inadequate for the imaginative re-organization 14 conceived by the Managing Editor 12. Conventional ways to teach the new Editorial Assistant include on the job training, attending seminars and lessons, courses in schools, reading books and magazines, CBT (computer-based training), CAI (computer-aided instruction), interactive videodisc, and expert systems.

The limitations of the conventional approaches are (1) none of them leads directly and rapidly to the Editor's concept of what the Assistant ought to be, and (2) none of them takes advantage of the many information

sources available in modern society that might help the Assistant learn faster on the job, and perform better. Modern society offers increasing ranges of useful information 16 to help create, describe, and implement the Managing Editor's conception (14) of the Editorial Assistant's job, but the conventionally available ways to teach and train her fail to use these resources adequately.

Referring to Figure 2, the present invention is based on a new paradigm for computing: Imagination-Driven computing. There are twin inputs, information 20 and imagination 22 to "The Contextualizer 24". The Context Bases come from modern society's accelerating generation of new knowledge and Context-based information. The Editor's imagination 22 is capable of accessing and manipulating many sources of information to describe and explain the Editor's ideas for her job, and how it ought to be done. The Contextualizer 24 provides an interactive tool for creating and implementing imagination-driven concepts by rearranging Contexts from many areas. The Contextualizer 24 is used to create and deliver an "Alternate" 26 to a computer or terminal 28 at the new Editorial Assistant's desk. An Alternate 26 is an imagination-driven construct that is used interactively, in this example to: (1) teach the new employee to perform the job as the Managing Editor envisions sees it ought to be performed; (2) increase the Assistant's span of responsibility rapidly, as desired; and (3) assist her in growing rapidly today and in adapting to change

in the future. The Contextualizer may be run interactively at any time to modify and improve her Alternate to drive change (as in this example) or to respond to future needs.

Referring to Figure 3, the Contextualizer thus enables an overall transformation from a current situation 29 (with inputs in the form of imagination 30 - and access to information and knowledge 32) to the preferred situation 36. The transformation is achieved by a set of operations and processes 34. The paradigm of computing represented by Figure 3 is named "imagination-driven computing." It starts from the current situation 29 at the beginning and assists in expressing and transforming it into the preferred situation 36. At its deepest conceptual level, the computer becomes a tool that helps move the source of everyday reality into the imagination. On a practical level, the invention provides a new type of tool for creating and introducing the changes and improvements that are desired by its users in jobs, work groups, organizations, and people's lives.

The preferred embodiment is illustrated through this prototypical example, which exhibits three principle advantages of the invention:

1. Enhanced performance in material transformations: The Alternate describes the accelerated assumption of a range of responsibilities by a new Editorial Assistant. She must rapidly become proficient at a wide range of specific new tasks according to the unique standards and rules of her new

employer. Quality performance of a large span of activities is promoted by the invention.

2. Rapid learning and adaptation: The Alternate supports the new employee in learning her new job at a rapid rate and in carrying out additional tasks at an earlier date than otherwise. The invention may increase her ability to respond rapidly to new situations and requirements in a rapidly changing company and job.

3. Innovation: The job definition, scope, and range of responsibilities may be expanded or changed by creating or modifying Alternates. The process of creating an Alternate is a Context-filled opportunity to conceive new ways to re-organize responsibilities, job definitions, and performance, and to implement them productively. As the employee learns how to use the Alternate, she will use many of the same skills to modify her Alternate in the future. The process of using a series of Alternates may evoke new personal growth: the user may conceptualize a succession of new methods and procedures that increasingly expand performance and productivity.

The invention adds to the work environment a potential alignment of interests between management and employees. First, by using the invention, management may gain a computerized capacity to visualize the expansion of a job (or the organization) with additional responsibilities and expertise that benefit both the employee and the company. Second, by using the invention, the employee may gain accelerated career

growth that may benefit the individual in income, managing changing responsibilities, and career satisfaction.

In other words, the invention may be used by management (top-down innovations, which express centralized expertise), or by employees (bottom-up innovations, which express decentralized familiarity with local conditions and needs), or by both, to imagine and implement a variety of organizational potentials.

The Main Menu

Referring to Figures 11 and 92, the "Main Menu" 120 of the Contextualizer is shown. The user knows his location in the software from the screen's top line 120, which identifies this as the Main Menu.

The menuing system is a multiple window system. In Figures 11 and 12 there is a Context Window 122, (2300 in Fig. 92) on the left, and there is a Guide Window 124, (2302 in Fig. 92) on the right. Each of these windows is labeled above its top border on the left.

The Context Window has a highlighted cursor bar that goes across the window from border to border. This cursor illuminates in reverse video the line on which the cursor is located. The highlighted cursor bar is represented on the Figures by an ">" arrowhead symbol 126. In Figure 11, the arrowhead is located in the left margin of the Context Window and points to "Create Alternates:" 128 (3002 in Figure 93).

Referring to Figures 11 and 137, as each choice or Context is highlighted in the Context Window 122,

9002, its contents are simultaneously displayed in the right Guide Window 124, 9003.

(As opposed to most software where one operation generally occurs at a time on a computer screen, the normal operation of The Contextualizer often involves two (or sometimes more) related operations occurring on the screen at a time.)

The right-hand Guide Window 124, 9003, shows the first screen of the guide to "Create Alternates." In the lower right-hand corner of the Guide Window, it shows that this is screen 1 of 2 (130). By using a function key 9010 to switch windows 9011, the user switches from the Context Window 122, 9002, to the Guide Window 124, 9003. Now, referring to Figures 12 and 138, when the user has activated the Guide Window 124, 9010, the user can press <PgDn> 9028, 9029 to show the second screen of the "Create Alternates" guide. See the second screen of Figure 11, which shows the second screen in the "Create Alternates" guide 132.

Guides may be much larger than two screens. Referring to Figure 138 when they are larger than one screen, the user can use a <Home> key 9024, 9025, to move to the top of the guide, an <End> key 9024, 9025, to move to the bottom of the guide, and <PgUp/PgDn> keys 9028, 9029, to move from screen to screen within it. As described in Figure 139, the user may also zoom the guide up so that it fills the entire computer screen 9040, 9044. After moving around a zoomed guide and using it, the user may zoom the window back down to its previous size 9040, 9041.

In Figures 11 and 92, below the Context Window is a window 134, 2304, which indicates functions that will be triggered by certain keys.

Referring to Figures 12 and 137, the user has returned to the Context Window 140, 9002, and has moved the cursor down one line to the "Run Alternates:" selection 142 (3006 in Figure 93). Note that each possible selection represents a "token" that corresponds to an underlying segment of information in the context base. This automatically displays the Run Alternates Guide for this selection in the Guide Window 144, 146, 9003.

Referring to Figure 13 and 93, the user has moved the cursor down to "Manage Alternates:" 150, 3010 and sees the two Guide Window screens for "Manage Alternates:" 152, 154, 3011.

Referring now to Figures 14 and 93, the two Guide Window screens 162, 164, 3015 for the choice called "Create Context Bases" 160, 3014 are displayed.

Referring to Figures 15 and 93, the Contextualizer Alternate choice 170, 3018 has been selected, displaying the "Contextualizer Alternate" 170, 3018, and Figure 141 which is, in itself, an Alternate that is built into a software program. Unlike an on-line "Help" system, the built-in Alternate provides an imaginatively conceived collection of Contexts from the skills, situations, expertise, products, markets, specific customers, technologies, and other possible Contexts that relate to the use of that software application 172, 3019.

Just as an Alternate may be a free-standing software application or program, it may also be included within a software program as a different and new type of

on-line Contextual assistance for the users of that software program. The bottom half of Figure 15 shows a screen 174 from the on-line "Contextualizer System". Two example uses for Alternates, built into other software as on-line tools, are described below.

First, customer support can be provided with an on-line product and procedure guides that support staff can access quickly while providing phone support, and do this seamlessly from within their Customer Support software.

Second, to handle phone calls about questions like slow checks, Accounts Payable clerks can branch from accounting software to the contexts such as the company's payment and other business policies that might be included in an on-line Alternate. This prevents supervisors from being interrupted for trivial questions while clerks provide higher quality relationships with vendors.

Making Alternates available within other software provides interactive, on-the-spot access to the Contextual information people need when working as a knowledgeable and competent part of a complex business system, especially when that system changes rapidly or often.

Referring to Figures 15 and 93, the first choice from the Main Menu is called "Create Alternates:" 176, 3002. Pressing the <Enter> key brings up that portion of the Contextualizer 3002, 3003, 3004.

Context Collection

Turning now to Figures 16 and 137 the user now sees the available "Create Alternates:" selections 182 in the left Context Window 180, 9002. As the cursor is moved up and down to the different Contexts 184 in the left window, the content of each selection is displayed in the right Guide Window 186, 9003. This general function of the two windows is followed consistently throughout the Contextualizer.

In the Context Window, 180, 9002, the end of each line has one of two punctuation symbols. These symbols indicate whether or not additional choices are subsidiary to that item. If the punctuation is a "colon" (:) 187, 9012, 9013, then additional choices are subsidiary to it. For example, the first line "Create Alternates:" ends in a colon 187. The first topic below that shows why that colon is there, 9012, 9013.

If the punctuation is a "period" (.) 188, 9012, 9013, then there are no additional choices subsidiary to it. For example, the third item in the list, called "Context Collection/ Positioning." 188 ends in a period. There are no items subsidiary to that 9012, 9013.

Referring to Figure 138, to show additional choices on the screen, or to remove them, the list is expanded or contracted using the "Plus" <+> key 9018 to expand the list to its next level of detail 9019, or the "Minus" <-> key 9018 to contract the list to the next higher level 9019. The list may be expanded to its maximum detail using the <Shift-Plus> key 9021, 9022 or

contracted to its minimum level of detail using the <Shift-Minus> key 9021, 9022.

Turning now to Figure 17 and referring to Figure 138, the list in the Context Window 190 has been expanded one level of detail 196 by pressing the <Plus> key 9018, 9019. As shown, the "Create Alternates:" portion of the software may have within it many various options and functions.

The user scrolls down to the second 192 and third 194 screens of the "Create Alternates:" expanded menu by pressing <PgDn> 9028, 9029. All three screens of this menu 190, 192, 194 are printed in Figure 17.

Now referring to Figures 17 and 94, the user returns to the top screen of the "Create Alternates:" menu 190 and places the cursor highlight bar on "New Alternate" 196, 3104 and presses <Enter>.

Turning now to Figure 18, the top screen is the blank catalog for starting a new Alternate 200. To fill in this screen, the user types in the fields 202, 3105 individually. The second screen in this Figure 204 shows a filled in sample screen for a sample Alternate for Julie Smith.

In the filled-in sample screen on the bottom of Figure 18, the user has answered "Y" for the last field, "Project Description" 206. When the last field is selected as "Yes" and the user completes this screen, Figure 19 shows that a "Notes/ Concept" window 219 will be opened.

The Notes/Concepts sub-window 210 is shown in the lower right corner of the lower window 209 of Figure

19. These Notes/Concepts are attached to this Alternate and may be opened at any time. They may also be modified at any time prior to compiling an Alternate for distribution.

These Notes/Concepts preserve information that describes the usefulness, origin, or any other aspect of this particular Alternate.

As shown in the Notes/Concepts 212 window in the second screen printed in Figure 19, this Alternate is based on the specific experience level of the newly hired employee for whom the Alternate 211 was created. An Alternate may be created for an individual (by management or by that individual); a general job position (created by management or by the employee); a department (created by management); to distribute new perspectives, responsibilities, or information (by the Context Base); or to influence many other purposes, situations, or processes.

This Alternate 211 is specific to this individual. It is based on her experience in writing, copyediting, and publishing. It is also based on her motivation level, which reflects the pace at which she is expected to learn and grow. As a result of adding this description, it is possible to use this Alternate in the future, without changing it, if similar high-potential Editorial Assistants are hired again.

In the future, the Alternate may be modified by adding or removing specific Contexts that are needed or not needed by future Editorial Assistants. As a result, this Alternate is both re-usable and modifiable. If

used as the basis for another Alternate, this Notes/Concepts description 212 assists in creating a similar but somewhat different Alternate.

After returning to the main "Create Alternates:" menu, the user selects the "Choose Context Bases:" screen 220, 3302, which is shown in Figures 20 and 112. This screen 220, 3302 offers access to different Context Bases 223, 3306, 225, 3310, 227, 3314, 229, 3318 when creating a single Alternate.

This screen depicts a method for selecting up to four different Context Bases at one time. This process may be repeated if needed. The ability to access a larger number of Context Bases from this screen could be expanded.

The bottom screen 222 in Figure 20 shows the Context Bases after they have been entered, including the display or entry of each Base's "Description" 224, 226, 228.

The first Context Base 224 in the bottom screen 222 of Figure 20 is a simulated CD-ROM disc of "how-to" skills information for editors and writers that has been compiled by the present inventor as an "Editorial Department Context Base". Figure 21 shows an excerpt from one of the "Context Bases" simulated. The "Editorial Department Context Base" (as shown in Figure 21) is based on a variety of published books, but it could include sources such as articles from periodicals, entire periodicals, or other types of information such as text, graphics, audio, or video. The type of information that can be accessed and displayed is

limited only by the capacity of the computer to access and display it.

The second Context Base 226 in the bottom screen 222 of Figure 20 is the company's unique internal policies and procedures. This source will generally originate from one or more information systems or other internal sources owned by the company, including its computers and other information media.

The third Context Base 228 in Figure 20 is an "unlocked Alternate" (defined in more detail later) containing expertise in the specific field in which this new Editorial Assistant will work. This field is CBT (Computer Based Training). This Context Base provides her rapid access to expert answers to all types of questions. This will help her (1) learn about CBT on a "need to know" basis, and (2) appear (in her writing, research, and dealing with writers) functional at a greater level of expertise than would be possible without extensive reference sources.

This third Context Base illustrates that any Alternate can serve as a Context Base from which Contexts and Guides can be collected to create or modify other Alternates. This supports the creation of a rich, inter-linked information environment. Complex organizations function like the links in a chain with the work output of one group typically forming the input of other groups. In a similar way, the Alternates used to guide or assist the work of one employee or group are likely to offer Contexts and Guides that are useful for others in the organization. With this invention this

information may be rapidly accessed and flexibility rearranged for the purposes and use of other departments or individuals throughout an organization.

Many types of Contexts and Context Bases are possible. The prototype in Figure 20, for example, has three different types of Context Bases: job skills 224 (those generally needed in an Editorial Department), company Contexts 226 (how that particular department in that company wants the job of Editorial Assistant done), and expertise Contexts 228 (the field of CBT in which that Editorial Assistant will work). Additional types of Context Bases might concern processes, relationships, products, and market.

Processes

These might include Contexts an employee may need to use for new or existing manufacturing processes, such as in biochemistry: if biologists are working with unfamiliar chemicals, the Alternate might provide Contexts that relate to chemicals used [when A is mixed with B it produces a carcinogen that must not touch your skin], safety [now that you are using chemical C, it is toxic and must be disposed of properly; press <F#> function key to call up the appropriate procedures]; new procedures [the quantity of liquid in the new tank must not fall below level X nor rise above level Y]; systems [record the manufacturing errors by using the following new codes...], etc.

Relationships

Contexts that describe how to function better with others in complex organizations. For example,

relationship formation in a complex, multi-divisional or multi-national business unit, corporation, or organization. Relationships Contexts might be cross-cultural, including customs, unique technical jargon in a foreign language, specific business customs or procedures, and knowledge about expanding relationships with a particular person or group (whether inside or outside of one's company).

Products: (supply-side improvements)

New Contexts could apply to current or new products or services that are being manufactured or sold. By using an Alternate, the range of Contexts that apply to new or current products may be expanded. This may improve the value or usefulness of a company's product(s) to customers by providing faster responsivenes, a wider diversity of product uses, and more accurate information to assist with individual customer needs.

Markets: (demand-side improvements)

New Contexts could apply to rapidly evolving market segments. For example, if one is in the health care industry and is selling to respiratory therapists in hospitals, specialized expertise Contexts may be needed to understand the procedures used with a new product. In addition, buyer Contexts include hospital purchasing procedures, capital budgeting, and payment options. By preparing an Alternate, a company might be able to launch a new product for respiratory therapists and before the first day give its nationwide sales force an Alternate that enables them to customize the specific

Contexts of each buyer relationship for this new product, no matter what the responsibilities of the person they are communicating with (which may blend medical specialization, purchasing responsibility, and department administration).

These and other types of Context Bases (such as technologies or competitors) may be accessed and blended together through the Contextualizer to create supportive and useful Alternates.

Referring to Figure 22 and our example, the user returns to the "Create Alternates:" menu 240 and moves the cursor down to "Context Collection/Positioning" 242. By pressing <Enter> the bottom screen in this Figure offers two choices: First, collect Contexts 244,3110 and second, position Contexts 246,3112. The user presses <1> to begin Context Collection.

Referring to Figures 23 and 112, entering Context Collection starts automatically at the first source, the "Editorial Department Context Base" (previously selected by the user) 224, 3307. For the user's clarity in navigation, the prototype shows this in the left Context Collection window 250, on its first (top) line 252. The number "1:" means the first Context Base, and the name of that Context Base is also displayed.

Referring now to Figures 23 and 138, in the right-hand Guide Window 254, 9017, general how-to instructions 256 may be displayed when the cursor in the left window is not on a specific Context 9016. Since

the user is in the Context Collection window250, this Guide Window explains some of the steps in how to collect Contexts from Context Bases. As a result, the user sees the main keys to operate the process of collecting Contexts.

The two screens in left Context Collection Window show the structure of the Editorial Department Context Base 250, 258, which is the structure of this Context Base. One page from that Context Base is also displayed in Figure 21 230.

Turning now to Figure 24 the user sees in reverse highlight (arrows in the Figure) 260 the specific clusters of Contexts that he tagged one at a time (4006, 4007, 4008, in Fig. 97). These relate to the job skills that the new Editorial Assistant will need in her job. In the printed screens they are marked with an arrow pointing to the right. These may be explored one at a time or they may be explored all together. In the following text, the user will explore them one at a time.

Referring to the top screen 270 in Figure 25 and also to Figure 138, by putting the cursor on the first cluster selected ("Departments:") and pressing the <Plus> key 9018 twice, this cluster expands to show all of its individual Contexts 9019. Referring to Figures 25 and 137, the user now sees the working of the punctuation at the end of each line in the Context Collection Window 9012, 9013. Both "Departments:" 272 and "Design:" 274 have colons after them because they have additional Contexts below them. Each of the

individual Contexts 276 has a period after it because it does not have subsidiary Contexts below it. The cursor is on the first Context, which is "Design Relationships to the Magazine" 276,9002. The content of that Context is displayed in the top right Guide Window 278, 9003. In the Guide Window 278, 9003, the bottom line 280 shows the source of that guide and the page number in that source on which it begins.

In Figures 25 and 96 there is also a third window 282, 2404 on the lower right, called "Collected Contexts." This window is displayed automatically as part of the process of Context Collection. The user may examine, at any time, the Contexts that have been collected for that Alternate.

At the bottom of Figure 25 and referring also to Figure 137, the user has moved to the Guide Window 278, 9003, by using <F2> 9010, the "switch window Function Key" 9011. The user then zoomed the Guide Window to fill the entire screen 284. In Figure 139, the zooming function 9040-9044 is described. The fact that this is a zoomed window is displayed in the upper left 286.

As shown in Figure 138, the user may use a zoomed Guide Window to examine the content of any Context 9024-9034. Keys such as "Page-down" or "Page-up" may be used to examine various portions of the guide 9028, 9029. Keys such as "Home" or "End" may be used to jump rapidly to the guide's beginning or end 9024, 9025. Based on examining the guide, the user has decided to "collect" this Context.

Turning now to the top screen 290 in Figure 26, the window has been zoomed back down (9040-9044 in Figure 139) and the user has switched (9010, 9011 in Figure 137) to the left Context Collection window 292. Referring to Figure 26 with Figure 97, with the cursor on the desired Context 294, the user presses the <Insert> key 4010, 4011 which collects this Context to the Collected Contexts window 296 at the lower right of the screen.

Context Collection is a scaffold that makes it possible for users to move rapidly through large and diverse Context Bases and rapidly collect the Contexts they will use to fabricate Alternates.

Context Collection involves at least three simultaneously interacting windows 292, 2400, 298, 2402, 296, 2404, as illustrated in Figure 26 and 96. In the invention, the primary use of these windows is to provide simultaneous access to information at different stages of its identification, collecting, rearrangement, and management in real-world situations. In general, the user whose window display is configured as in Figures 26 and 96 would select Contexts in the left window 292, 2400 and switch to the top right window 298, 2402 to examine the Guides in detail. As described in Figure 137, the user switches from one window to the next by pressing a Function Key 9010, 9011. (In the prototype, keys are named and numbered based on IBM PC/AT/PS2 and compatible keyboards.) Figure 97 shows that Contexts are collected by pressing the <Ins> key 4010, 4011 when they are highlighted in the left window

or are being examined in the top right window. In Figures 26 and 96, the bottom right window 296, 2404 shows the Contexts that have been collected.

In Figures 26 and 96, the left window 292, 2400 is called the "Context Collection" window. This window shows the items in the Context Bases in outline form with one item per line. In the left window, the items are listed according to subject. Figure 97 illustrates a custom search 4016-4023. The user can rapidly do custom searches, as explained later. (An optional display format for the left window, called the "Cognitive Window," is explained below.)

In figures 26 and 96, the top right window 298, 2402, is called the "Guide" window. This displays the text and graphics and other data in each Context. The Guides are the information that is collected and put to practical use in the Alternates.

The bottom right window 296, 2404 is called the "Collected Contexts" window. This is where the Contexts are collected so that Alternates can be constructed. (See the section on Context Positioning.) In actual use, a user moves seamlessly back and forth between Context Collection and Context Positioning simply by operating in different windows, which automatically changes their views and relationships, though these processes are described separately here. While this description makes it appear as if a user collects Contexts first and fabricates an Alternate separately in Context positioning, the user may follow any order of collecting and positioning Contexts desired.

The use of Contexts to create preferred situations is a complex process that may be done with multiple views and Contexts. The use of multiple windows (which may be overlapping windows instead of separate as shown in the Figure) provides access to simultaneous views and Contexts that are an essential part of gathering the Contexts needed to represent the user's conceptions.

Turning now to the top screen 300 in Figure 27 and also to Figure 138, the user reads the rest of the titles in the (left) Context Collection Window 302. Most of them have to do with graphics, which are not among the responsibilities of the new Editorial Assistant. The last Context, however, is "The Editor's View" 304 and this appears relevant. By pressing the <End> key 9024 to go to the end of the list of Contexts, the user jumps to the bottom of the list 9025. This is displayed in the bottom screen 306 printed in Figure 27. "The Editor's View" is highlighted by the cursor bar 308, and the content of this Context is displayed in the Guide Window 310.

Referring to Figure 97, because "The Editor's View" is valuable for the new Editorial Assistant while she is learning her job, this Context is collected to the lower right window by pressing the <Insert> key 4010, 4011. The bottom screen 306 in Figure 27 shows that "The Editor's View" has been collected to the Collected Contexts window 310 on the lower right of the screen.

Referring now to Figure 138, the user then uses the <Minus> key 9018, 9019 to condense the "Departments:" list. Turning now to the top screen 320 in Figure 28, the user has condensed the list 322 to show the Context clusters in the Editorial Department Context Base. The user moves the cursor down to the cluster titled "Letters to the Editor" 324. By pressing the <Plus> key 9018, 9019, this section is expanded to show the one Context within it. This expansion is shown in the bottom screen 326 in Figure 28.

Still referring to Figures 28 and 138, the one Context in this cluster concerns the readability of Letters to the Editor. The user does not believe that this information 328 is relevant to the Assistant Editor's job. The user rejects this by pressing the <Minus> key 9018, 9019 to condense the list and exit this cluster. This returns the list to the outline of the Editorial Department Context Base 322 as shown in the top screen 320 of Figure 28. The user then moves the cursor highlight down to the next cluster 330, which is "New Products:".

Turning now to Figures 29 and 30, the user knows that the Editorial Assistant will be responsible for writing the "New Products" departments of the magazine. This is an essential area for the new employee to learn rapidly.

The user scrolls down this list of Contexts one line at a time in the left Context Collection window 340, 342, 344, 346, 348, 350. At the same time, the user examines the content of each of the Guides in the

Guide Window 352, 354, 356, 358, 360, 362 to verify that it is appropriate and helpful. These Guides are displayed in Figures 29 and 30.

The user decides that all of these Contexts are valuable for the new Editorial Assistant. Using the Method shown in Figure 97, 4006, 4007, 4008 the user tags all of them. Turning now to the top screen 370 in Figure 31, the Figure shows all of the Contexts are selected (an arrow is displayed to the left of each Context selected 372). Referring to Figure 97, the user then collects all the Contexts by pressing the <Insert> key 4010, 4011. The screen 374 that shows this process has taken place is at the bottom of Figure 31. The first Context that was just collected is displayed in the lower right window 376, and all the small tagging arrows have been removed 378, indicating that the Contexts were collected.

At any time, the user may examine the Contexts that have been collected into the Collected Contexts window at the bottom right of the screen. Referring to Figure 137, the user uses the "switch window Function Key" 9010 to shift between the windows in a clockwise direction 9011. By pressing this key once, the user moves from the Context collection (left) window to the Guide Window (top right). By pressing this key a second time, the user moves to the Collected Contexts (bottom right) window.

Now referring to Figure 139, when the user goes into this latter window and zooms it up to fill the screen 9040-9043, the system seamlessly goes into

Context Positioning mode 9043. This is shown in the top screen 380 of Figure 32. In Context Positioning, the Alternate's name is listed on the top line of the left Context Positioning Window 382. The collected Contexts are listed in the Context Positioning window on the left 384. The content of each Context is displayed in the Guide Window on the right 386. As the user moves the cursor to highlight each Context (in the left window) 388, the guides are displayed in the right window 390. In this view the user may keep or discard any of the Contexts or switch windows to explore any of the Guides. As shown in Figure 102, screen display functions in Context Positioning are described by Figures 137-139. The process of Context Positioning will be described below.

Figure 32 shows screens from three of the Contexts that have been collected so far. The top printed screen 380 shows the cursor on the first Context, "Design Relationships to the Magazine" 388. The middle screen 389 shows the cursor on the second Context, "The Editor's View" 392. The bottom screen 393 shows the cursor on the third Context, "A Vital Reader Interest" 394.

The user then goes through the same process of returning to the main menu of the first Context Base 260, "1: Editorial Department Context Base", moves to each cluster of Contexts that relates to this Alternate, and selects the appropriate Contexts. This would be a fairly rapid process for a user who is this new employee's manager and simultaneously: (1) either knows

or imagines the job the new employee ought to do, (2) has a basic familiarity with the skills available in the Editorial Department Context Base, and (3) understands how to use this invention to collect helpful Contexts for the new employee.

Later the user will return to the Contexts selected. Now the user will select the Contexts from the other Context Bases. (If interrupted, the user may save the work in process and return to it.) In Figure 102, the user presses the key that returns to the "Create Alternates:" menu 5002, 5003. As shown in the top screen 400 in Figure 33 and also in Figure 94, the user moves the cursor up to "Choose Context Bases" 402, 3107, and presses <Enter> to go to this function.

Turning to the bottom screen in Figure 33, the user sees the "Choose Context Bases" screen 404. Referring to Figure 112, the user selects the second Context Base 406 Information Source by pressing the number <2> 3310-3312. While different patterns may be used to identify keystrokes, the essential function here is that it is possible to go to each individual Context Base from where they were entered.

Turning now to the top screen 410 in Figure 34, when the user calls up the company's internal Contexts, its titles and order 412 follow the Editorial Department Context Base 252, 258 shown in Figure 23. The Editorial Department Context Base is a CD-ROM disc compiled externally. The company's internal Context base is prepared using the Contextualizer. Its arrangement is designed to match the main externally generated Context

Base that the Editorial Department relies on. (See the section on "Creating Context Bases," below.) As a result, the two structures may be merged.

The user knows that all the areas in the "Company's Internal Contexts" may have individual Contexts that are valuable for this new employee's Alternate. All the areas 414 are selected by using the same key 4006-4008 described in Figure 97 that was used to select all the Contexts in Figure 31.

In the (left) Context Exploration window 416 in Figure 34, the top line 418 clearly shows that the user is in the second Context Base (that is, the number "2:" is displayed clearly). As described in Figure 137, it also displays the label from the Context Base screen 9002, called "Our Company's Internal Contexts."

This bottom screen in Figure 34 shows that all the areas were selected 414. As shown in Figure 138, the user next uses the <Shift-Plus> key 9021-9023 to expand the entire list of the company's Internal Contexts to its maximum level of detail.

Turning now to the top screen 420 printed in Figure 35, the cursor 422 is on the first Context in the list. The content of this Context is also displayed in the upper right Guide window 424. Note also that the Contexts that have been collected previously are still displayed in the lower right Collected Contexts window 426. In other words, a single Alternate is being constructed from multiple Context Bases.

The second screen 428 printed in Figure 35 shows the second Context in the list, "Anatomy of a

Competent Article" 430, 432. The user simply uses the <Down> cursor key to continue moving the cursor down line-by-line in the left window. At each Context the user pauses to examine its contents displayed in the (right) Guide Window.

The item displayed in the third screen 434 of Figure 35 shows the company's internal "Editorial/Type Specifications" 436, 438. This illustrates that a company's unique internal technical information may be placed into Contexts and made readily accessible through Alternates, based on each employee's individual need to use each specific Context to create material transformations in the products of their employers.

Referring now to the top screen 440 printed in Figure 36, it turns out that all the company's Internal Contexts, except one, are useful for this new Editorial Assistant. Using the procedure 4006-4008 in Figure 97, the user tags all the Contexts 442.

In the middle screen 444 in this Figure 36, the user jumps to the last line in the left window by pressing <End> 9024, 9025, as described in Figure 138. The user deselects the last item which is under the current highlight 446. Figure 97 describes the method by which the context is untagged 4006-4008. The small arrow to the left of that Context has disappeared.

Referring to Figure 97, the user then presses the <Insert> key 4010, 4011 to add all the selected Contexts to those already collected. In the bottom screen 448 printed in Figure 36, the Collected Contexts (lower right) window 450 shows that the company's Internal Contexts have been added.

Using the escape key 4042, 4043 described in Figure 98, the user returns to the "Create Alternates:" menu, chooses the "Choose Context Bases" 3107, 3108 as shown in Figure 94, and enters number "3" for the third Context Base 3314-3316 as shown in Figure 112. These are the CBT (Computer Based Training) Contexts that provide expertise knowledge of the field in which the employee will work.

Arriving at the CBT Contexts, the user sees the top screen 460, 9002 in Figure 37, see also 9016, 9017 in Figure 138. In it, the first line of the Context Collection window 462 shows that the user is in Context Base #3. These are the Contexts of specialist expertise from the field of Computer Based Training. The left Context collection window is the overall list of Context clusters 464.

The second screen 466 in Figure 37 shows that same list expanded to show the individual Contexts available. The cursor highlight is on the first Context 468. In the guide window, on the upper right, it shows the guide for "Administering CBT Development:" 470. As it can be seen from Figure 37 and this Context, the expertise and knowledge offered from this type of Context Base is specialized knowledge of the field in which the new Editorial Assistant will work. This is commonly known as specialist expertise.

The creator of the Alternate decides that the new Editorial Assistant may have questions that touch almost any area of CBT: It is impossible to predict in advance the type of questions the Editorial Assistant

will have to answer, or the types of answers that may be required in a given situation. Therefore, she should have access to all the specialist expertise about CBT in this Context Base. While the volume of information is considerable, it is not overwhelming because it is used as needed.

Therefore, instead of selecting individual Contexts from this Context Base, Bar, the user decides to provide all of it. Instead of integrating it into the Alternate, the user will link it to the Alternate.

This is an example of a situation where it is decided to provide a single end-user with more than one Alternate. To simplify the process of providing users with multiple Alternates, The Contextualizer includes a method to link them, instead of merging them into one larger Alternate.

Turning now to the Figure 38 and to Figure 98, the user presses a Function Key 4044, 4045 to go to the screen 480 where Alternates are linked. Figure 124 describes the process for linking alternates 5202-5206. The user enters the relevant information of the names of the Alternates 482 so that the "specialist expertise (CBT) Alternate" will be linked with the Alternate that is being constructed here: skills knowledge for the new Editorial Assistant, and internal company knowledge about the procedures, policies, and rules of this particular company.

Context Positioning

Referring to Figures 39 and 93, after linking the Alternates the user returns to the "Create

Alternates:" menu 490. The user selects "Context Collection/Positioning." 492, which is shown in the top screen 494 printed in Figure 39. Turning to the bottom screen 496 in Figure 39 and also to Figure 94, the user selects number <2> 498, 3112, Context Positioning.

As shown in Figure 139, Context Positioning may also be reached seamlessly, by zooming up the Collected Contexts window in the lower right of the Context Collection screen 9040-9043.

Figure 40 shows two of the Contexts and Guides from Contexts that were collected. Referring also to Figure 137, The top line 500 of the Context Positioning window 502, 9002 has the name of the Alternate in it, which is "New Editorial Assistant." At this time the user is beginning the process of creating the final order and sequencing of this Alternate.

In the Context Positioning Window 502, 9002, each Context has a number 504 to its right. The numbers in the top screen are all number "1". This means they all came from the first information source, the Editorial Department Context Base.

In the bottom screen 506, the numbers to the right of each Context 508 are all number "2", which shows that those Contexts came from the internal corporate information source.

Still referring to Figures 40 and 137, except when examining an individual Guide, the user generally operates in the left window 502, 9002 (2500 in Fig. 99). This shows the Contexts collected using Context Collection, in the order the user added them. As the

user highlights each Context 512 in the left window 502, 9002, its text and graphics are displayed in the right "Guide" window 510, 9003 (2502 in Fig. 99), permitting rapid viewing of the Contexts while the user rearranges them into an Alternate.

As shown in Figure 100, it is possible to divide the right Guide window into two Guide windows 2512, 2514. As described in Figure 137, this is done by switching to the Guide window 9005 and pressing the "Divide" key (/) 9006. By showing multiple Guides, users are able to make each of them active (5022-5024 in Fig. 103) to make rapid judgements about the relationships between various Contexts, to cluster them or to select the most appropriate ones for a given situation.

Turning now to Figures 41 and 105, the user is merging the collected Contexts from separate sources into one Alternate. To do this, the user presses the "Merge Alternates" function key 5070 (and 5208-5210 in Fig. 124). A new window 520 will appear on the screen which gives the user the option of undoing the merged Alternate 522, 5214, 5215 if it turns out that this action does not produce the results wanted.

Turning to Figure 42, two screens 530, 532 are displayed from the merged Alternate. Note that the Context Bases are combined and indicated by the number "1" 534 or "2" 535 in the right column of the Context Positioning window. This level of automated merger is possible because both Context Bases were set up with a parallel internal structure.

Turning to Figures 43 and 138, the user presses the <Minus> key 9018, 9019 until the list in the Context Positioning window 540 is contracted to the level shown. This brings to the forefront the current structure of the Alternate 542.

When the cursor is no longer on any individual Context the Guide Window displays a "how-to" information screen 544, 9016, 9017. Since the user is in the Context Positioning mode, the "Editing Speed Keys" are displayed. These keys enable the user to rearrange the order of the clusters of Contexts, and the individual Contexts (depending on which level of detail is displayed in the Context Positioning window).

An editing method is built into the process of Context Positioning (Figs. 102-106). This pattern of keys and displaying this information on the screen may be different depending on different types of software designs.

Several editing moves are unusual. Turning to Figures 44 and 103, the top screen 550 shows the cursor highlight on the line "EDITORIAL:" 552. By indenting "EDITORIAL:" to the right, this indents a title that is over a title, without any Contexts in between. As a result, the title that is indented disappears and is deleted, resulting in the line that is printed at the bottom of Figure 44. As shown in Figure 103, the indenting function is accomplished using the left and right arrow keys 5018, 5019.

Another unusual type of editing is shown in the screens 560, 562 printed in Figure 45. In the top

screen 560, the cursor is on the title "Editing Articles:" 564. By "overtyping", the user is able to type in a new title, which is "Editing:" 566, as shown in the bottom screen 562. Figure 106 describes the method for entering a new title 5106-5109. This title was changed because the job description and the Contexts that were collected apply only to editing, not to working with complete articles or with authors. Since only a limited number of Contexts were included in this area (the ones appropriate for a new Editorial Assistant to start writing Departments of the magazine), it was clearer to retitle this section.

Another type of editing is shown in Figure 105. A Function Key 5066 opens a "Concept/Notes" window for that Context 5067. This window is blank and the user can type in concepts or notes to explain that Context, its use, value, etc. These concepts and notes are attached to that Context and they stay with it, just like its Guide, even if it is moved or copied.

A third type of rearranging is illustrated in the top screen 570 in Figure 46 and also in Figure 103. The cursor highlight is on "Copyediting:" 572 (Figure 46), which is one form of editing. Using the right indent key, 5018, 5019, "Copyediting:" is made a sub-head under "Editing:". The result 574 of this move is shown in the bottom screen 576 of that Figure 46.

This bottom screen 576 in Figure 46 shows the final Model for this Alternate. It is a considerable rearrangement from the initial order in which the Contexts were collected. This Model is one possible way

to look at this job. In fact, this Model is how the manager believes the new Editorial Assistant ought to do her new job.

The Editorial Assistant's main responsibility is the Departments of the magazine. The first section, "Departments:" 575, explains them to her and answers questions about them when she works on them.

The second section, "Writing:" 577, is what she is going to be learning how to do. She needs to learn how to write Departments, and this section holds the relevant Contexts that can help her get up to speed as she writes the Departments.

Once she's written the Departments, she has to edit them. Therefore, Contexts about "Editing:" 574 comprise the third area of her responsibilities.

In addition to writing Departments, the new Editorial Assistant ought to have new responsibilities as the Editorial Department's liaison with the "Production and Design:" Department 578. Therefore she has been provided Contexts that assist her in learning and using the company's internal procedures. These include skills, policies, and relationships in the areas of production and design, and the transfer of text and graphics between the Editorial and Production Departments.

The last area of Contexts is "Proofreading:" 579. She must proofread the work that comes back from production before giving it to editors for them to check prior to publication.

Turning now to Figure 47, the top two screens 580, 582 are printouts of "New Editorial Assistant" Alternate after it has been expanded to the next level by pressing the <Plus> key 9018, 9019 (Figure 138).

Since an Alternate is easier to access for a new user if its structure is displayed in one window, two options are possible: either change the size of the window or condense the Alternate. In this case the Alternate is condensed (i.e., edited). This shows how the same editing functions may be used to reshape the Alternate at each finer level of detail.

The main editing operation in Figure 47 is to indent the two cluster titles under "Production and Design:". The cursor is placed on "Basics:" 584 and "Costs:" 586 and each one is indented to the right 5018-5020 (Figure 103). This makes them disappear from the list at this level. As a result, the last title, "Proofreading:" 588, is moved to the bottom of this screen's window 592 from the next screen. 588

The bottom screen 590 in Figure 47 shows the final Alternate at this level of detail.

In the same way that Context Positioning is used to create a "Outline Model View," it is also used to create a "Time Sequence Model" view. Both the Outline Model and the Time-Sequence Model views may be present in every Alternate. They may be identical or they may provide two different orders of Contexts to access the Guides.

The value of an Alternate is greater than simply giving individuals access to Contexts that Model

their Preferred Situation. The Time Sequence Model assists early adaptation and results.

The Time Sequence Model is specifically designed for the implementation of the Alternate. For many situations, it adds practical planning by providing an implementation sequence for the skills, responsibilities, and relationships in the Alternate.

The Time Sequence Model view resembles project management. Though project management is intended to be applied by project managers, the Contextualizer provides every person who has an Alternate with an implementation (time sequence) view of his or her jobs and his or her responsibilities.

As shown in Figure 137, to access the Outline Model and Time Sequence Model views, the user activates the Context Positioning window, 9002, then uses the "Divide" key 9004. When that key is used in this window, it switches back and forth between the Outline Model view and the Time-Sequence Model view 9005-9008.

Turning now to Figure 48 and 101, the top screen 600 shows the result when the "Divide" key 9004 (Figure 137) is pressed over the Context Positioning window 9002 (Figure 137) for the finished model. It is changed to the Time Sequence Model view, with the Time Sequence Model located in the top window 602, 2520.

In Figures 48, and 101 the Time Sequence Model window is labeled just above the window 604, 2521. The name of the Alternate is in the top line of the Time Sequence Model window 606. The Guide window 608, 2522 is now on the bottom of the screen. Since the cursor is

on a title, rather than on a Context, an information screen 610 is displayed in the Guide window, 608 2522. Referring to Figure 138, the information screen appears when the cursor is on a cluster title 9016, 9017. The user is in Context Positioning so the information that is most helpful concerns the Editing Speed Keys. These are the same Editing Speed Keys that were used to create a Model, and they work nearly the same way.

When a Time-Sequence Model window is first opened, it lists the same Contexts in the same order as the current Outline Model view 590. As the user rearranges the Time-Sequence Model, a dual structure emerges for the Alternate. The Outline Model is not changed. The eventual users will access the information in the Guide through either the Outline Model or the Time-Sequence Model, or both, based on the appropriate choice for their needs.

The bottom screen 612 printed in Figure 48 shows the result of pressing the <Minus> key 9018-9019 (Figure 138) to contract the list 614. In the Time Sequence Model window 616 it can be seen clearly that each major heading is indented farther to the right than the previous one 614. Figure 107 describes the display of the time sequencing window 5504. The purpose of the indentation is so that the user can see the time relationships quickly, easily, and clearly.

The Time-Sequencing Model window has a different appearance than the Context Positioning window, but both use the same keys to rearrange the Contexts. The main difference is that, in the

Time-Sequencing Model window, when the user moves an item upward or downward, it is moved to the left or right at the same time. This is because the emphasis shifts from the vertical outline (which dominates the Outline Model view) to the horizontal timeline. In the Time Sequence Model view, time is represented as moving from the upper left to the lower right. To show time clearly, indenting works this way:

(1) Each Context Cluster is a group and its members are indented together, with the Cluster Titles indented about as much as the Contexts underneath them.

(2) Each Context Cluster is indented to the right of the cluster just before it. When the user reads from top left to bottom right, this format clearly sequences the clusters.

(3) A user may want to keep two (or more) Context Clusters at the same indent level, because they should be implemented at the same time. To do this, the user simply inserts a blank line between the two clusters 5602-5604 (Figure 111). This automatically

keeps them at the same indent level, while separating them visually for easier reading.

Turning now to the top screen 620 printed in Figure 49, it is possible to see the finished Time Sequence Model 622. This was rearranged into this order from the order 614 shown in Figure 48 by use of the Editing Speed Keys (Figs. 107-111). The keys work slightly differently from their own in Context positioning since Contexts move simultaneously up and left, or down and right. Figures 107-111 describe the editing speed keys for Time-Sequencing Model in detail. Referring to Figure 109, if the cursor is on a Cluster Title, the whole cluster will move one indentation up and to the left when the <Alt-Up> 5542, 5543 cursor keys are pressed, placing it above the preceding cluster.

The same type of simultaneous horizontal and vertical movement works for the other keys when the Time-Sequence Model window is active. Referring to Figure 108, moving a Context to the bottom of the list also moves it to the far right of the list 5526, 5527, 5529. Moving a cluster to the top of the list also moves it to the far left of the list 5526-5528.

The other operations used for Context Positioning may also be used in the Time-Sequence Model window. For example, as shown in Figure 138, the <Plus/Minus> keys 9018-9020 will expand or reduce the level of detail of the list in this window. With the <Shift-Minus> key 9021-9023 the user can rapidly review the basic structure of the Alternate, then use the

<Plus> key 9018-9020 to add the main Cluster Titles and Contexts at each level until the full sequence is clear. If the user discovers something missing, it is easy to add a Cluster Title to identify what it is and mark the place 5602-5607 (Figure 111), then go into Context Collection 5506, 5507, (Fig. 107) to collect the needed Contexts (such as tasks, goals, relationships, or procedures) that fill the gap.

In Figure 49, in the final Time Sequence Model 622, for the new Editorial Assistant, the manager needed a different order to implement the Alternate than the Outline Model view. This order has its own logic, as follows.

The new Editorial Assistant will start with the most mechanical aspects of her job so she will learn its basics and form relationships with key people before moving into her more creative responsibilities. The first area will be "Production and Design:" 623. Through this she will establish working relationships as she moves the finished written articles from members of the Editorial Department into the Production and Design Department, and back again. As a result she will work with key people in both departments. As she works, her Alternate will provide many of the in-company procedures, codes, and guidelines that will help her rapidly fulfill the expectations she will encounter right away in both busy Departments.

"Proofreading:" 624 starts as soon as she receives materials back from Production. This will occur rapidly, since Production generally has a

one-to-two day turnaround and work is already in process. She will consult her Alternate while she proofreads, to make sure she fulfills all that is expected of her in this area. Within a few days, these first two areas will familiarize her with many areas of the magazine and the staff in both Departments. With her Alternate helping answer questions and providing in-depth insight, she will rapidly gain working familiarity with the people and processes by which the magazine is produced at this publisher.

"Editing:" 625 comes in as soon as she starts understanding what is expected and needed in the Departments (the sections of the magazines she will write). She will be given the first drafts of the Departments that were written by others. She will be told to try and edit their work into the final quality and formats needed. The editors will tell her what they did and why, how topics were picked, and their goals for each piece. Her Alternate will give her considerable assistance in three areas: First, it will help her expand her editing skills. Second, she will use it to learn more about the Departments of the magazine, their role and value in the magazine, and how to create them. Third, she will access specialist expertise in the field of Computer Based Training in the linked Alternate. The Alternate will give her breadth of access and depth of information in these areas, based on the Contexts included by her manager. This will amplify her progress as she starts helping create the Departments.

Having learned in those areas and knowing what's expected of her, she will be ready to start writing "Departments:" 626 on her own. The last section of the Time Sequence Model, "Writing:" 627, will give her a great deal of assistance in the specific components of the writing process.

As an entire process, this Time Sequence Model gives her a tailored information sequence in which she can get up to speed quickly while learning the range of responsibilities and skills she will need as she does her new job the way her manager believes it ought to be done.

Turning to Figure 50, the top screen 630 is simply the top screen of the Time Sequence Model window using the "Zoom Window Function Key" 9040, 9041 (Figure 139) to expand that window to the size of the computer monitor's screen. The bottom screen 632 printed in that Figure simply uses the <Plus> key 9018, 9019 (Figure 138) to expand that list 634 so that it is expanded to the next level of detail 636. If desired, the list may be expanded to the level of the individual Contexts 9021, 9022, (Figure 138), and these may be re-ordered or re-titled as previously described.

This bottom screen 632 is the final Time Sequence Model view that the new Editorial Assistant will use in her job. The result is the new Editorial Assistant receives two ways to access the Contexts in her Alternate. First, the Outline Model view shows how her manager believes she ought to do her job. It shows her a model of this job's expanded responsibilities, and

provides her access to guidance on how to fulfill them. Second, the Time Sequence Model view provides her information based on the order in which her manager thinks will be best for her to learn her job. It was designed by her manager to help her adapt to her job, the company, and co-workers in the shortest amount of time.

In summary, an Alternate is built by collecting and selecting the appropriate Contexts from a variety of Context Bases. Next, the Contexts are re-ordered by an imagination-driven process into both a Outline Model view and a Time-Sequence Model view.

It is now possible to compile the Editorial Assistant's Alternate for distribution. After an Alternate is compiled, it may be (1) run on that computer system, (2) copied to diskette(s) or other media may be used for distribution or sale to the user(s), or (3) multi-user computers may be used to provide multiple access to a single Alternate(s).

There are two ways to compile an Alternate. Both ways are shown in flowchart form 5612-5617 in Figure 111. The first is as a "Locked" Alternate 5612, 5613, 5617 (Figure 111). Turning to the top screen 640 in Figure 51, the user sees that the cursor is on "Locked Alternates" 642 under "Compile for Distribution:" 644. The Guide Window 646 explains that a locked Alternate cannot be modified; the Alternate must be run exactly as distributed.

In the case of the Alternate for this new Editorial Assistant, a locked Alternate will be compiled

(see the middle screen 648 in Figure 51). The new Editorial Assistant will start her job by using the Locked Alternate. She will learn both the model that her employer wants her to see as her job, and the time sequence in which she should learn these skills.

At the same time an unlocked Alternate 650 will be compiled for her future use (see the bottom screen 652 in Figure 51 and 5612-5614 of Figure 111). When she is given the unlocked Custom Alternate, the Editorial Assistant will be able to re-order its Contexts in both the Outline Model view and the Time-Sequence Model view.

When the new Editorial Assistant has gotten up to speed in the eyes of her manager, her Locked Alternate will be replaced with the unlocked Custom Alternate. She will then have the ability to spend a few minutes and re-order the way she sees her job, so her Alternate mirrors her own perception of her needs.

In addition, by working with the unlocked Custom Alternate, the new Editorial Assistant starts learning how to create an Alternate for herself. The Alternate is run by using the same editing keys as the Contextualizer. In the future, as her job responsibilities expand, she will be able to use the Contextualizer alone or with her manager. They may modify her Alternate or create new ones. Thus, as she learns her job she can expand her responsibilities rapidly by adding new areas to her Alternate; when she is given special or rush assignments, she can rapidly access the skills, expertise, Contexts needed to tame

them; when she changes "hats" in her job, her Alternate may be modified to match her new skill and information needs; and when she is promoted into a new job, she will inherit the former job holder's Alternates so she can rapidly gain her next range of skills, performance, and relationships.

In sum, locked and unlocked Custom Alternates are provided to support both centrally managed situations and locally managed situations.

"Locked Alternates" cannot be modified, only run exactly as distributed. This permits the use of centrally constructed Alternates for specific performance improvements or Situation Shifts, without allowing any modification of the Outline Model or the Time-Sequence Model. The end-users still determine the Guides that they access and when they use them, but this can be directed by managers. Figures 117-120 illustrate the use of Locked Alternates.

Unlocked "Custom Alternates" may or may not arrive as finished Alternates because users can re-order them on the spot to meet local or personal needs. Figure 121 illustrates use of Unlocked Alternates 6104-6123. Users can modify these Outline Models and Time-Sequence Models. The Guides (the Context base) of the Alternate are locked, however: With Contextualizer software Contexts and Guides can be added or deleted, but with an unlocked Alternate alone (without contextualizer software), Contexts cannot be added or deleted. With an unlocked Custom Alternate, users may create personalized and evolving patterns for accessing the Contexts and Guides included in their Alternates.

Turning to Figure 52, the menu choice 660 for "Saving the Uncompiled Alternate." was selected. The uncompiled Alternate 602 is saved 662 so it can be called up and modified in the future. For example, it might be changed and compiled for other new Editorial Assistants when they are hired, to match their individual skill levels and need for expertise.

In addition, this Editorial Assistant may modify her own Alternate, and use this new type of computing to imagine how she can perform better, accelerate her rate of growth and performance, and expand her range of responsibilities. By interactively expanding her personal Alternates, she uses them to help expanded achieve her goals.

By "Saving the Uncompiled Alternate," 662 the work can be saved at any point during Context Collection, Context Positioning, or Time-Sequencing. A variety of reports can be printed during Context Positioning. For example, it is possible to print either a brief version of the Outline Outline Model or the Time-Sequence Model, as one-line Cluster Titles and Contexts. It is also possible to print them with any notes and concepts that have been added to them. The Guides may be printed several ways. First, they may be printed in the order of the Outline Model or the order of the Time Sequence Model, as a complete reference. To print only one or a few Guides, they may be highlighted on the Outline Model or the Time-Sequence Modelby using a function key, then printed.

After the uncompiled Alternate has been saved, the user returns to the "Main Menu".

Using the Alternate

As explained, an Alternate is an imagination-driven construct that represents the Preferred Situation (or one stage in implementing the Preferred Situation) as its creator would like it to be. From the point of view of its user, an Alternate has three main components:

(1) The Outline Model is the way the Alternate is structured and arranged by its developer. It reflects the way the developer "sees" the current or preferred situation. The Outline Model is also an access pattern to the Clusters of Contexts and Contexts. As the user moves the cursor through the Outline Model, the Guide window changes to show the text and graphics of the current Context.

(2) The Time-Sequence Model is the implementation plan, if one has been included. In the simplest sense, it is the order in which Contexts might be added to the current situation. In the broadest sense, it supports Situation Shifting from the Current Situation to the Preferred Situation. (See the section on "Managing Alternates," below.) As the user moves the cursor through the Time-Sequence Model, the Guide window changes to show the text and graphics of the current Context.

(3) The Guides are the individual Contexts displayed in the Guide window. They are the text and graphics (pictures, data, illustrations, audio, video, etc.) in each Context.

Turn now to Figure 53. When the new Editorial Assistant's Alternate is opened it starts at its top-level list of Contexts 672 (9002 in Figure 137), as seen in the top screen 670. The top line on the screen 670 shows that an Alternate is running. It also shows the name of the Alternate that is being run 670, though this is not a requirement of the software.

The bottom screen 674 in Figure 53 shows the Alternate expanded (in the left Context Window 676) to its next greater level of detail. The (right) Guide Window 678 (9003 in Figure 137) shows that when the highlighted cursor is not on an individual Context, this window shows information on how to use the Alternate 9016, 9017 (Figure 138).

The first function is the mode of access. There are two choices. First is the Outline Model view. Second is the Time-Sequence Model view. In Figure 53, the user begins with the Outline Model view 672, 676. Figure 118 illustrates the method of shifting between the two choices 6038-6041.

Next, the user accesses Contexts. The user may rapidly access any part of the Alternate by contracting the Outline Model or Time Sequence Model, moving to the relevant section, then expanding it. Referring to Figures 117 and 118, various keys may be used to jump to the top or the bottom of the Alternate, to scroll to the next or previous screen of Contexts, to select individual Contexts, or to expand or contract the list of Contexts 6008-6032.

As the user locates one or more Contexts that provide immediately useful information, the user may switch to the Guide Window 6004, 6005 (Figure 117). The user may view the Guide in that window by using <PgDn> or <PgUp>, <End> or <Home>, or zoom the Guide Window to fill the entire screen 6006-6032 (Figures 117, and 118). Or, the user may press the "Divide" key (/) to split the Guide Window into more than one window and make various guides active 6038-6050 (Figures 118 and 119). A different Context may be displayed in each Guide Window, and the user may shift between the windows as needed. Referring to Figure 118, even when multiple Guide Windows are active, the user may zoom any Guide Window up to the size of the full screen 6006, 6007. This places more information on the screen from that Context to improve accessibility to that Guide.

Turning to Figures 54 and 55 and also to Figure 117, when the <Plus> key is pressed one more time, the Alternate is expanded to the next larger stage of detail 680, 6008-6010. At this level, the individual Contexts 682 are rapidly accessible.

Figures 54 and 55 show five screens of Contexts included in the new Editorial Assistant's Alternate (i.e., this prototype). Since <PgDn> 6026, 6027 (Figure 118) is being used to display these successive screens, the cursor highlight stays at the top Context on each screen 682, 684, 686, 688, 690. Therefore, the right Guide Window shows the top Context in each of the (left) Context Windows 692, 694, 696, 698, 700.

When the user expands the Alternate to its maximum level of detail 6012-6014 (Figure 117), the (left) Context Window 702 in Figure 54 indicates where the user is in the Alternate. It does this in the Context Window's upper right corner 704. There it indicates how many screens are in the Alternate (at that size window) and which screen the user is in. If the size of the Context Window is changed 9004 (Figure 139), the number of windows in the Alternate is recalculated for the new size window.

Figures 56 and 57 illustrate how the new Editorial Assistant could use her Alternate the first day in her new job. She may access the Guides sequentially or use the "Divide" key to open more Guide windows at one time 6038-6040 (Figure 118). In either method, multiple Contexts from different sources may support a single situation because work often requires two or three kinds of information at once.

Suppose during her first day the new Editorial Assistant is manually proofreading the New Products Department which has just been returned by Production to Editorial.

She may keep open the Context "Editorial/Type Specifications" (the top screen 710 in Figure 56). This is an internal company policy that specifies the components required to be included in Departments of the magazine 714, and the publisher's formatting codes, so she can check the type styles and type sizes used to typeset the piece.

At the same time, she might open the Context "New Products as News" 716 (the middle screen 718 in Figure 56), to check the handling of the lead product in the department 720. This is a job skill Context that helps her understand and improve the quality of the writing as she proofreads the piece.

As she proofreads she opens and reviews two Contexts that look helpful, "Editing for Flow" 722, 726 (the bottom screen 724 in Figure 56) and "Editing for Content" 728, 730 (the top screen 732 in Figure 57). She wants to make sure that she learns the best possible writing techniques for this Department.

Finally, she discovers a Context called "New Products in IC Magazine," 734 and opens it (the bottom screen 736 in Figure 57). Here she discovers the Editorial Department's guidelines 738 for selecting new products for this department. While she doesn't need this Context today, understanding it will help her select next month's new products so she glances through it to see how the products were selected in the piece she is proofreading. The value of an Alternate is that people often need several different types of understanding while operating in a single situation. Accessing and applying multiple shifting Contexts may be one way to simplify or control rapid change, whether one is changing jobs and companies, changing responsibilities inside a company, or facing new external changes imposed by competitors or the economy.

Since rapid change is normal for many companies, jobs, and professions, an Alternate may assist as either a pro-active or a reactive way to adapt rapidly: In a pro-active sense, a user (an individual, a department, or a company) might imagine how an improved situation should be, and then create an Alternate (or a sequence of Alternates) that includes the Contexts and time sequence to create the Preferred Situation. In a reactive sense, a user (an individual, a department, or a company) might modify his Alternate(s) to collect the new Contexts needed, and Model the best possible reaction to the situation.

In either approach, the situation is tackled with customized information environments that include rapid and personalized access to more of the knowledge wanted or needed. In either case, this tool enables managers to shift their computing paradigm to imagining a preferred situation, then creating Alternates that help them implement it via their company's computing infrastructure.

Turning now to Figures 58 and 120, the new Editorial Assistant uses a function key to access the linked Alternate 740, 6072-6074 when specialized expert knowledge is needed about CBT (Computer Based Training) 742, 744, 746, 748, 750, 752. The linked Alternate works identically as this Alternate, except it is specific to the domain of CBT expertise. In the Alternate that contains CBT expertise, however, it was fine to keep the Outline Model view and the Time Sequence Model view the same. These views are in the identical order in this linked Alternate.

Even though the linked Alternate operates in the same manner as this Alternate, it is a separate stand-alone Alternate. Access to it is provided by means of using a function key to jump into that Alternate and return from it. When the user presses the Function Key to switch Alternates, it returns to the same point from which it was last exited 6073 (Figure 120).

If, however, the original creator had wanted to merge the Alternates, that could have been done. This is what was done with the Contexts collected from the first and second Context Bases.

Turning to Figures 59 and 60, an individual Context's Guide is examined. This shows the usefulness of the Alternate for transforming a new employee's work product. The user rapidly discovers a Context that comes from the company's internal Contexts, which include the writing procedures and goals the Editorial Department Manager wants employees to follow. The Context selected is how the department manager believes the writers might be "Creating Excitement in Articles" 760.

The user presses <F2> (the switch window function key) 6004, 6005 (Figure 117) to move from the left Context Window 761 to the right Guide Window 762. The screens in Figures 59 and 60 show how the Guide Window, which displays the screen number (e.g., "1 of 5" in the lower right corner) may be scrolled down using the <PgDn> key to display the 2nd 766, 3rd 768, 4th 770, and 5th 772 screens of this Guide. The user may directly

access the top 764 and bottom 772 of the guide, or any screen in the guide, by using keys such as <Home> or <End> and <PgDn> or <PgUp>. These function keys 6016-6032 are described in Figures 117 and 118.

Turning now to Figure 61, the user of the Alternate has pressed the "zoom" key and expanded the right Guide window 780 to fill the entire screen 6006, 6007 (Figure 117). This is indicated in the upper left corner, above the window, where it clearly states "Zoomed Guide Window" 782. This view puts more information from that Context on the screen. This Figure shows the first three screens 784, 786, 788 displayed in the Guide Window. The contents of the zoomed Guide window may also be manipulated by using keys like <Home> or <End> as well as <PgDn> or <PgUp> 6016-6032 (Figures 117 and 118).

Referring to Figures 62 and 115, the screen 790, 2620 begins the operation of the Alternate from the Time Sequence Model view 6038, 6039, 6041 (Figure 118). Again, at the top of the screen, the user sees that an Alternate is running, and the name of the Alternate 790. The upper window 792 is the Time Sequence Model window 9002 (Figure 137) and the bottom window 794 is the Guide window 9003, 9016, 9017 (Figure 137 and 138). The Time Sequence Modelwindow shows the major categories in the Alternate 796.

In the bottom screen 798 in Figure 62, the user sees the results of pressing the <Plus> key to expand the Alternate 800 to its next level of detail 6008-6010 (Figure 117).

Turning now to the top of each screen 810, 812, 814 printed in Figure 63, the Time Sequence Model view 816 has been expanded to show the Contexts. The right-hand column 818 of the (top) Time Sequence Model window 9002 (Figure 137) shows the number of the Context Base from which each Context was taken. As a result, the end-user is able to tell whether the information came from job skill knowledge (Context Base #1) or internal company policies and procedures (Context Base #2).

The lower left corner 820 of each (top) Time-Sequence Model Window displays the location within the Alternate. The three screens in this Figure are screen "1 of 8" 820, screen "2 of 8" 822, and screen "3 of 8" 824.

Turning to the bottom of each screen printed in Figure 63, the user sees the relevant Guides displayed in the lower Guide Window 826, 828, 830. As in the previously reviewed Outline Model View of the Alternate, the user may switch to the Guide Window by using the "switch window Function Key" 6004-6005 (Figure 117). The user may zoom any Guide to fill the entire screen 6006-6007 (Figure 117). Or, the user may remain in the Guide Window at the bottom of the screen. In either case, the contents of the Guide Window may be used by pressing keys such as <PgDn> or <PgUp> as well as <Home> or <End> 6016-6029 (Figures 117 and 118).

Figure 64 shows the first two 840, 842 of the four screens 844, 846 in the Alternate as seen with a zoomed Time Sequence Model window. The user may press

the "switch window Function Key" 6004-6005 (Figure 117) to display the zoomed Guide Window from any Context that the cursor is highlighting, or switch from the Guide back to the zoomed Time Sequence Model window.

Turning to Figure 65, there are three example zoomed Guide Windows 850, 852, 854. The user's location is displayed in the upper left, just above the window, where it indicates that each of these screens is a zoomed Guide Window 856.

The first guide 850 is an internal company Context. It indicates how that magazine publisher specifies its editorial layouts and its typesetting. In other words, the employee has immediate access to the specialized and unique ways the company wants the employee to do his or her job.

The lower two Guide Windows 852, 854 provide access to two different types of job skills from the Editorial Department Context Base. Both of these Guides help the new employee get up to speed in those skills by utilizing the type of guidance the company would like the employee to have. The middle screen 852 helps her learn how to describe machinery, while the bottom screen 854 helps her understand how to write in a visual and more interesting style. It is quite possible for the new Editorial Assistant to sit down to write a full-page Departmental Feature about a new piece of machinery, and need to open these three Contexts 850, 852, 854 to create this story properly.

Turning now to Figures 66 and 127, the user sees a new way of displaying and viewing information.

This is named the "Cognitive Window" 861, 2900. It is based on the fact that the human mind is limited in the number of concepts it can remember at one time, and in the levels of a hierarchy it can access concurrently for depth of information. The user switches to or from this view by pressing a function key (9058-9060 in Fig. 139).

In the top screen in Figure 66, the focused detail area, which is called the Micro Area is indicated by increasing the thickness of the middle of the left and right sides of the left window's border 862, 863, 2904 (though this is not required for the invention). The surrounding area 864, 866, 2902, 2906 which is called the Macro Area, retains the normal window border.

As a new type of display of an information environment, the Cognitive Window operates like a magnifying glass that displays the level of detail the user wants in its Micro Area 862, 2904, while displaying less detail in the top and bottom Macro Areas 864, 866, 2902, 2906. This view may also be thought of as two accordions: The first that expands the Micro Area in which the user is working 862, 2904, while the second compresses (while still displaying) the surrounding Macro Areas 864, 866, 2902, 2906 around it. The cursor remains in the Micro Area 862, 2904 and does not enter the Macro Areas 864, 866, 2902, 2906.

In the Cognitive Window illustrated in Figure 127 and shown in the three screens 860, 868, 870 printed in Figure 66, the same settings are used. They show a main focused area of detail (the Micro Area) 862, 2904

and the surrounding areas (the Macro Areas) 864, 866, 2902, 2906.

As the user scrolls down to the second and third screens 868, 870 in Figure 66, the entire window is not scrolled; the changes are restricted to the Micro Area's display of details and the larger titles in the Macro Area immediately above and below the details. In this example, when the user presses <PgUp> 9126-9132 (Figure 129) the entire window does not switch to a different part of the list. Instead, the focused Micro Area moves up to the next topic, "Writing:" 872. It then expands the area around the cursor's new location to show its detail 874. The former detailed area "Editing:" 862, 876 condenses and moves down to become a heading in the Macro Area below the Micro Area. Similarly, when the user presses any key that moves the cursor into the areas above or below the current focus 9114-9117, 9134-9140 (Figures 128 and 129), the level of detail follows the cursor while the current details are condensed and "put away" in the Macro Areas at the top or the bottom of the Cognitive Window.

Turning now to Figure 67, this is the screen 880 where the parameters of the Cognitive Window are set. While this screen may be modified, its interactive principles are apparent. As the user changes the settings in the left window 882, the right window 884 alters its appearance to display the current settings. Every user may set the Cognitive Window to match his or her cognitive style, and change the settings 886, 888 when a more or less focused cognitive approach is

desired. The Micro Area 888 can be set to match the level of detail preferred by the user, and the Macro Areas 886 above and below can be set to display the main points at the levels of detail that permit the larger picture of information to be accessed with the speed and flexibility the user desires.

For example, the Cognitive Window in Figures 66 and 67 are set to the following cognitive approach according to the methods illustrated in Figures 130 and 131.

(1) The Macro Areas 886 (above and below the Micro Area):

Up to 3 points are listed above the Micro Area 9202-9204

Up to 3 points are listed below the Micro Area 9206-9208

Line spacing is condensed (blank lines are eliminated) 9210-9212

The top level of the hierarchy is the level displayed. 9214-9216

The Micro Area (the detail area):

10 main points are included 9218-9220

Line spacing is normal (the same as in other views) 9232-9234

3 horizontal levels are displayed 9236-9238

With the Cognitive Window, the user gains the twin advantages of both Macro 886 and Micro 888 views in the same window, without having to jump around the Model to locate the Guides and Contexts needed next.

While the Cognitive Window is shown only in the Alternate, it may be used in other areas of this invention such as Context Collection and Context Positioning. In addition, its general usefulness for other types of software is apparent.

Using Alternates to Manage Situation Shifting

A system for explicitly managing "Situation Shifting" is part of the present invention. This part of the invention may prove increasingly valuable as innovation, new technology, and the speed with which these are commercialized grow as part of global economic competition. In organizations that might use Situation Shifting, many types of change occur. To fit the often professional but varied supervisory environment, a set of flexible management tools have been developed to explicitly control this process.

The management of Situation Shifting is the process of using the Contextualizer and Alternates systematically to improve the Current Situation or to move into an imagination-driven Preferred Situation. This spectrum may range from trivial changes to profound transformations.

The management of Situation Shifts includes four component systems in the present invention, though they may be used in any order. They will be explained here in the following sequence: First, Alternates are Modeled. Second, the Alternates in the Outline Model are Time-Sequenced into clear Situation Shifts. Third, a flexible reporting system rapidly discloses management information about the development of Alternates and the

process of Situation Shifting. Fourth, a Copyright Payment System which tracks costs and payments for distributing Alternates.

The top screen 890 in Figure 68 shows the menu for this option. The Guide window 892, 896 includes the main areas of Outline Modeling and Time Sequence Modelling the Alternates, providing a copyright payment system, and running reports. The last two screens in this Figure show the Contexts and Guides for Outline Modeling the Alternates 894, 892, 896, and Time-Sequence Modelling the Alternates 898, 900. Those texts explain the activities.

Turn now to Figures 69 and 142 for the Outline Model of Editorial Department Alternates. As can be seen in the Outline Model Window 910, 2700, only the new Editorial Assistant's Alternate 912 has been completed 914 while other Alternates have been planned 916 for positions like Writer/Editor 917 and Managing Editor 918. Future Alternates are indicated by asterisks 916 placed before their planned start dates. If the user would like to run a completed Alternate 912, the user highlights it with the cursor and presses the "Run Alternate" function key 7023, 7024 (Figure 126).

When the new Editorial Assistant's Alternate was started a Catalog screen was created for it 204 (Figure 18). The Catalog information 920 (7002-7007 in Figure 126) is attached to the Alternate to help manage its use, and it is displayed at the bottom 920 in Figure 69 (2702 in Figure 142). The items may be changed as needed; they are categories used to track the development, use, cost, and progress of each Alternate.

Alternate's Name 922: This is required. It is the basis for Outline Modeling Alternates and Time-Sequence Modelling them for Situation Shifting.

Date 924: Required and initially entered by reading the current system date when the Alternate is compiled. The date can be changed by the user.

Developer's Name 926: This is optional, but if it is entered the Alternates can be tracked by their developers. If this is not entered, developer tracking is disabled for this Alternate.

Developer's Department 928: This is optional, but if it is entered the Alternates can be tracked by the originating departments. If this is not entered, departmental tracking is disabled for this Alternate.

Estimated Budget 930: This is optional, but if it is entered the Alternate's cost may be compared to this budgeted figure. If this is not entered, cost tracking is still kept for the Alternate but budget comparisons are not available.

Cost for one Alternate 932: This is the amount calculated by the Copyright Payment System. See below.

Number Distributed 934: This is the quantity of this Alternate that has been compiled, duplicated, and distributed (whether internally in a company, or sold outside of it).

Total Cost for Alternates 936: This is the cost per Alternate multiplied by the number distributed.

Estimated Start Date 938: This is required. It is the basis for adding the Alternate to Outline Models and Time-Sequence Models.

End-User Names 940: This is optional.

End-User Department, Product, Business Unit, Etc. 942: This is optional.

Alternate's Description 944: This is optional, but if it is entered a "Concept/Notes" window is opened (212 in Figure 19). In it, a description of the Alternate can be entered and this description is attached to the Alternate's Catalog information. This description may be included in printed reports. If "N" is entered, notes window displays and printing the description are disabled.

As shown in Figure 69, the Outline Model is a two-window 910, 920 display (7002-7007 in Figure 126). The same type of keys work with these windows as with other systems in the invention; The cursor is a reverse-highlight light bar, and this is indicated by an arrowhead in the left column of the top window 912. As the cursor is moved to highlight an Alternate, its Catalog information is displayed in the bottom Guide window 920. The user switches between the windows with the <F2> function key and moves around both windows with the <Home> or <End>, <PgUp> or <PgDn>, and <Up> or <Dn> cursor keys 9010-9034 (Figures 137 and 138). In the bottom window, items can be updated at any time. If the Alternate's name or date(s) are changed in any window at any time, these changes are reflected in the Outline Model, the Catalog information, and the Time-Sequence Model(s). Flexible reports to track combinations of Alternates, or report on an individual Alternate, are available (see below).

The same sequencing, indentation, and titling tools operate in Modeling as in Context Positioning (Figures 102-106 and 7002-7019 in Figure 126). The user

reorders the Alternates into a Model 946 of a Situation Shift. This Model 946 reflects the user's view of the area covered by the Shift, regardless of whether this is a department, a business unit, or a complex organization-wide program like creating a new technology and marketing new products from it.

In Figure 69, the Situation Shift 948 is a reorganization of the Editorial Department that is part of the publishing company's launching a major new magazine. During the year-long start-up period, staff are being given added responsibilities through Alternates that describe how they ought to do their expanded jobs 912, 917, 918. After the new magazine becomes established, new staff will be hired for it. Until then, however, the current staff will create and publish the new magazine's first issues. Alternates are being created and implemented systematically throughout the year 916 to increase the staff's output, to support a faster pace of change, to learn added responsibilities, and to provide specific new skills and expert information needed to create the new magazine in its specific field.

Turning to Figures 70 and 124, the top window 950 2710 shows the Time-Sequence Model for the Editorial Department's Alternates 954. The bottom window 952, 2712 provides the Catalog information 958 about each Alternate 956, so the user has the relevant details immediately available.

The actual process of Situation Shifting involves implementing sequence(s) of appropriate

Alternates over time 955. The same editing tools for sequencing apply to moving the order of the Alternates, as described above in Time-Sequence Modelling. In brief, (Figures 107-111) and 7002-7019 in Figure 126) the process of Time-Sequencing Alternates parallels Time-Sequencing of Contexts (see above).

By moving the Alternates in the Time-Sequence, their projected implementation can be moved forward or backward to evolve a situation 960 toward the Preferred Situation, or to modify a Situation Shift 960 in the middle of its evolution. The resulting Time-Sequence 954 shows the top-down picture of the Alternates included in that Situation Shift 960, so any gaps or conflicts may be identified and corrected.

This method is flexible. In a different company, for example, a corporate planner might build and save a complete Alternate covering a Situation Shift for one department of a business unit. The planner might then call it up for each type of job in the department, extract three Alternates for each job, and sequence the three Alternates by the initial, transition, and final new skills and relationships needed in each job. Then, each job's three Alternates would be compiled and saved into a separate directory on the computer's hard disk. These directories can rapidly be copied to floppy disks and distributed to be run on the computers used by the employees who work in each job.

A new Time-Sequence Model 954 may be created for each Situation Shift 960. When Time-Sequencing Alternates is selected from the Managing Alternates menu

(898 in Figure 68), either a new Situation Shift is started or an existing Situation Shift is selected from a list of ongoing Shifts. If this is a new Situation Shift, a "Concepts/Notes" window may be opened for it and the developer's ideas can be attached (if desired). When the new Time-Sequence window opens, the relevant Alternates are listed in it, displayed by their start dates. Other Alternates or even entire Situation Shifts may be added or linked to this Situation Shift. This window's time spacing 962 is by month and all the Alternates that start in any one month are listed together under that month in the order of their start dates 957 (so the user can rearrange their order by moving their start dates forward or backward by a few days 959). Using the same editing as in Time-Sequencing, the user can quickly re-order the appropriate Alternates 954 to create each Situation Shift 960, 7018, 7019 (Figure 126).

The essential process of Managing Alternates is a scaffold of larger and larger structures that parallel each other; at the lowest level, an Alternate is built with Contexts from many Context Bases (see above); at the next level, a Situation Shift is built with multiple Alternates (see above); now, the top-down senior management perspective is constructed by Outline Modeling and Time Sequencing multiple Situation Shifts to plan and implement Preferred Situations. If the entire structure is built on one computer system, the designer(s) can move from the largest perspective down to individual alternates by pressing the <Plus> key and

revealing greater levels of detail and vice-versa with the <Minus> key 9018, 9019 (Figure 138).

Turning to Figure 71, the user constructs an implementation plan on the level of the company's entire Situation Shift 970 (7002-7019 in Figure 126). This includes interactive access to the Situation Shifts 972, 978 in the related Departments of the publishing company. Together, their Preferred Situation is a rapid and ambitious reorganization to launch a new magazine. As a practical program that is Outline Modeled 974 and Time Sequenced 976 in Figure 71, this is the major goal for this company for this year.

The invention for managing larger Situation Shifts operates the same as creating and running Alternates, but it encompasses larger information environments. The point is that Situation Shifting is just as imagination-driven as creating Alternates. Even though a Situation Shift may be constructed rationally and implemented by professional managers, the process still reflects its users' ideas and imaginations.

Organizational Situation Shifts 970 are constructed by Outline Modeling 974 and Time-Sequencing 976 local Situation Shifts. They are treated as malleable and portable Contextual environments (i.e., imaginative Preferred Situations) that may be designed on the computer by means of the invention, and implemented both in parallel and in sequence.

The Model of Situation Shifts 974 mirrors the structure that the user(s) decide should be given to the organizational Situation Shift 970. As their activities

evolve, as they learn more, and as their goals change, the users may modify their Models appropriately.

This same imaginative openness exists when users are Time-Sequencing local Situation Shifts 960 into organizational Situation Shifts 976, 978. Like the Outline Models, the Time-Sequenced Situation Shifts may be modified at any time to match rapidly changing situations. By definition, Alternates that will be implemented in the future are being created for Preferred Situations that do not yet exist, so they may be expected to be modified during future stages of Situation Shifting.

The tools for Managing Alternates may be applied to small as well as large Situation Shifts. On the smaller end of the spectrum, a user might simply want to redefine jobs in a department that has a few employees, to increase the quality of their work and the speed of learning of new responsibilities. On the larger end of the spectrum, the centralized management of a multi-national corporation might be struggling to keep up with rapidly changing business units, technologies, global competitors, and regional markets by attempting to shift dozens of situations toward their Preferred Situations. One or more of these varied management challenges might be helped by this new type of computing.

For example, a Time-Sequenced Situation Shift may contain a new Contextual environment that goes considerably beyond this publisher's reorganizing jobs and launching a new publication. Consider a Situation

Shift to introduce new technologies into a factory: converting from an assembly line to computer-controlled flexible manufacturing. In this type of Situation Shift, three sequencing principles might be used: First, some new skills will need to be mastered before others are started. Second, as changing machinery alters the ways people see their jobs and their departments, the user might want to schedule the individual Situation Shifts in a particular order (such as putting the smaller and easier ones before the larger and more difficult ones, or putting consensus-building first followed by the highest priority goals). Third, when individuals or work groups must rely on new or unproven technologies, it may be preferable to complete the known conversions first, in ways that build relationships and mutual support for the riskier leaps.

Another user may plan a Situation Shift from an assembly line to flexible manufacturing but consider simplicity critical, so that all employees and managers may understand the implementation plan. This planner may believe that too many new types of Contexts at each step may confuse or frustrate people, because too many smaller steps could obscure or confuse the larger goals. To provide simplicity, the user may restrict the published structure of the Situation Shift to one view. The only published view might be the Time-Sequence for implementation, but the Outline Model each person follows in his job (on his computer) would be unique to provide rapid access to the Contexts he needs as an individual.

The third tool for Managing Alternates is a flexible reporting system 980, as shown in Figure 72. This permits a wide range of reports to be designed 985, run 995, and saved 992 for rapid re-use. Some potential reports include:

(1) Who created the Alternates, listed by developer; for each developer, list the Alternates by the end-user department; within each department list the Alternates by their start date.

(2) Who created the Alternates, listed by the developers' departments; for each department, list the cost of each Alternate and the total cost of all the Alternates it developed.

(3) How closely does the actual cost of finished Alternates match their projected budget; run this separately for the three most expensive Situation Shifts.

(4) What Alternates have been developed for the XYZ Business Unit (or department), listed by start date, including both budgeted and actual cost of each Alternate?

These and other reports are created using the screen shown in Figure 72. The user simply enters the Report Name 982 and the Situation Shift 984 (or an individual Alternate's) name to specify which Alternates are included in the report. The <Down> and <Up> cursor keys are used to move within columns 986, 988, 990 and the <Left> and <Right> cursor keys move between the columns

986, 988, 990. The left column 986 shows the available information and anything wanted in the report can be included by entering a "Y." The middle column 988 is used to organize (sort) the information listed in the report. This is done by numbering up to four items in this column, with the most important item numbered "1." The right column 990 is used to indicate the totals that are wanted at the end of the report (sub-totals are generated automatically); the units of measure are next to each total to the right of that column 990. The output is chosen when the report is run. The output can be sent to the screen or the printer, or saved to a file for use in word processing.

This reporting system allows each user to create 985 as many custom reports as needed, and to save 992 the reports that provide the management information wanted in each situation and by each company. When reports are saved 992 they can be run 995 repeatedly without re-entering their parameters. When saved, a notes window may be opened to add a description of the report. Any report can also be called up and modified 994, or erased 996. When a saved 992 report is useful for multiple Situation Shifts or Alternates, it can be run 995 for any of them simply by changing the name 984 at the top of the Report Screen (or a separate report can be saved 992 for each of them, with its name 982 already specified).

The reporting screen 980 is also a rapid interactive tool that answers detailed questions quickly. The user simply skims the list of saved

reports 995, picks the one closest to the current question, and calls it up on the report screen. The cursor keys are used to modify the report 986, 988, 990 to produce the exact information needed 986 and the order of presentation 988; the questions are answered right away on the screen or on paper. If that report is useful, it can be permanently saved 992 and re-run 995 immediately (from the list of saved reports) any time those questions need to be answered.

The final function in Managing Alternates is the Copyright Payment System, and the menu for this is in Figure 73. This was developed so that users may take advantage of many valuable Copyrighted Materials to create alternates and Context Bases, and by protecting intellectual property rights, stimulate publishers to make more Context Bases available for potential Contextualizer applications.

This Copyright Payment System 1000 (1) links users of the Contextualizer with information vendors so the re-publishing of copyrighted information may result in fair payments, and (2) permits the present invention to provide a revenue source to publishers. In brief, this system helps the Contextualizer's users make rapid and simplified payment to the multiple vendors whose property they might re-publish in Contextual formats and distribute as Alternates.

Modern societies produce vast amounts of new "how to" and Contextual information every year. In addition, enormous stores of previously produced information are readily available. The vast majority of

this information is copyrighted or proprietary to an individual or an organization, which means it is the property of others and payment must be made to re-publish all or parts of any specific work.

The present invention may serve as a technology for rapidly accessing, extracting, reorganizing, and distributing large amounts of useful information, both within organizations and for re-sale. The responsibility to pay for copyrighted information accompanies this extraction and distribution of information from copyrighted and or proprietary sources.

Creating a Copyright Payment System is a practical decision since it supports attempts to persuade some publishers to permit appropriate publications to be turned into Context Bases that can be used in the Contextualizer. If publishers believe a re-publishing market may develop for their properties, they can evaluate the costs and benefits of developing Context Base information products to stimulate this market and establish a leadership position in this new technology.

If the Contextualizer's users become re-publishers who use copyrighted materials and pay for them, revenue sources may emerge and it might become profitable to develop additional Context Bases as products for the specific market niches in which these users are active. For example, some potential Context Bases are "how to" information that may be immediately used to improve job and business performance, profitable commerce, and daily life. This may lead to the

emergence of successful new information products (Alternates) based on these Context Bases. A related business could be the emergence of on-line Context Bases, whose information sources are database publishers. In about a decade, Lockheed (a company from outside the traditional publishing industry) developed the Dialog Information Service with access from many parts of the globe. On-line information vendors, some database publishers, and others are currently helping develop the CD-ROM market (whose growth rate currently exceeds 100% per year).

Two of the uses of copyrighted information in the present invention are first, for creating Alternates; the use second is for re-publishing and distributing Alternates that contain copyrighted information owned by others. Each of these involves a different form of payment.

The first use is for creating Alternates. This use parallels a business office that buys a reference book, puts it on a shelf, and all the employees use it when needed. Any use of the materials in a reference book is permitted without additional charges, except: (1) making copies of substantial portions of it and distributing them, or (2) re-selling all or part of the book (in the latter two cases, re-publishing all or part of the property). Therefore, the Contextualizer is designed so that users can buy and then access copyrighted Context Bases and use the information to develop Alternates without needing to consider additional payments to copyright owners - equivalent to

accessing a reference book from a shelf. Alternates must be compiled to be distributed as stand-alone programs, however, which is re-publishing. The invention then calculates the copyright fees and prepares both summary information and invoices that simplify payment 9320-9350 (Figure 140). While the invention does not police the purchaser for the vendor, the Copyright Payment System permits honest customers to pay for copyrighted materials that belong to others, and it encourages the rest to be honest by its presence and its functions.

Turning now to the top screen 1010 in Figure 74 and to Figure 140, after the Copyright Payment System is selected the user chooses a Context Base 1014, 1016, 1018. Selecting the option for the copyright vendor produces an alphabetized list 1012 from which the user may look up the information about copyrighted Context Bases that have been used in creating an Alternate.

The top screen 1010 of Figure 74 lists these sources by author 1014, by the title of the Context Base 1016, and by the owner/vendor of the copyright 1018. In the prototype, the cursor is a reverse highlight bar similar to that used in the invention (indicated by an arrow in the left column of the window) 1020. An item is selected by putting the cursor on it 1020 and pressing <Enter>.

The bottom screen 1022 in Figure 74 shows the detailed copyright information 1024 from one information source and its costs. In detail, it shows the work's author 1026, title 1028, and publisher 1030. It also

shows the most recent date 1032 on which the Alternate extracted material from this Context Base, the number of pages 1034 in the source that was copyrighted, and the year 1036 it was copyrighted. The middle section shows the copyright vendor 1038 and the contact person 1040 and contact information 1042. Since many publishers have several lines of books or magazine titles, and the publishing industry is increasingly concentrated, some subsidiary rights offices manage the rights for many valuable information sources.

Since the copyright vendor information and costs are not (at this point in time) built into most Context Bases for re-publishing, they must be entered manually 9310-9312 (Figure 140).

The copyright fees are entered at the bottom 1044 of the second screen, based on contacting that copyright vendor. The main choice is whether or not there is a flat fee for the copyright cost. As can be seen in the left column 1046 in this fictional example, until a developer uses more than 100 pages, there is a one-time fee of $15.00. Above 100 pages 1048, the fee goes to 3-cents per page; over 1,000 pages it goes to 2-cents per page; and over 10,000 pages used it falls to 1-cent per page.

Turning now to Figure 75, the user enters in the top window 1050 the name of the alternate 1051, 9320 and the number of copies of the Alternate 1052, 9330 that are being published and distributed. This shows that for the New Editorial Assistant only one copy will be distributed and used at any one time.

The information input by the user 1051, 9320, 1052, 9330 is used to compile a list of sources with total number of pages used 9321 and calculates the cost summary 9331 that is in the bottom window 1054 of the screen 9320-9332 (Figure 140). It shows that 43 Contexts 1056 were used to create this Alternate. Eight were internal 1058 to the corporation and already owned. Copyright fees were already paid for 24 Contexts 1060 used in the Alternate. There are 11 Contexts with copyright fees due.

The cost, based on the copyright costs entered into the detailed copyright information on each Context Base external to Figure 74, is a total of $20.00 1064 for each Alternate. Since there is only one Alternate being distributed, the cost for all the Alternates is also $20.00 1066.

The last line at the bottom 1068 shows that there are 14 sources for which copyright fees have already been paid. In these sources, 1,084 pages remain to be used without any additional charge. This is because flat fees may permit use of more information than is accessed to create and distribute one or more Alternates.

These three systems (the Outline Model of Alternates, Time-Sequenced Model Alternates, and Management Reporting), together with the Copyright Payment System, yield a flexible approach to managing imagination-driven change, achieving many benefits.

Centralized senior management can design, control, track, and modify individual or simultaneous

Situation Shifts throughout an organization. When a variety of different Alternates are implemented at one time, a spectrum of different imagination-driven goals might be targeted: the transfer of technology between certain business units, quality improvements from current employees, increased output from various departments, additional responsiveness to customers in a business unit, etc.

Local decentralized executives can create and manage Situation Shifts that produce single or multiple changes in their area of an organization, including their internal operations, their ability to adapt to new local or market conditions, and improving their external relationships with a parent company, suppliers, or customers.

A large component of the costs are tracked and reported through the Copyright system.

The combined Outline Models, Time-Sequencing Situation Shifts, and Reporting system may be used to manage the overall, top-down pattern of Situation Shifts throughout an organization, including one of the most difficult challenges facing modern multi-industry global organizations: using multiple Situation Shifts to improve the management of simultaneous multi-national projects and businesses that include multiple alliances with corporations, vendors, and major customers around the world.

Create Context Bases

Figure 76 shows the main menu 1070 of Creating Context Bases, and the Guide 1072 that explains the main choices in that area.

Creating Context Bases has two primary functions. The first is importing 1074 and templating 1076 information into Contexts that can be used to create Alternates. The second is a sub-set of the first, doing on-the-fly extracts from an information source to import one to a few Contexts. Because speed of creating useful Contexts is a primary goal, part of the templating process has been automated.

This portion of the invention creates Context Bases, which are sets of Contexts that can be Collected and Positioned to create Alternates. These products could be bought by users of Contextualizer software and by developers who are creating Alternates for re-sale. A "Context Base Editor" (a fictional title for a new kind of job at a publisher or an independent Context Base product developer) might transform selected publications into Context Bases for these purchasers. A corporate user of the Contextualizer might also use this to transform selected corporate manuals, reports, and other types of data into Context Bases that may be Collected and Positioned to create Alternates.

The range of digital information sources that can be turned into Context Bases is already large and growing in a variety of media, including sizable on-line and optical disc (CD-ROM) sources. In many corporations, computerized information resources are enormous and growing rapidly. The publishing and database industries are thriving and produce most of their new publications via word processing and/or computerized typesetting, so they are also in digital

form. Any of these sources might re-package portions of their information as Context Bases and put them on the market as products, or sell the right to do this to others (the same way publishers of hardcover books sell certain rights to paperback publishers, movie makers, audio cassette publishers, etc.).

Turning to Figure 77, it shows the two-window 1080, 1082 system used for both importing and exporting these sources of Contexts from the Contextualizer. Figure 135 describes the importing function 8041. This Figure 77 is filled in for importing an information source that will be a helpful Context Base for creating Alternates in the Editorial Department of a magazine publisher. It shows that a text file for the first chapter of a book was acquired or scanned from the book, How to Understand and Negotiate a Book Contract or Magazine Agreement, by Richard Balkin (Cincinnati, OH: Writer's Digest Books, 1985).

As shown in Figure 77, the source of the information is a file 1084 that is located in the directory \WP\BOOKTEXT 1086 and has the filename CHAP-1.TXT 1088. (The reverse highlight does not print but the source of the document is a FILE, which is marked by an arrow.) This file 1088 will be imported into the WRITERS directory 1090 and put into the file "magazine agreement instructions" which is abbreviated into the filename MAG-AGMT.INS 1092. The title of this Context Base is going to be WRITER AGREEMENTS 1094.

The exporting function 1082 is included so Contexts and Guides can be exported from an information

source into an ASCII file. In Figure 133, the exporting function is shown in flowchart form 8010, 8011. This permits Contexts to be imported into other software (such as word processing), which allows Contexts to be updated and modified to make sure they are accurate and applicable. For example, this is likely to be helpful for updating Contexts that include information on the current needs of key customers, instructions for operating machinery that has been modified, and changing the working relationship with another company department.

A "notes" window (that parallels what may be added to Alternates) may be opened to add a user-written description to the Context Base. This description is attached to the information source and it can be displayed (and modified if desired) while the Context Base is selected by pressing a function key. The description can also be included in printed reports. If this notes window is not used it can be added later; until it is added, its printing and display are disabled.

Turning now to Figure 78, this screen 1100 comes up with the upper left window 1102 active. The user changes windows in the same manner as in the rest of the software, by using the <F2> function key 9010, 9011 (Figure 137) and moving through the windows 1104, 1106, 1102 in a clock-wise direction.

The invention semi-automates the process of templating the information source into a Context Base. The general procedure is to import a computer-readable document 1080 such as in Figure 77 (or to scan a document into the computer). Referring to Figures 78

and 135 and using this screen 1100, the user sets the template markers 1102, 1108, 1110, 1112 and enters keywords 1104, 1114, 8041, 8042. These set up the automated beginning and ending markers for each Context in the file, which are then adjusted manually by the user.

In the upper left window 1102 of Figure 78, the reverse highlight does not print but an arrow is used to highlight PARAGRAPHS 1108. Because chapter 1 of this book is organized by brief headings, the templating marker to begin each section will be those headings. Therefore, the "BEGIN" templating marker for each section is zero above each keyword 1110; i.e., when the software finds each keyword, it sets the beginning marker just before that keyword.

Below each keyword 1112 the templating is configured to go down two paragraphs and place the ending marker there; i.e., the number two is entered after "Below each keyword:". If, however, another keyword is encountered, the ending marker for that section will be placed just before the next keyword. As a result, each Context will be automatically templated for a length of two paragraphs or less 8044-8048.

By pressing <F2> 9010, 9011 (Figure 137), the user switches windows in a clockwise direction and moves to the right window 1104. The keywords are entered here 1114, 8042. They are typed in a list with one keyword per line. Since the headings in the text are exact, capitalized, and end in a period, it is possible to enter the headings exactly as the keywords that the

software should locate. This permits very precise location of unique keywords.

After those keywords are filled in 1114, 8042, the user presses <F2> to switch from the right window 1104 to the lower left window 1106. When the user selects the lower left window, the START 1116 of templating is automatically highlighted, which is marked by an arrow. The user may press <Enter> to start the templating, or <Shift-F5> 1118 to produce a list of previously saved templating set-ups (including the keywords for each one saved) 8045 (Figure 135). This option allows the user to save the current templating set-up and list of keywords. The user could make modifications in a single set-up to template an information source several times, thereby template it for several lengths on sets of keywords, each time extracting the appropriate sections to turn them into Contexts.

Turning to Figure 79, the user selects the type of action. The first step 1120 is to "Template the imported text." This adds beginning and ending markers to the text according to the criteria set up in the template screen. According to Figures 133 and 135, to select this the user simply presses "1", which templates the information to start creating Contexts 8006, 8007, 8046-8048.

The results of templating the text are indicated beginning with Figure 80, which shows the first 1130 and the last 1132 screens of this templated chapter.

Also referring to Figure 132, templated text is displayed in a two-window system. The left window 1134, 2800 is fixed and does not change. It shows the speed keys used to edit the templated text, or it may serve as a menu to select functions if a mouse is used. The right window 1136, 2802 shows the text that has been templated. The top screen in Figure 80 shows the "BEGIN" marker 1138 that is set at the first keyword found, which is "Finances" 1140. In the left margin is a reversed bar 1142, both horizontal and vertical, showing the information within the template, i.e., what is included in that Context.

The screen number 1144 is displayed in the lower right corner of the right window. In this case, the top screen 1144 is the first screen and the bottom screen 1146, which is the end of the imported text, is screen 42. In both cases, the first author's name is Balkin and this is displayed on the same line as the screen number at the bottom of the window 1148, 1149 but directly under the text.

The first screen 1136 does not start at the beginning of the imported text. It starts with the first keyword 1140 located, which is "Finances." That is where the "BEGIN" marker 1138 is placed, along with the start of the highlight 1142 in the left margin.

Figure 136 describes the method for manipulating templated information 8054-8060 and should be referred to in the following discussion of Figures 81-84. Turning now to Figure 81, three computer screens 1150, 1152, 1154 are printed in it. The first screen

1150 shows the "BEGIN" marker 1156 for the "Finances" 1158 template. The second screen 1152 (which is screen 5 1160) shows the "END" marker 1162 for the "Finances" template. The "END" marker is two paragraphs after the keyword "Finances" 1158. The third screen 1154 (which is screen 6 1164) shows the "BEGIN" marker 1166 of the next potential Context; this was located by its keyword "Assignment vs Speculation" 1168.

The user jumps from screen one at the "BEGIN" marker 1156 to the "END" marker 1162 on screen five 1160 by looking at the keys in the left window 1170 and pressing the <F8> Function Key 1172. This jumps to the ending marker of the current templated Context 1162.

By glancing through the text, the user sees that there is a paragraph 1174 between the first "END" marker 1162 and the second "BEGIN" marker 1166. This is located in the middle screen 1152 and it starts with the words, "Of course, this assertiveness. . ."

The user determines that this paragraph 1174 should be included in the first Context rather than in the following one, or rather than being omitted.

Turning to Figure 82, the "END" marker 1162 is moved down to the end of the paragraph 1180 by extending the highlight. The <F3> Function Key 1182 is used (as indicated in the left window): The cursor keys are used to put the cursor on the first letter of paragraph 1184 that starts, "Of course. . ." Pressing <F3> 1182 selects the word "Of" and reverse highlights it. Pressing <F3> 1182 again selects that sentence, and pressing it 1182 a third time selects the entire

paragraph. By pressing <Enter> this brings the "END" marker 1180 down to the end of the highlighted section.

If the user wanted to move the next "BEGIN" in an upward direction, the user would have started the <F3> highlighting from the last letter of the paragraph and selected upward. Then pressing <Enter> would move the "BEGIN" marker upward.

Turning to the top screen 1190 in Figure 83, the user has jumped back to the "BEGIN" marker 1192 by pressing the <Shift-F7> key 1194, as indicated in the left window 1196. At that point the user presses the <F5> Function Key 1198 and types in the title 1200.

The title desired for this Context is "Quoting a Fee" 1200. This is automatically centered on the line, as indicated in the bottom screen 1202 in this Figure. Since there is a limited space for the title after the "BEGIN" marker 1204, this also provides for a one-line title that fits the Context Collection window.

Figure 84 illustrates how quickly a user can finalize an appropriately templated Context. In the top screen (1210), the user jumps to the "BEGIN" marker 1212 by pressing the <F7> key 1214. In the Figure, this lands the user at the beginning of the section on "Kill Fees" 1216 on screen number 9 1218. The user then skims the screen, presses either page-down 9028, 9029 (Figure 138) or <F8> to get to the next "END" marker 1220 (the middle screen 1222 in this Figure) and sees that this is properly templated. In the third screen 1224 of this Figure, the user presses <Shift-F7> 1226 to go back to the "BEGIN" marker 1228, presses the <F5> key 1230 and

types the title 1232, then presses <Enter> to complete that Context. If needed, the user could have moved either the "BEGIN" 1212 or "END" 1220 markers. If the user needs to delete words, sentences, or paragraphs the user selects them with the <F3> key 1234 then presses the <Delete> key.

Turning to Figure 85, the user selects option 2, "Model the Context Base 1240, 8066, 8067 (Figure 136).

Figure 86 displays the starting 1250 and ending 1252 screens from a series of screens during which the newly created Context Base 1254 is rearranged into the Context Base 1256 that will prove useful in a magazine publisher's Editorial Department.

As can be seen, the first screen resembles Context Positioning (Figures 102-106); in fact, it functions identically to that. In the left window 1258, 9002 (Figure 137), the title of the Context Base is centered at the top: "Writer Agreements." The cursor is a reverse highlight bar (shown in the printout as an arrow in the window's left margin) on "Quoting a Fee" 1262. The Guide for this Context is displayed in the right window 1264, 9003 (Figure 137). The source of the information is at the bottom of the right window 1266, showing both the author and the page numbers. That number of pages and source information are automatically linked to the Copyright Payment System.

The user operates in the left window 1258 and uses the same tools as in Context Collection and Positioning 5000-5117 (Figures 102-106), as in the creation of an Alternate. Individual Contexts 1262] END

1789B (WAC)
APPL1424

are moved around. Headlines are inserted and/or changed by overtyping the existing headlines 5102-5111 (Figure 106).

The result of the rearranging process is shown in the bottom screen 1252 printed in Figure 86. The "Writer Agreements" source 1260 has been rearranged into three sections: first is the Assignment 1268; second is the Payment to the writer 1270; and the third is the Rights to the finished piece 1272.

Each of these new headlines, which were inserted 5102-5111 (Figure 106), includes the appropriate Contexts that were templated from Chapter 1 of the Balkin book.

After the original information source has had the appropriate Contexts templated from it, and it has been Modeled into a useful source of Contexts, it is time to save the file as a Context Base (i.e., an information source that contains only Contexts) 8008, 8009 (Figure 133). After being saved this will no longer be a text file; it will be a rapidly accessible collection of Contexts with all extraneous text removed.

Turning now to the top screen 1280 in Figure 87, this screen shows selecting "Save/Clean Context Base" 1282 from the menu for Creating Context Bases. Figure 133 also illustrates saving an information source to a written file 8008, 8009. The second screen 1284 of Figure 87 shows the warning 1286 to the user, that this will delete all unmarked text. It also displays the destination file location 1288, file name 1290, and title 1292 that were entered when the file was imported

into the Contextualizer (see Figure 77). The user may change any of these, if desired. The user then presses Enter› to save and clean the Context Base. After this is finished, the bottom screen 1284 is displayed, indicating that the Context Base is ready to be used to create Alternates 1296.

The same steps are used to extract a quick, on-the-fly Context 8016-8037 (Figure 134). The difference is only one (or a few) keywords are entered so the templating produces a minimum number of templates and these can be extracted rapidly. In some cases, the Context needed is a single computer file. For example, "Creating Excitement in Articles" was a single Context in the Alternate for the new Editorial Assistant (see Figures 59 and 60). This was a single computer file that was developed using word processing by the publisher's Managing Editor, at his desk.

Environments

The following describes the environments in which the Contextualizer and Alternates may be run.

First, both the Contextualizer and Alternates may be run from the Main Menu on the computer that developed it. This might include a microcomputer or a workstation at a user's desk, or it can be accessed over a Local Area Network (LAN), on a departmental minicomputer, or on a mainframe computer at a corporate data center. Storage may include one or more CD-ROM or read/write optical disc drives. The system may or may not have video display capability, including video or

optical disc(s) and appropriate video imaging on TV monitors or in a window(s) on the computer screen(s)

Second, an Alternate may be distributed (or sold) on disk(s) to be run on other computers. (For example, the new Editorial Assistant might run her Alternate on the microcomputer at her desk.)

With an Alternate, the type of access should vary based on the type of need. For example, the new Editorial Assistant only requires access to her own customized Alternate at her own desk. If this had been the Alternate created for all the Writer/Editors in the Editorial Department, and there was a network in place (whether a LAN or a departmental minicomputer), the Writer/Editors might access a shared Alternate over their network.

The key variable is whether the media in the Contexts match the communication system and the display capabilities of the computer systems at each person's desk. The above approaches work if all the systems handle digital text and computer graphics, and the Alternate's Contexts and Guides do not contain any more than that. If the Guides display still or moving video images, then optical disc or video tape players would be needed to provide access to video media, and the local systems at each user's desk need the ability to display video images.

As technology evolves, the means of access to this invention may potentially become more varied:

DIAL-IN VIDEOTEX SOURCES. These are dial-in services available to subscribers. The Contextualizer

and Alternates would run on the Videotex service and be operated remotely by the user who is dialing in.

POINTER ENVIRONMENTS: Basically, a computer system and a user with a pointer input device would run this software interactively, including both the Contextualizer and the Alternates. The main types of pointer devices are a touch screen, mouse, lightpen, digitizing tablet, and joystick. The location could be, for example, a Kiosk with touch screen input located on a factory floor between several flexible manufacturing cells.

NEW STORAGE TECHNOLOGIES: Emerging optical disc technologies, such as CD-I (Compact Disc-Interactive), and DVI (Digital Video Interactive), or similar mass storage media may also provide platforms for running or storing parts of the Contextualizer, Alternates, and/or their Context Bases. The same is true for existing CD-ROM and laser disc technologies. In general, mass storage technologies are attached to a computer as interactive storage devices and they are operated under the control of the computer.

NEW TECHNOLOGIES: Planners and users of the Contextualizer could use a large, high-definition computer monitor (like a large color TV), developing or using the information environment either alone or together, controlling it with one or more pointer devices such as hand-held remotes. The CPU might have a (high capacity) mini-floppy disk and writable optical discs for importing/exporting finished Alternates and Context Bases. In this environment, the users' efforts

would go into thought and discussion, not into operating the computer.

The ultimate design goal is software that is as easy and fast to use as an Automatic Teller Machine (ATM), so that this invention might evolve toward simplicity rather than complexity. A prototype of this new information environment runs with only the cursor keys block on the right side of the keyboard, with about 20 operations programmed into the Function Keys on the keyboard. The rest of the keyboard is used only occasionally, such as when typing in a file name changing a title. With these few keys, complex Alternates and Situation Shifts can be created; existing ones modified, linked, or merged; and even fewer keys are needed for the final users to access the Alternates interactively.

EMERGING DIAL-IN SERVICES: The technology of dialing into and accessing an information source is continually advancing in fields such as computers, videotex, kiosks, and digital optical players/recorders. For example, France's Minitel system is installed in over a million homes. It is possible that new types of dial-in services may become available in American businesses and homes. If so, it may be possible to offer the Contextualizer and/or Alternates on-line for broad audiences of users.

COMBINED TECHNOLOGIES: It is possible to combine the current and emerging technologies. A centrally developed set of manufacturing Alternates might be run from a kiosk on a factory floor that is

operated by a touch screen and displays full motion video in some of its Guides. The Contextualizer with an extremely large set of on-line Context Bases might be offered on one or more phone-in vidotex services; its users could construct business-related Alternates from their offices during the day and personal Alternates from their homes at night.

With these types of environments possible either today or in the future, the target population may become broad and significant: users who have major goals, are chronically short of time, and must perform at the highest quality global standards using the best information and expertise available.

The process of constructing, distributing, and using Alternates may have wide applications. As computer desktop systems use optical discs to store and access large volumes of information and move into greater use of electronic text retrieval and multi-media, the invention may provide the ability and to access, extract, and manipulate information in many forms. Alternates may be useful for creating flexible information environments that match varied situations, needs, or desires. We consider three examples.

The first example is use by groups as well as by individuals. When a Outline Model or a Time-Sequence Model is built by a group, such as the Purchasing Department of a hospital, they would create a mirror of their shared understanding. A group Model might include areas such as what the group knows, its desires or goals, the problems it has, the questions it wants to

answer, and the information they know how to access to create their answers. Since each person views a common situation differently, a shared Model are moved around. Headlines are inserted and/or changed by overtyping the existing headlines 5102-5111 (Figure 106).

The result of the rearranging process is shown in the bottom screen 1252 printed in Figure 86. The "Writer Agreements" source 1260 has been rearranged into three sections: first is the Assignment 1268; second is the Payment to the writer 1270; and the third is the Rights to the finished piece 1272.

Each of these new headlines, which were inserted 5102-5111 (Figure 106), includes the appropriate Contexts that were templated from Chapter 1 of the Balkin book.

After the original information source has had the appropriate Contexts templated from it, and it has been Modeled into a useful source of Contexts, it is time to save the file as a Context Base (i.e., an information source that contains only Contexts) 8008, 8009 (Figure 133). After being saved this will no longer be a text file; it will be a rapidly accessible collection of Contexts with all extraneous text removed.

Turning now to the top screen 1280 in Figure 87, this screen shows selecting "Save/Clean Context Base" 1282 from the menu for Creating Context Bases. Figure 133 also illustrates saving an information source to a written file 8008, 8009. The second screen 1284 of Figure 87 shows the warning 1286 to the user, that this will delete all unmarked text. It also displays the

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areas such as what the group knows, its desires or goals, the problems it has, the questions it wants to answer, and the information they know how to access to create their answers. Since each person views a common situation differently, a shared Model expresses a different level of understanding: the grasp of the Purchasing Department and the ideas many people can offer for solving the current problems or growing beyond the short-term obstacles. In addition, the activity of involving many members in picking goals, planning how to achieve them, and implementing them may create a dynamic involvement. The Purchasing Department may evaluate themselves and improve their performance based on making visible the "how to" and "why" and other criteria they understand and believe in together.

A second example is that unlocked Alternates may be a new type of distribution method and product for publishers of books and magazines. Publishers (such as a publisher of engineering handbooks) may have useful "how-to" information sources that they may want to sell as Context Bases. If users could purchase engineering handbooks in the form of unlocked Alternates, they could add their own Outline Models and Time-Sequence Models to apply the Context Bases to their evolving situations and needs. This would permit engineers to store a set of handbooks on their computers and rearrange its Contexts into Outline Models and Time-Sequence Models that support their current projects. Since the Guides remain locked and cannot be expanded or deleted, this permits book and magazine publishers to package their

information products in ways that might be appropriate for interactive computer users.

A third example is a potential new method for re-publishing copyrighted information originally published in books and magazines. By developing the types of Context Base products described in the second example, such as on-line engineering handbooks, publishers also create Context Bases independent developers might access to create Alternates. These provide Contexts that might be copied to construct new Alternates. If independent developers create Alternates for re-sale or internal corporate distribution, such as product design guides for engineers, or structural materials selection guides for architects, the downstream sales potential might be substantial. These Alternates could reflect the experience and judgment of experts, such as how to do site selection for small retail businesses, how a small manufacturer may profitably introduce CAD/CAM, or how a farmer might grow his crops while using a minimum of pesticides. Just as desktop publishing produced a growing volume of specialized newsletters, the Contextualizer might produce new types of useful information in the form of Alternates that are sold as stand-alone products. Many types of copyrighted information sources might be re-published as Context Bases to create these new information products that are sold as Alternates. By including copyrighted Contexts in their Alternates, developers of Alternates become "re-publishers" of materials that are the property of others. These

re-publishers would pay copyright use fees for the copyrighted material they include and re-sell. (See the Copyright Payment System above.) Publishers of some types of books and magazines, such as handbooks and other "how-to" publications, may have a financial incentive to develop Context Bases as products to stimulate or supply this type of potential market, since the publication of Alternates could produce additional copyright royalty revenues with relatively little additional investment.

Group creation of Alternates (the first example) indicates how the shared visions of organizations, industries, and public or professional associations might be developed. Digital publication of books and magazines as unlocked Alternates (the second example) implies that some of modern society's prodigious output of know-how, expertise, and conceptual insight might be published as rapidly accessible Context Bases; using the Contextualizer, developers would then be able to collect Contexts rapidly and create custom Alternates. The re-sale of useful Alternates (the third example) suggests the flexible focusing and re-publishing of knowledge resources into useful forms that increase the performance of individuals, business units, and organizations throughout society and the world.

This could become a self-perpetuating process because Alternates may be used as Context Bases to develop successive generations of Alternates. As a result, both Context Bases and Alternates become

resources for further imagination-driven computing development 6240-6246, 6202-6209 (Figures 122 and 123). In a corporation, the more Alternates that are in use, the easier it is to create the next Alternate since so many useful Contexts might be immediately available.

While the Preferred Embodiment may make it appear as if a user collects Contexts first, fabricates an Alternate, and then schedules the use of Contexts over time, users may follow any order of Collecting Contexts and Positioning them that is appropriate for their purposes. For example, the user may start by typing in Cluster Titles then re-order them by subject, priority, or time-sequence even though no Contexts have been collected. Concepts or notes can be attached to the Cluster Titles for explanation of the imaginative conception. Once an ideal structure has been projected, the user may then use Context Collection to find Contexts for the project. Thus, users may take advantage of the flexible tools in the invention to develop imaginative or wholly novel ideas first, followed by the actual new information environments.

This may contribute new opportunities to create idealized transformations. The structure of an Alternate is based on its Outline Model. The process of Context Positioning permits various types of Models to be built quickly. Each user sets up each Model according to a pattern (and an order within that pattern) that is meaningful for him or her.

Models reflect many ways of "seeing" a situation, such as: subjects, goals, responsibilities,

the ultimate manager for each responsibility (if different), different clients, customer groups, products, co-workers, employee names, project names, business departments, job titles, job functions, processes, or different fields of science or knowledge.

The Alternates each have a unique meaning to their users. The way a user approaches a situation determines the Model(s) they create; and the Models are the users' access to the Alternates. (This also applies to the development of the Time-Sequences.) Each Model's pattern reflects its developer's understanding of a Preferred Situation. The flexible Context manipulation tools in the Contextualizer help developers and users keep their overall concepts clear and accessible. (If the developer and the users are not the same, the Model could be field tested with users.)

An example may clarify how a user may see a situation and create two Models of it. Here, the user is a (fictional) executive who is unexpectedly asked to figure out how to make the company's large and busy Customer Service Department (CSD) a more important and central part of the corporation's competitive strategy. This use of the Contextualizer illustrates how a user may need one solution, yet rapidly discover both conventional and innovative alternatives. From the start, imaginative new learning may enter the process, and the new learning is immediately captured in a Model from which implementation can be planned.

Without the Contextualizer, this executive might only be able to muster several meetings with the

manager of CSD before making recommendations. With the Contextualizer, he may prepare for his first meeting by rapidly constructing researched alternatives for action. As the executive uses the Contextualizer to explore a number of Context Bases, he makes both traditional and innovative discoveries from other companies and countries, from management systems, from managing personnel relationships, and even from business forms design, evaluation methods, and negotiation strategies.

Since the executive is a traditional line manager, he devotes most of this session to developing the standard approach (Figure 88). Due to the ease of accessing and manipulating information, however, it turns out to be easy to discover new ideas and construct a potentially more rewarding approach from them (Figure 89).

Turning now to Figure 88, the executive's first Model mirrors a traditional management approach 1300 that includes a variety of methods, internal reports, and other information from a diverse variety of sources. For example, internal corporate sources are Customer Service Department (CSD) reports 1302 that include numbers, graphs, and text. External Contexts include sources from business publications 1304, and both internal and external sources offer statistics 1306 for comparison and the methods 1307 needed to handle several of the steps in the project. Other external Contexts are customer service examples 1304 from the company's industry and from other industries, and these

were located in Context Bases from both books and magazines.

While he was exploring the available Context Bases, the executive stumbled into developing a second Model 1320 (in Figure 89) to achieve the same goal. He titled this, "II. A Voice for the Customer Throughout the Company?"

Turning now to Figure 89, in this second CSD Model 1320 suggested how the customer could have a voice throughout many areas of the company including manufacturing, distribution, quality assurance, and product development. Satisfying the customer became the second priority of the Customer Service Department. With this new invention, its first goal could be to push the customer's information rapidly to the point in the company where it could be used best: to improve product quality, to lower defects, to focus distribution on market needs, to capitalize on new product ideas, or any other valuable information that might be discovered.

Since every customer service operator already worked at a terminal, customer comments were already automatically entered into the computer and flagged by type. It was not unreasonable to sort them and import the best suggestions into the Contextualizer. There, a unique "Customer Alternate" would be created and updated periodically. Appropriate sections of this Model would be extracted for each of the operating divisions of the company 1322. These "Customer Alternates" would be compiled and rapidly distributed to the appropriate decision makers in key operating areas of the company.

This second Model would increase the strategic value of the Customer Service Department. Their mission would be to constantly help the company answer how it could serve its customers better. Part of how CSD could be judged might include the percentage of their ideas that the company started using. This could expand how they were evaluated from how well they worked with the customer to include how well they assisted the rest of the company in achieving its strategic business goals.

As the executive reviewed the second model (Figure 89) he discovered he had found an opportunity based on undeniable proof from many companies 1323, 1324, 1325: higher quality costs less, reduces waste, and improves operations. If the customer's voice could speak from every appropriate computer screen throughout the corporation, and it was immediately accessible when decisions were being made, it might make a real difference.

Continuing this fictional example, this executive went on to work with the manager of CSD. Together they built a better second model and firmed up a time-sequenced implementation schedule. They quickly added the first model's tracking system 1310 to the second, so results would be documented 6202-6209 (Figure 123). Thus, a rapid learning curve could emerge from using the Contextualizer -- not only in building the model, but throughout the company. CSD operations fed the Contextualizer, which built "Customer Alternates" as a delivery system for the new information.

At their desks, decision makers in many departments could merge the "Customer Contexts" they needed from the Customer Alternates into their own Department's Alternates 6202-6209 (Figure 123) which they built to reach their operating goals. This rapidly transferred their customers' needs and desires into their planning and implementation schedules. As a result, this new information environment turned out to be one way to improve the competitiveness of many parts of the company.

Thus, the processes of Context Exploration, Context Positioning, and Time-Sequencing may be generalized. The examples cited showed a variety of uses, but the invention is not meant to be limited to them or to the specific keys identified in the description or the Figures. The invention is a set of flexible Context manipulation tools which enhance the ability to explore and develop new ideas, arrangements, Contexts, and situations, move the information to new users as Alternates, and allow them to extract the Contexts to create or modify their own Alternates. Such tools allow components of reality to be manipulated through "Contexts" and "Context Clusters" that can be constructed and rearranged as if they were concrete objects that can be moved and changed at will. Thus, computers are used to bridge imagination and reality on multiple levels throughout organizations and society, and produce "imagination-driven computing."

This injects additional creativity, learning, and potential performance improvements into everyday

work and goals. On a broad scale, people could gain the ability to imagine Preferred Situations and utilize rapidly increasing ranges of knowledge to Outline Model finer goals and rapidly construct the Time Sequenced plans to achieve them.

Figure 90 provides a brief summary by illustrating the processes of the invention in column 1 1330, the steps in the invention in column 2 1332, and the difference produced by the invention in column 3 1334. It is a novel use of computing to transform rapidly expanding knowledge resources 1333 into Contexts and Context Bases 1335, and manipulate them with these new tools of imagination-driven computing 1336, 1337, 1338, 1339.

Figure 91 illustrates the new information environment 1340 that may be created by means of the invention, from today's expanding information resources 1342. Users may envision Preferred Situations 1344 and construct Context Bases 1346 and Alternates 1348 that Outline Model them and include Time Sequences for implementing Situation Shifts 1350. These may be distributed internally in an organization 1352, or sold by a variety of sources as products such as Context Bases and Alternates 1354 to a wide variety of customers 1358. Groups of Alternates may be managed by Outline Modeling and Time Sequencing them to direct large or complex Situation Shifts 1356. Since the Alternates created by one user (or group) may also be used as Context Bases by other users, the best Alternates imagined in one situation may be an immediately

accessible foundation for others to build related or similar information environments 1358. The Contextualizer describes a new type of information environment that expands the impact of the imagination in computing 1360. By providing an information technology to express our imaginations, and access the imaginative creations of each other, the Contextualizer offers potential new opportunities to manage what might become real and how to introduce it 1360.

As a global transformation is already developing, a growing number of companies and industries face new needs to leapfrog their current operating limits and become effective competitors on a global level, reshaping their performance, productivity, adaptation and innovation capabilities. Ultimately, this invention's goal is to help stimulate a potential Situation Shift to greater imagination-driven learning, responsiveness, and creativity, and help fill critical needs for economic growth, humanitarian progress, rapid performance, and survival. Continuous learning may be fostered at the point when better situations are imagined or even desired, with the best ideas captured in information systems, then spread rapidly to others in useful forms so they can, in turn, rapidly improve and produce and then spread their new capabilities to others.

With this invention, new and productive uses for the emerging infrastructure of information systems may be developed. This is not only a new paradigm for computing, it is potentially a systematic new way to help organizations, groups, and individuals manage and develop the increasingly complex world in which we live.

Claims

1. A computer-based method for assembling a body of stored information by selecting segments from a larger available group of information segments, comprising

displaying a set of tokens, each token indicating the content of a corresponding one of said segments in said available group,

enabling a user to point to a succession of said tokens in said set using an electronic pointing technique,

for each token to which said user points, immediately and simultaneously displaying the corresponding segment to the user, and

assembling said body in response to selections made by a user.

2. A computer-based method for assembling a body of stored information by selecting segments from a larger available group of information segments, comprising

displaying a set of tokens, each token indicating the content of a corresponding one of said segments in said available group,

enabling a user to point to a succession of said tokens using an electronic pointing technique,

for each token to which said user points, displaying the corresponding segment to the user, and

simultaneously while displaying said segment corresponding to the token to which the user is pointing, displaying a segment corresponding to a token to which the user had previously pointed.

3. The method of claim 1 or 2 further comprising

simultaneously while displaying said set and said segment to which the user is pointing, displaying a second set comprising an accumulation of tokens to which said user has previously pointed.

4. The method of claim 3 wherein there are a plurality of available said groups of information, further comprising

displaying, for each group, an associated said set of tokens,

said second set comprising an accumulation of said tokens corresponding to said selections made with respect to all of said groups.

5. The method of claim 3 wherein said second set is organized in accordance with a model.

6. The method of claim 5 wherein said model comprises a hierarchy of at least two levels.

7. The method of claim 6 wherein said hierarchy comprises an outline.

8. The method of claim 5 wherein said model comprises a time sequence.

9. The method of claim 5 further comprising, in response to a user's commands, revising the organization of said tokens in said second set to modify said model.

10. The method of claim 3 further comprising,

in response to commands of a user, changing the content of said tokens in said second set.

11. The method of claim 4 wherein one of said available groups is available on-line from a remote location.

12. The method of claim 3 further comprising compiling only the segments corresponding to the tokens in said second set into said body of stored information.

13. The method of claim 6 further comprising, in response to commands of a user, eliminating one of said tokens at a higher level of the hierarchy from said second set.

14. The method of claim 8 further comprising displaying said second set by placing each said token of said set in a visual position which reflects its position in said time sequence relative to the visual positions of other said tokens.

15. The method of claim 14 wherein said visual position comprises an indentation relative to a margin of said display.

16. The method of claim 3 further comprising in response to commands of a user, making either of said set and said second set selectively active to said user.

17. The method of claim 3 further comprising displaying said set, said second set, and said segments in windows.

18. The method of claim 17 further comprising altering the proportions of the display occupied respectively by said windows.

19. The method of claim 5 further comprising establishing multiple said models of said second set, and

displaying said models selectively to said user.

20. The method of claim 1 or 2 wherein said tokens comprise textual phrases.

21. The method of claim 3 wherein said set and said second set comprise lists.

22. A computer-based method for producing an annotated body of stored information comprising

specifying keys each of which may appear within said body of stored information,

searching said body of stored information for instances of each of said keys,

defining boundaries of segments of said stored information, each said segment including at least one of said instances,

assigning to each segment a token based on a key found within said segment,

displaying each segment to a user,

in response to commands from said user, adjusting the boundaries of at least one of said segments,

23. The method of claim 22 further comprising

defining said boundaries on the basis of criteria specified by said user.

24. The method of claim 22 wherein said keys comprise textual phrases.

25. The method of claim 22 wherein said stored information comprises text.

26. The method of claim 22 wherein said boundaries comprise beginnings and ends of paragraphs.

27. The method of claim 22 further comprising

in response to user commands, compiling selected said segments and corresponding tokens, each token indicating the content of the corresponding said segment.

28. A computer-based method for aiding a user in accessing a body of stored information which includes segments of related information, the method comprising

displaying a set of tokens, each token indicating the content of a corresponding one of said segments, said tokens being displayed in an organized hierarchical model reflecting relationships among said corresponding segments,

enabling a user to point to a succession of said tokens in said model using an electronic pointing technique, and

for each token to which said user points, immediately and simultaneously displaying the corresponding segment to the user.

29. The method of claim 28 wherein said model comprises a hierarchy of at least two levels.

30. The method of claim 29 wherein said hierarchy comprises an outline.

31. The method of claim 28 wherein said model comprises a time sequence.

32. The method of claim 28 further comprising, in response to a user's commands, revising the organization of said tokens in said set to modify said model.

33. The method of claim 28 further comprising,

in response to commands of a user, changing the content of said tokens in said second set.

34. The method of claim 28 wherein said body of stored information is available on-line from a remote location.

35. The method of claim 28 further comprising, in response to commands of a user, eliminating one of said tokens at a higher level of the hierarchy.

36. The method of claim 28 further comprising displaying said set by placing each said token of said set in a visual position which reflects its position in said time sequence relative to the visual positions of other said tokens.

37. The method of claim 36 wherein said visual position comprises an indentation relative to a margin of said display.

38. The method of claim 28 further comprising displaying said set and said segments in windows.

39. The method of claim 38 further comprising altering the proportions of the display occupied respectively by said windows.

40. The method of claim 28 further comprising establishing multiple said models of said set, and

displaying said models selectively to said user.

41. The method of claim 28 wherein said tokens comprise textual phrases.

42. The method of claim 28 wherein said set comprises a list.

43. The method of claim 28 further comprising displaying said set selectively at different levels of detail in said hierarchy.

44. The method of claim 43 further comprising simultaneously displaying one portion of said set at a higher level of detail in said hierarchy, while

displaying another portion of said set at a lower level of detail in said hierarchy.

45. The method of claim 44 further comprising varying said proportions in response to user commands.

46. The method of claim 45 further comprising displaying a controllable range indicator which indicates a range within said set for which said display is at said higher level of detail, and adjusting the span of said indicator in response to user commands.

47. The method of claim 46 further comprising providing a marker within said range which indicates a user selection of a token in said set.

48. The method of claim 28 further comprising preventing a user from changing the order or content of said set.

49. The method of claim 28 further comprising preventing a user from changing the content of said segments.

50. The method of claim 28 further comprising altering the order or content of said set in response to user interaction.

51. The method of claim 28 further comprising altering the content of said segments.

52. The method of claim 28 wherein one of said segments comprises another said set of tokens which itself corresponds to other segments of stored information.

53. A system comprising storage containing

a body of information comprising segments, said storage also containing a set of tokens, each token indicating the content of a corresponding one of said segments, said tokens being arranged in an organized model reflecting relationships among corresponding said segments, and

software for displaying said model and for enabling a user to access a selected said segment by invoking a corresponding token in said model.

54. A computer-based method for providing assistance to a user of an application program comprising

in response to a user requesting assistance in the course of using said program, displaying a set of tokens, each token indicating the content of a corresponding segement of assistance information, said tokens being displayed in an organized model, and

simultaneously while displaying said set of tokens, displaying a segment of assistance information corresponding to one of said tokens selected by said user.

55. The method of claim 54 wherein said model comprises a hierarchy of at least two levels.

56. The method of claim 54 wherein said hierarchy comprises an outline.

57. The method of claim 54 wherein said model comprises a time sequence.

58. The method of claim 54 wherein said tokens comprise textual phrases.

59. The method of claim 54 wherein said set and said second set comprise lists.

60. A computer-based method for aiding a user to scan a set of displayed data items while simultaneously performing another interactive task using the display, portions of said set being expressable at two levels of detail, some of said items being included at one level of detail and excluded at the other level of detail, said method comprising

displaying selected portions of said set at said different levels of detail in response to user commands, while

simultaneously displaying other information and responding to said user with respect to said other interactive task.

61. The method of claim 60 further comprising

displaying a controllable range indicator which indicates a range within said set for which said display is at one said level of detail, and

adjusting the span of said indicator in response to user commands.

62. The method of claim 61 further comprising

providing a marker within said range which indicates a user selection of a data item in said set.

63. The method of claim 1 further comprising

assembling multiple said bodies of stored information, each body being assembled by selecting segments from a larger available group of information segments,

assigning a name to each said body of stored information, and

displaying said names in an organized model.

64. A computer-based method for facilitating the organization, distribution, and use of digital

information of the kind that can be displayed on a computer, comprising

dividing said information into discrete segments, various segments being represented respectively by incompatible digital representational schemes,

providing said segments to a user in accordance with a unified digital representational scheme,

associating with each segment a token indicative of the content of the segment,

collecting a set of segments that are related by subject matter,

organizing the tokens associated with said segments in accordance with a model based on the content of said segments,

distributing the collected segments and model to a second user,

displaying the collected segments to said second user, and

altering the organization of the tokens in accordance with a revision of said model in response to said second user.

65. A computer-based method for assembling a body of stored information by selecting segments from a larger available group of information segments, comprising

displaying a set of tokens, each token indicating the content of a corresponding one of said segments in said available group,

enabling a user to point to a succession of said tokens using an electronic pointing technique,

for each token to which said user points, representing one or more other sets of tokens and their corresponding segmentsdisplaying the corresponding segment to the user, and

permitting a user to modify said tokens that correspond to other sets of tokens to construct models.

66. A computer-based apparatus for assembling a body of stored information by selecting segments from a larger available group of information segments, comprising

means for displaying a set of tokens, each token indicating the content of a corresponding one of said segments in said available group,

means for enabling a user to point to a succession of said tokens in said set using an electronic pointing technique,

for each token to which said user points, mean for immediately and simultaneously displaying the corresponding segment to the user, and

means for assembling said body in response to selections made by a user.

67. A computer-based apparatus for assembling a body of stored information by selecting segments from a larger available group of information segments, comprising

means for displaying a set of tokens, each token indicating the content of a corresponding one of said segments in said available group,

means for enabling a user to point to a succession of said tokens using an electronic pointing technique,

for each token to which said user points, means for displaying the corresponding segment to the user, and

means for simultaneously while displaying said segment corresponding to the token to which the user is pointing, displaying a segment corresponding to a token to which the user had previously pointed.

68. A computer-based apparatus for producing an annotated body of stored information comprising

means for specifying keys each of which may appear within said body of stored information,

means for searching said body of stored information for instances of each of said keys,

means for defining boundaries of segments of said stored information, each said segment including at least one of said instances,

means for assigning to each segment a token based on a key found within said segment,

means for displaying each segment to a user,

in response to commands from said user, means for adjusting the boundaries of at least one of said segments,

69. A computer-based apparatus for aiding a user in accessing a body of stored information which includes segments of related information, the method comprising

means for displaying a set of tokens, each token indicating the content of a corresponding one of said segments, said tokens being displayed in an organized hierarchical model reflecting relationships among said corresponding segments,

means for enabling a user to point to a succession of said tokens in said model using an electronic pointing technique, and

for each token to which said user points, means for immediately and simultaneously displaying the corresponding segment to the user.

70. A computer-based apparatus for providing assistance to a user of an application program comprising

in response to a user requesting assistance in the course of using said program, means for displaying a set of tokens, each token indicating the content of a corresponding segement of assistance information, said tokens being displayed in an organized model, and

means for, simultaneously while displaying said set of tokens, displaying a segment of assistance information corresponding to one of said tokens selected by said user.

71. A computer-based apparatus for aiding a user to scan a set of displayed data items while simultaneously performing another interactive task using the display, portions of said set being expressable at two levels of detail, some of said items being included at one level of detail and excluded at the other level of detail, said method comprising

means for displaying selected portions of said set at said different levels of detail in response to user commands, while

means for simultaneously displaying other information and responding to said user with respect to said other interactive task.

72. A computer-based apparatus for facilitating the organization, distribution, and use of

digital information of the kind that can be displayed on a computer, comprising

means for dividing said information into discrete segments, various segments being represented respectively by incompatible digital representational schemes,

means for providing said segments to a user in accordance with a unified digital representational scheme,

means for associating with each segment a token indicative of the content of the segment,

means for collecting a set of segments that are related by subject matter,

mens for organizing the tokens associated with said segments in accordance with a model based on the content of said segments,

means for distributing the collected segments and model to a second user,

means for displaying the collected segments to said second user, and

means for altering the organization of the tokens in accordance with a revision of said model in response to said second user.

FIG.1

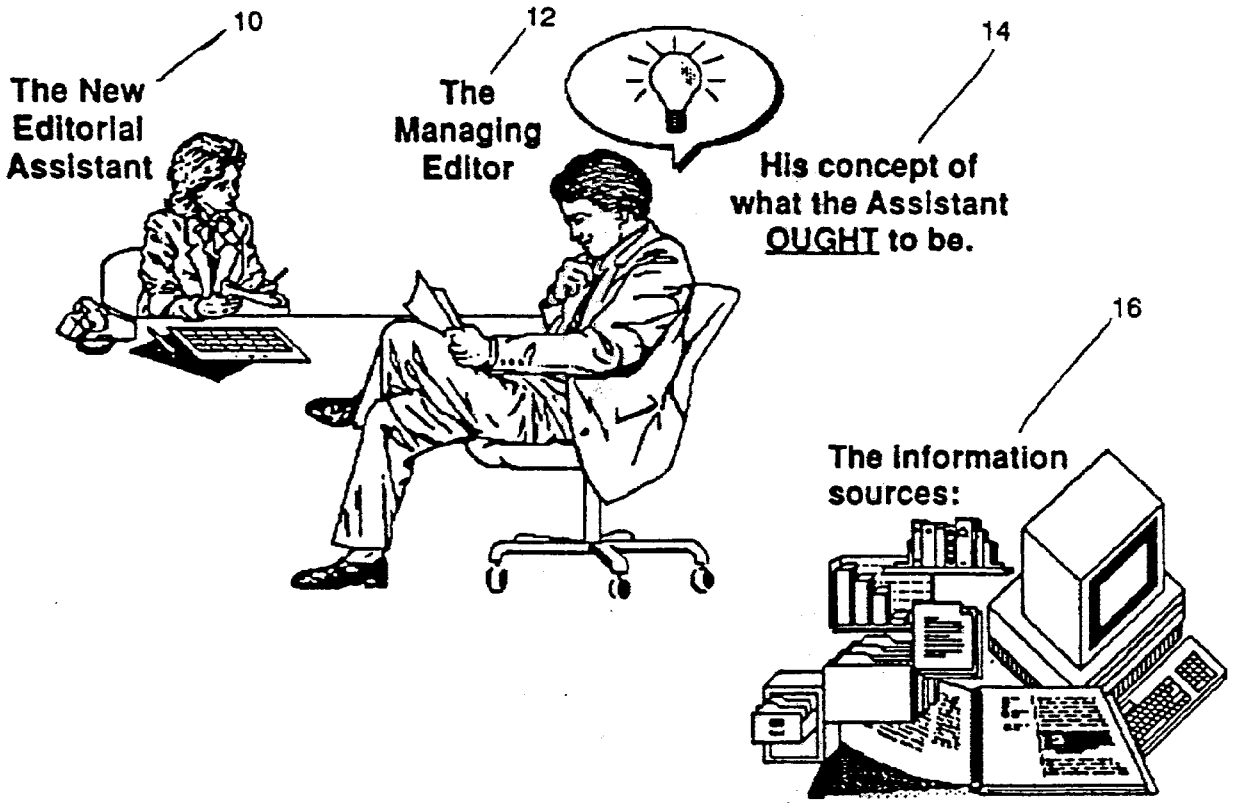

10
The New Editorial Assistant
12
The Managing Editor
14
His concept of what the Assistant OUGHT to be.
16
The information sources:

FIG.2

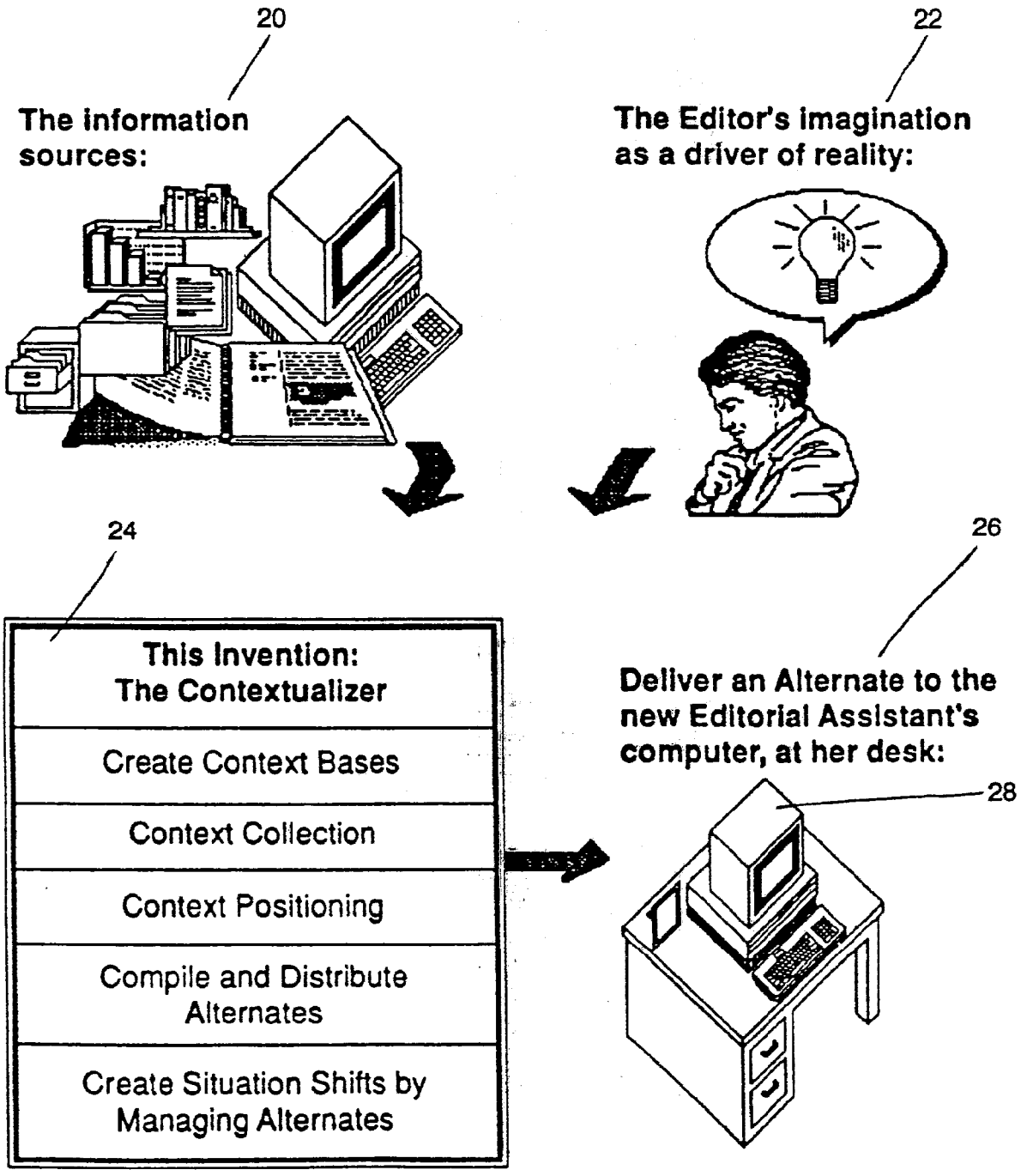

20
The information sources:
22
The Editor's imagination as a driver of reality:
24
This Invention:
The Contextualizer
Create Context Bases
Context Collection
Context Positioning
Compile and Distribute Alternates
Create Situation Shifts by Managing Alternates
26
Deliver an Alternate to the new Editorial Assistant's computer, at her desk:
28

FIG. 3

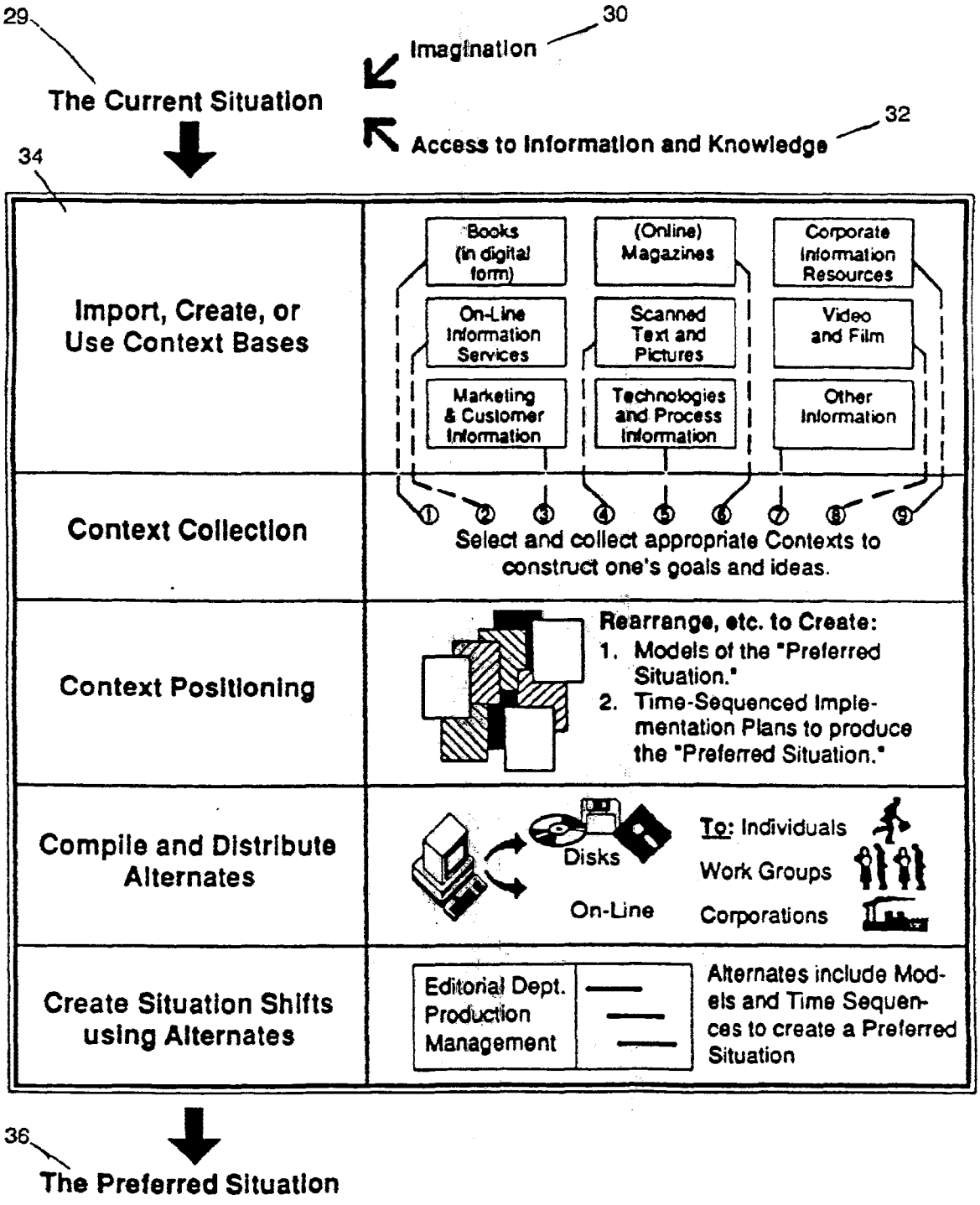
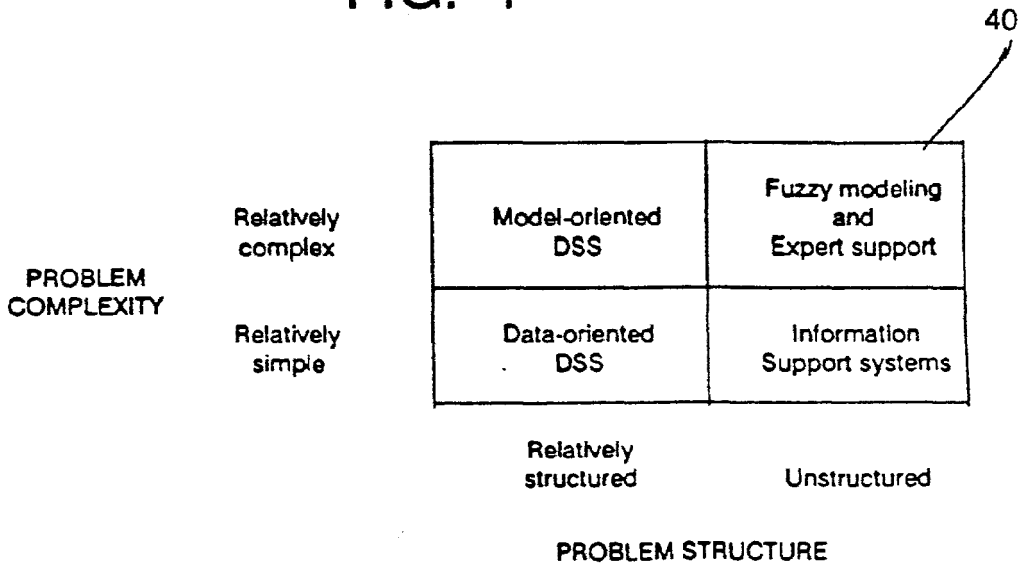

29
The Current Situation
30
Imagination
32
Access to Information and Knowledge
34
Import, Create, or Use Context Bases
Books (in digital form)
(Online) Magazines
Corporate Information Resources
On-Line Information Services
Scanned Text and Pictures
Video and Film
Marketing & Customer Information
Technologies and Process Information
Other Information
Context Collection
1 2 3 4 5 6 7 8 9
Select and collect appropriate Contexts to construct one's goals and ideas.
Context Positioning
Rearrange, etc. to Create:
1. Models of the "Preferred Situation."
2. Time-Sequenced Implementation Plans to produce the "Preferred Situation."
Compile and Distribute Alternates
Disks
On-Line
To: Individuals
Work Groups
Corporations
Create Situation Shifts using Alternates
Editorial Dept.
Production
Management
Alternates include Models and Time Sequences to create a Preferred Situation
36
The Preferred Situation

FIG. 4


40
Relatively complex
Relatively simple
PROBLEM COMPLEXITY
Model-oriented DSS
Fuzzy modeling and Expert support
Data-oriented DSS
Information Support systems
Relatively structured
Unstructured
PROBLEM STRUCTURE

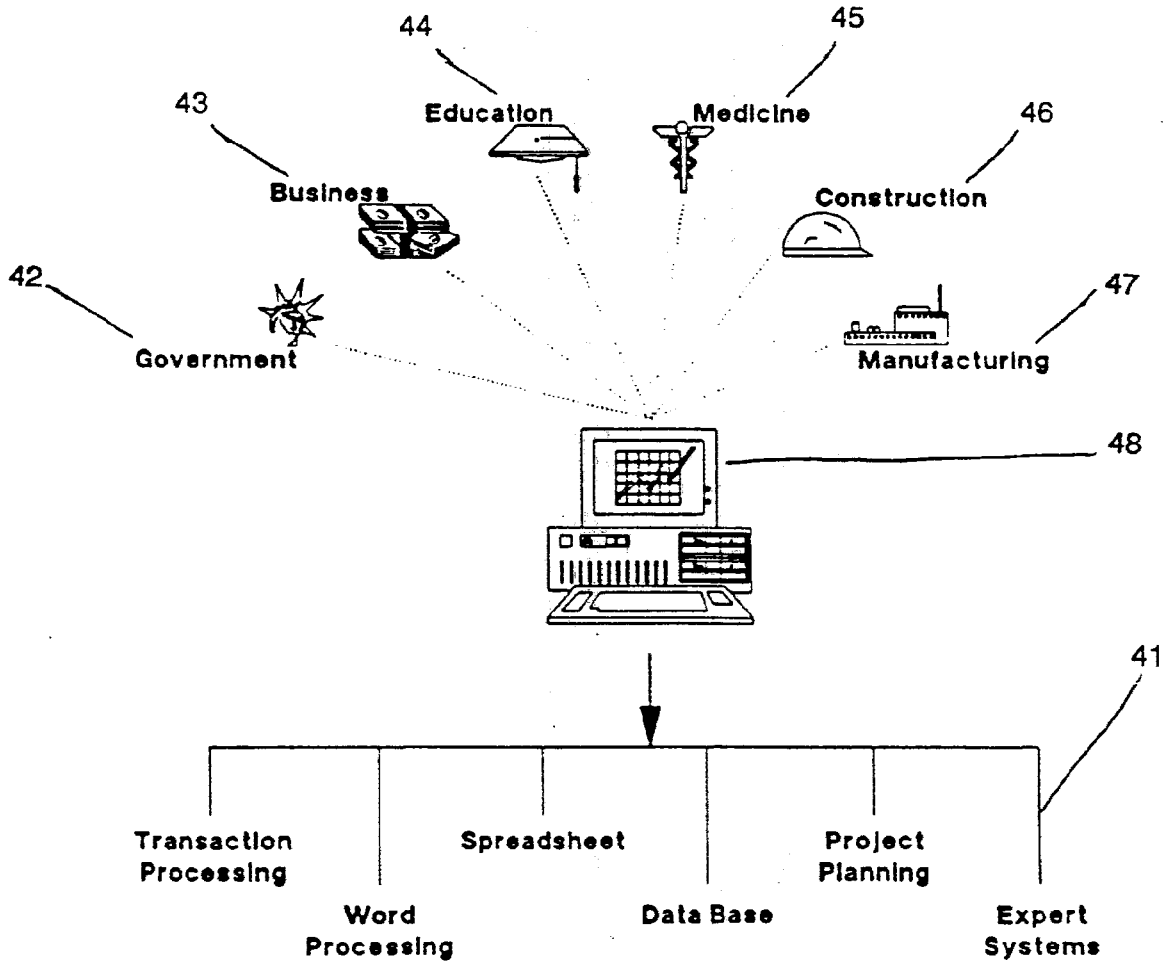

44
45
43
Education
Medicine
46
Business
Construction
42
47
Government
Manufacturing
48
41
Transaction Processing
Spreadsheet
Project Planning
Word Processing
Data Base
Expert Systems

FIG. 5

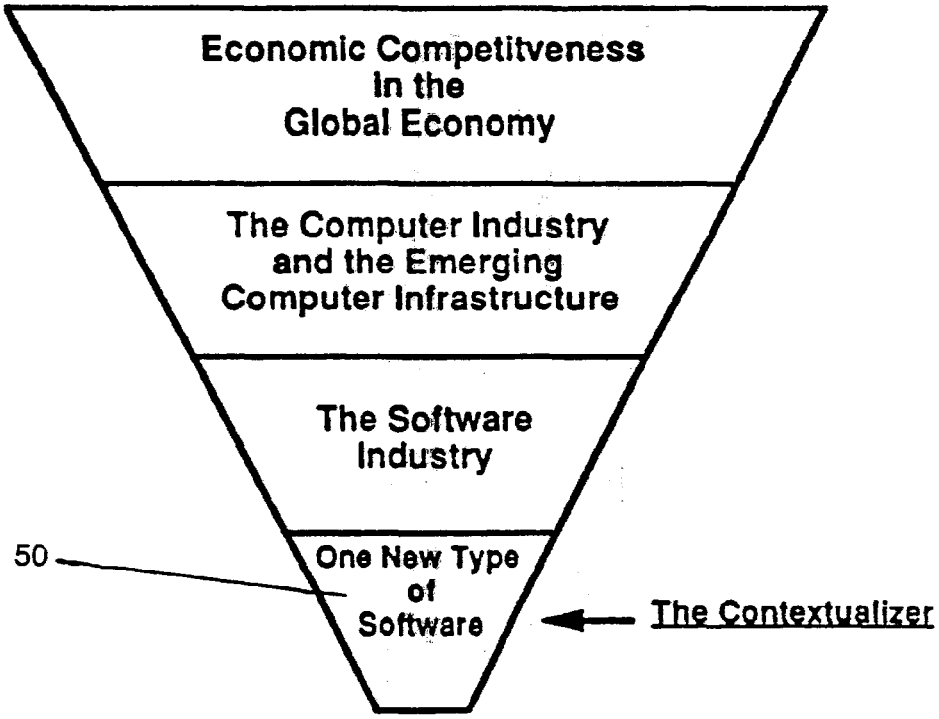

Economic Competitveness
In the
Global Economy
The Computer Industry
and the Emerging
Computer Infrastructure
The Software
Industry
50
One New Type
of
Software
The Contextualizer

FIG. 6

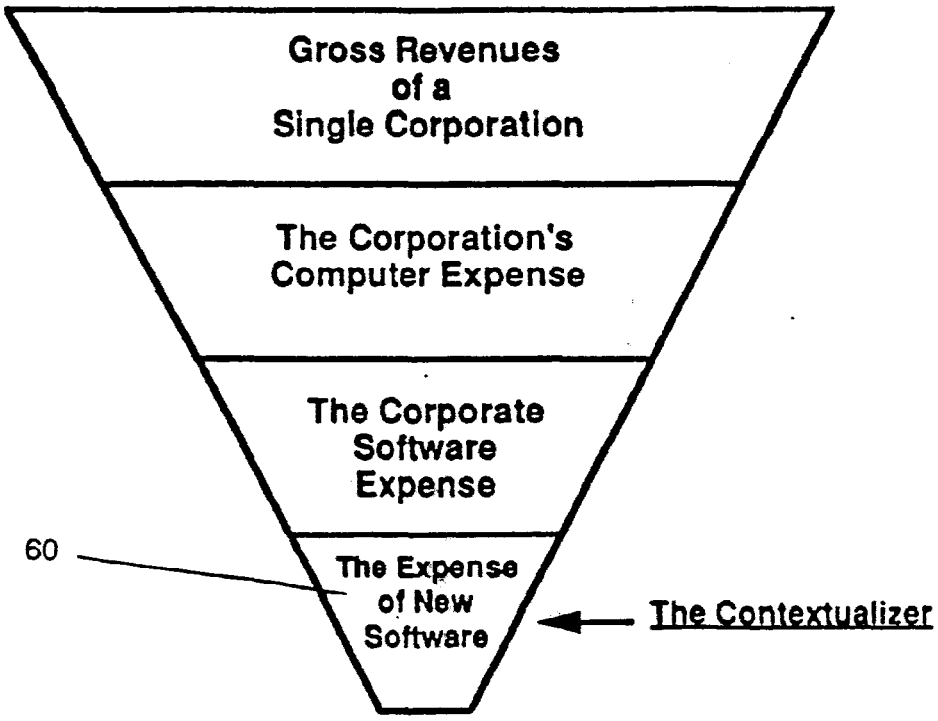

Gross Revenues of a Single Corporation
The Corporation's Computer Expense
The Corporate Software Expense
60
The Expense of New Software
The Contextualizer

FIG. 7

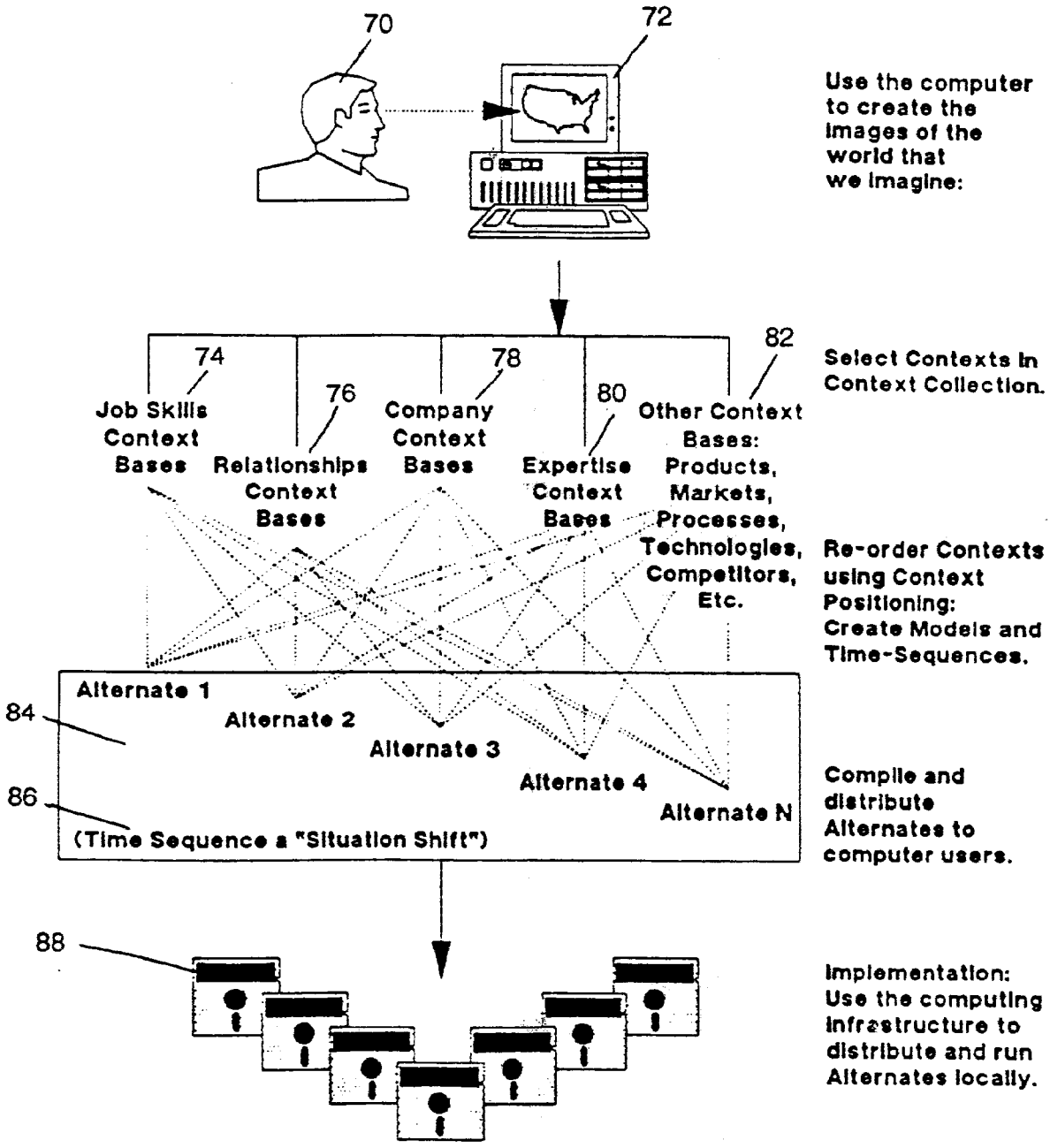

70
72
Use the computer to create the images of the world that we imagine:
74
Job Skills Context Bases
76
Relationships Context Bases
78
Company Context Bases
80
Expertise Context Bases
82
Other Context Bases: Products, Markets, Processes, Technologies, Competitors, Etc.
Select Contexts in Context Collection.
Re-order Contexts using Context Positioning: Create Models and Time-Sequences.
84
Alternate 1
Alternate 2
Alternate 3
Alternate 4
Alternate N
86
(Time Sequence a "Situation Shift")
Compile and distribute Alternates to computer users.
88
Implementation: Use the computing infrastructure to distribute and run Alternates locally.

FIG. 8

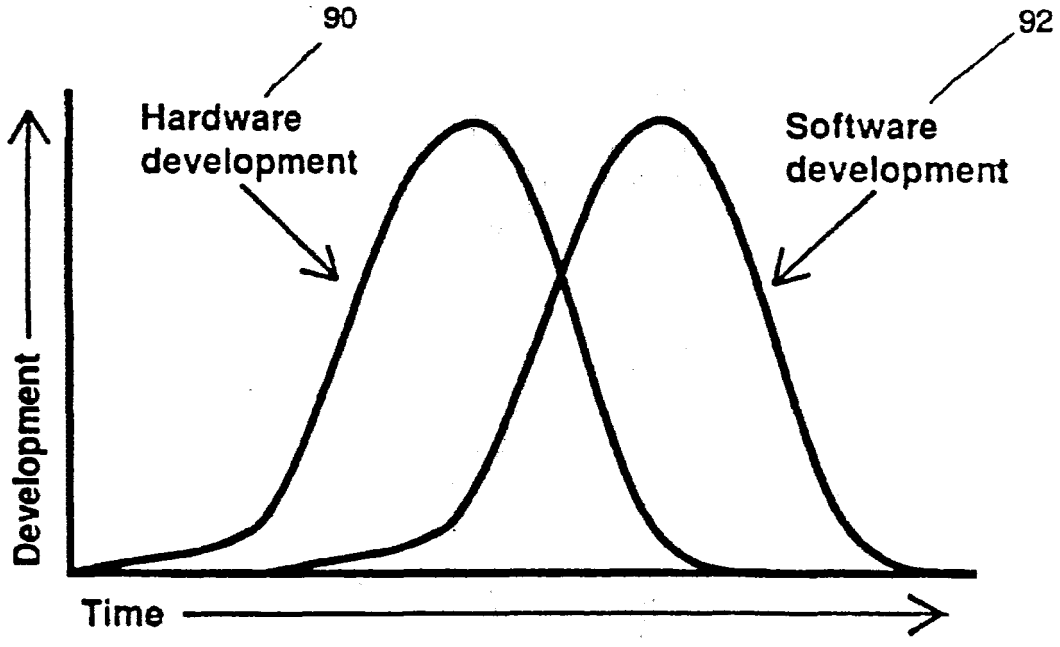
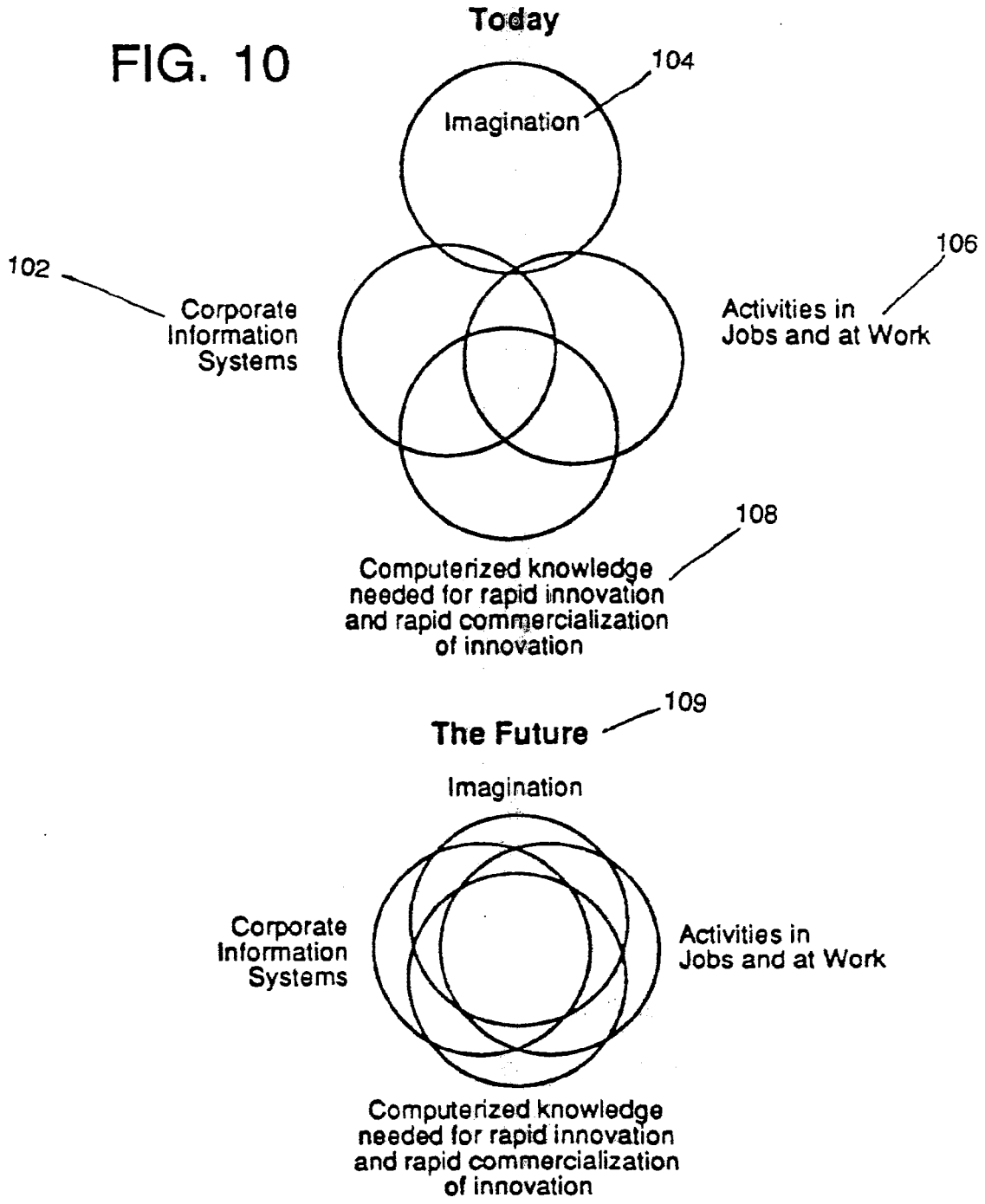

90
92
Hardware development
Software development
Development
Time

FIG. 9

FIG. 10


Today
104
Imagination
102
Corporate Information Systems
106
Activities in Jobs and at Work
108
Computerized knowledge needed for rapid innovation and rapid commercialization of innovation
109
The Future
Imagination
Corporate Information Systems
Activities in Jobs and at Work
Computerized knowledge needed for rapid innovation and rapid commercialization of innovation

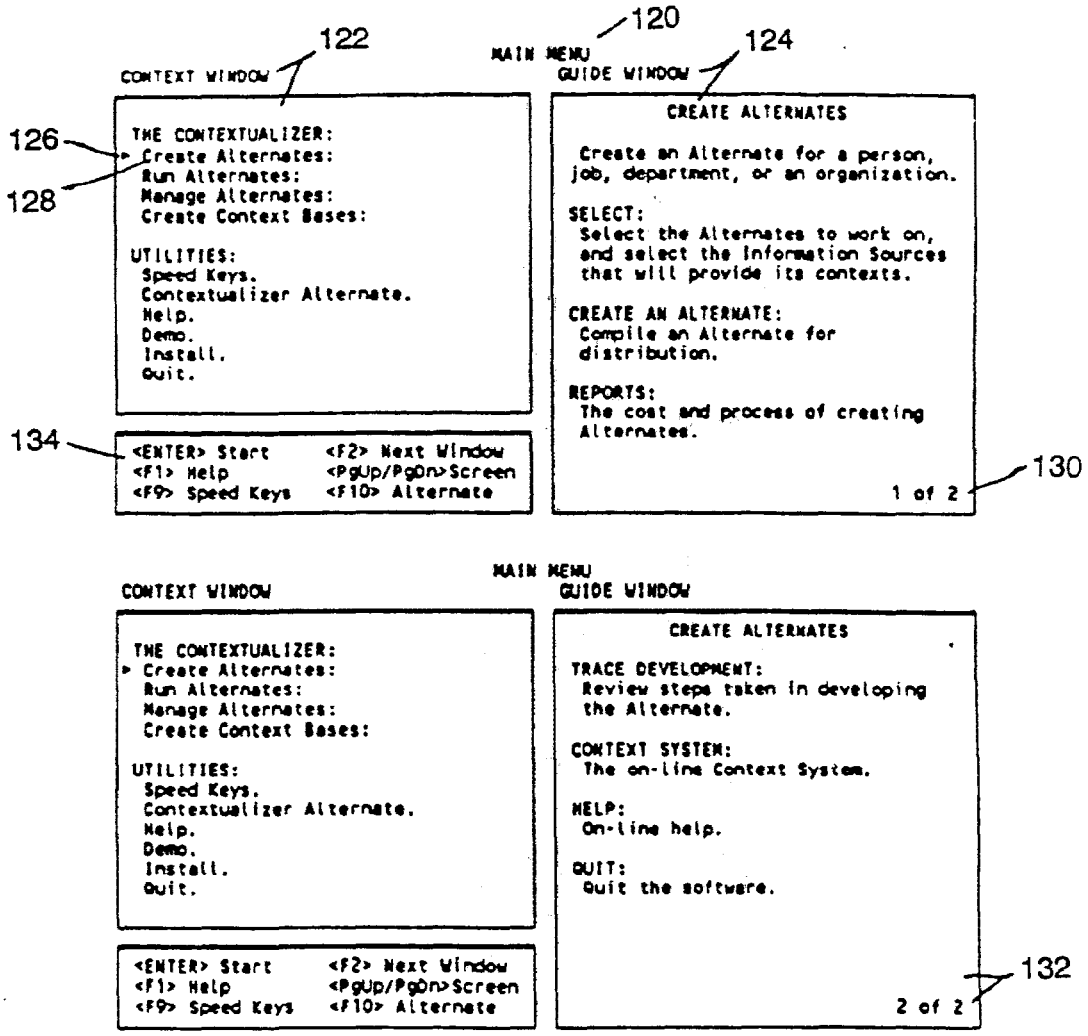

120
MAIN MENU
122
CONTEXT WINDOW
124
GUIDE WINDOW
126
128
THE CONTEXTUALIZER:
► Create Alternates:
Run Alternates:
Manage Alternates:
Create Context Bases:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Demo.
Install.
Quit.
CREATE ALTERNATES
Create an Alternate for a person, job, department, or an organization.
SELECT:
Select the Alternates to work on, and select the Information Sources that will provide its contexts.
CREATE AN ALTERNATE:
Compile an Alternate for distribution.
REPORTS:
The cost and process of creating Alternates.
1 of 2
130
134
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Alternate
MAIN MENU
CONTEXT WINDOW
GUIDE WINDOW
THE CONTEXTUALIZER:
► Create Alternates:
Run Alternates:
Manage Alternates:
Create Context Bases:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Demo.
Install.
Quit.
CREATE ALTERNATES
TRACE DEVELOPMENT:
Review steps taken in developing the Alternate.
CONTEXT SYSTEM:
The on-line Context System.
HELP:
On-line help.
QUIT:
Quit the software.
2 of 2
132
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Alternate

FIG. 11

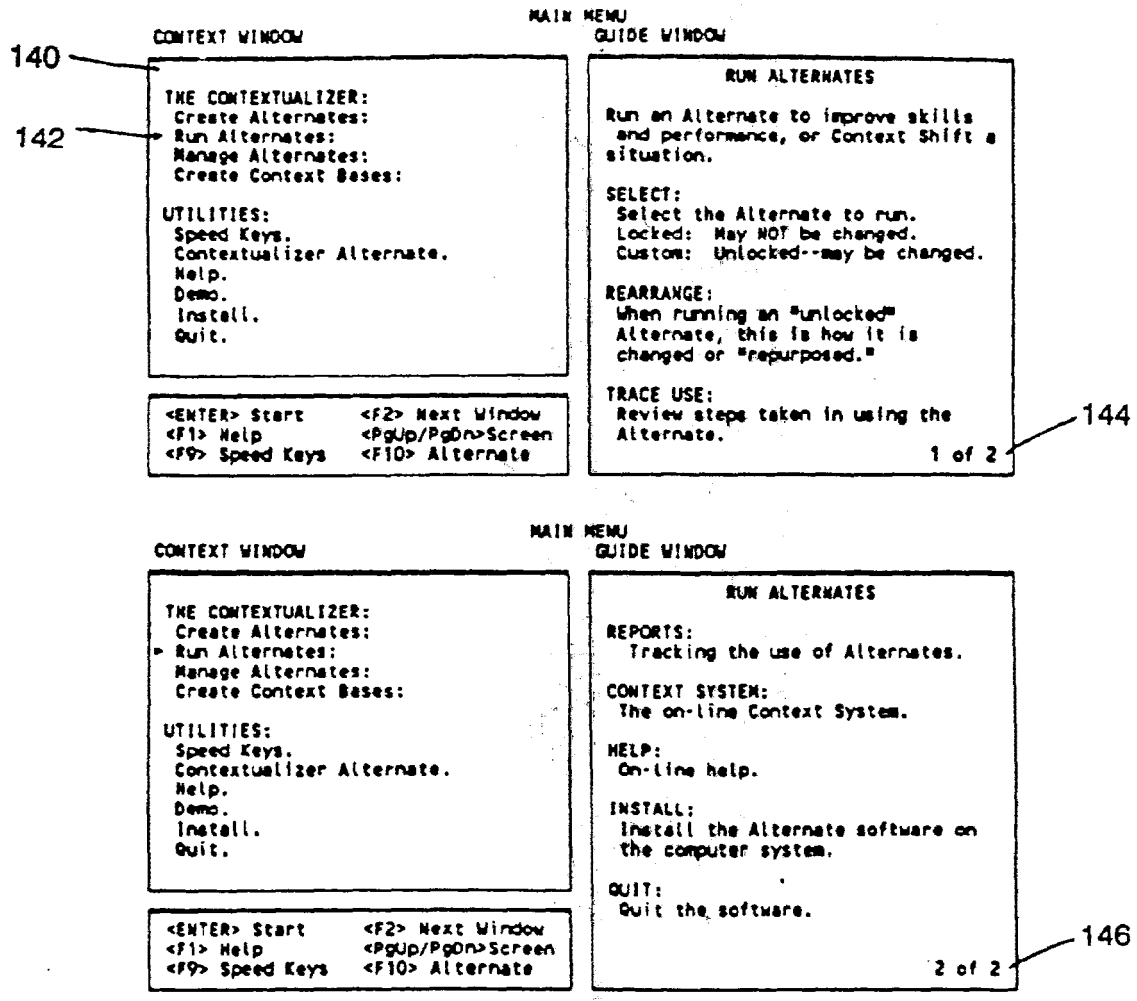

MAIN MENU
CONTEXT WINDOW
GUIDE WINDOW
140
142
THE CONTEXTUALIZER:
Create Alternates:
Run Alternates:
Manage Alternates:
Create Context Bases:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Demo.
Install.
Quit.
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Alternate
RUN ALTERNATES
Run an Alternate to improve skills and performance, or Context Shift a situation.
SELECT:
Select the Alternate to run.
Locked: May NOT be changed.
Custom: Unlocked--may be changed.
REARRANGE:
When running an "unlocked" Alternate, this is how it is changed or "repurposed."
TRACE USE:
Review steps taken in using the Alternate.
1 of 2
144
MAIN MENU
CONTEXT WINDOW
GUIDE WINDOW
THE CONTEXTUALIZER:
Create Alternates:
Run Alternates:
Manage Alternates:
Create Context Bases:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Demo.
Install.
Quit.
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Alternate
RUN ALTERNATES
REPORTS:
Tracking the use of Alternates.
CONTEXT SYSTEM:
The on-line Context System.
HELP:
On-line help.
INSTALL:
Install the Alternate software on the computer system.
QUIT:
Quit the software.
2 of 2
146

FIG. 12

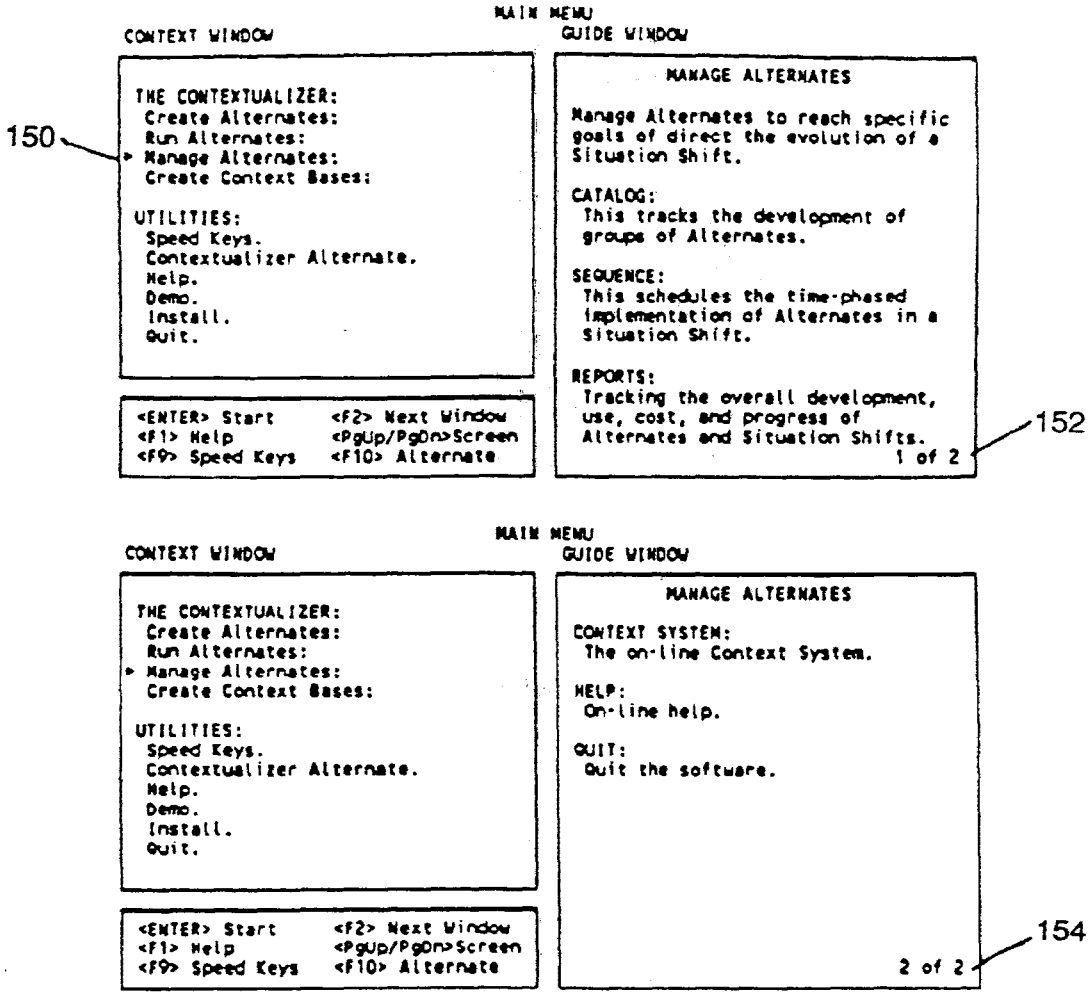

MAIN MENU
CONTEXT WINDOW
GUIDE WINDOW
150
THE CONTEXTUALIZER:
Create Alternates:
Run Alternates:
▸ Manage Alternates:
Create Context Bases:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Demo.
Install.
Quit.
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Alternate
MANAGE ALTERNATES
Manage Alternates to reach specific goals of direct the evolution of a Situation Shift.
CATALOG:
This tracks the development of groups of Alternates.
SEQUENCE:
This schedules the time-phased implementation of Alternates in a Situation Shift.
REPORTS:
Tracking the overall development, use, cost, and progress of Alternates and Situation Shifts.
1 of 2
152
MAIN MENU
CONTEXT WINDOW
GUIDE WINDOW
THE CONTEXTUALIZER:
Create Alternates:
Run Alternates:
▸ Manage Alternates:
Create Context Bases:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Demo.
Install.
Quit.
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Alternate
MANAGE ALTERNATES
CONTEXT SYSTEM:
The on-line Context System.
HELP:
On-line help.
QUIT:
Quit the software.
2 of 2
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FIG. 13

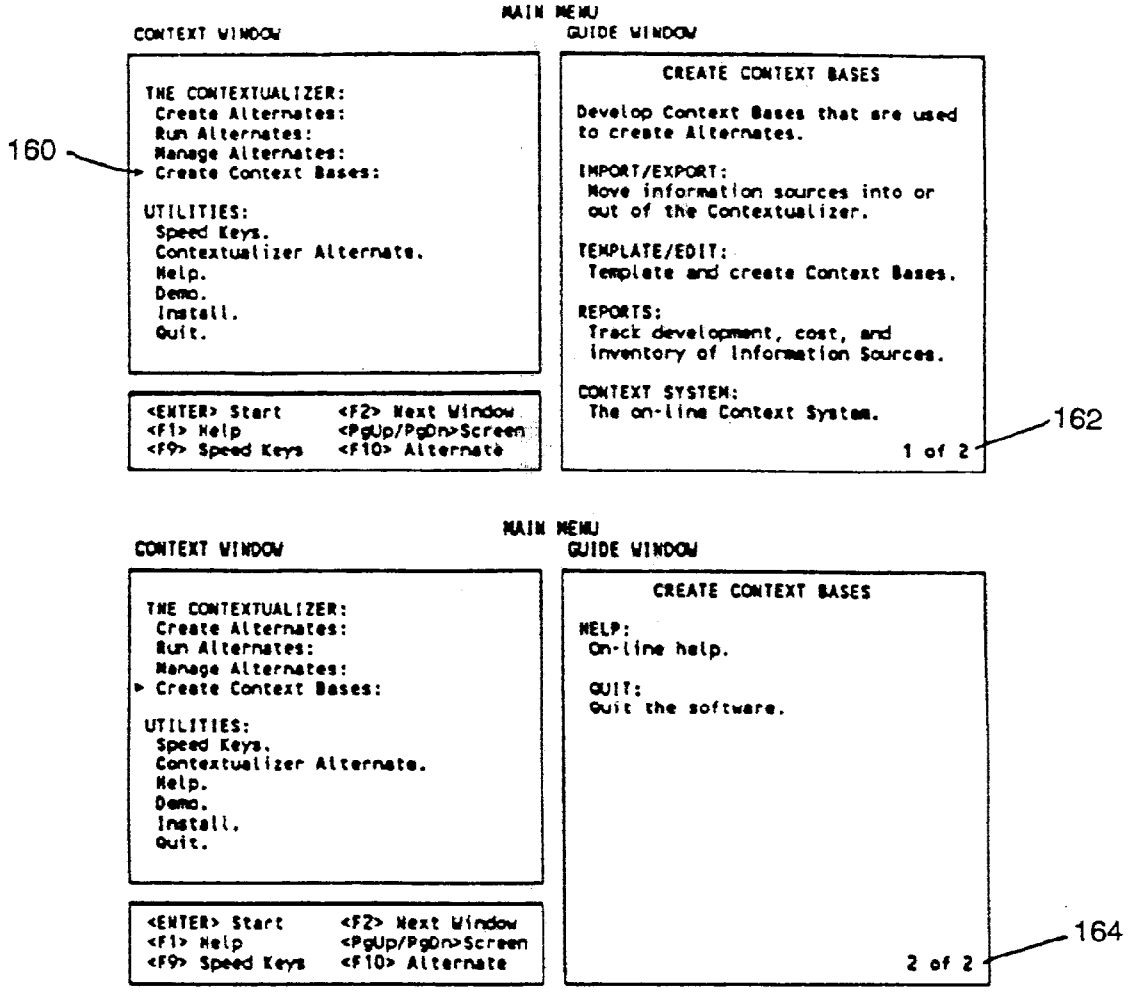

MAIN MENU
CONTEXT WINDOW
GUIDE WINDOW
THE CONTEXTUALIZER:
Create Alternates:
Run Alternates:
Manage Alternates:
Create Context Bases:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Demo.
Install.
Quit.
160
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Alternate
CREATE CONTEXT BASES
Develop Context Bases that are used to create Alternates.
IMPORT/EXPORT:
Move information sources into or out of the Contextualizer.
TEMPLATE/EDIT:
Template and create Context Bases.
REPORTS:
Track development, cost, and inventory of information Sources.
CONTEXT SYSTEM:
The on-line Context System.
1 of 2
162
MAIN MENU
CONTEXT WINDOW
GUIDE WINDOW
THE CONTEXTUALIZER:
Create Alternates:
Run Alternates:
Manage Alternates:
Create Context Bases:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Demo.
Install.
Quit.
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Alternate
CREATE CONTEXT BASES
HELP:
On-line help.
QUIT:
Quit the software.
2 of 2
164

FIG. 14

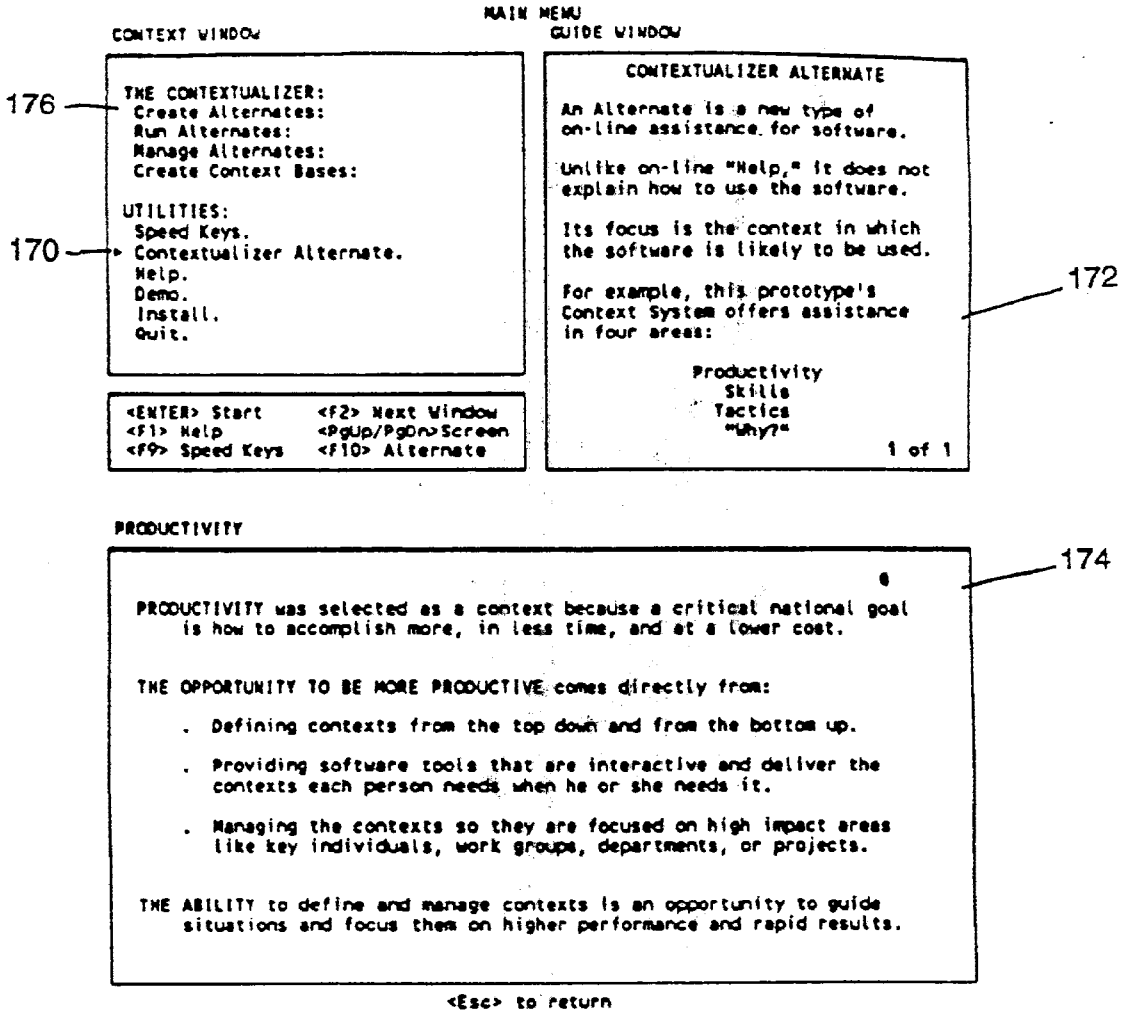

MAIN MENU
CONTEXT WINDOW
GUIDE WINDOW
176
THE CONTEXTUALIZER:
Create Alternates:
Run Alternates:
Manage Alternates:
Create Context Bases:
UTILITIES:
Speed Keys.
170
Contextualizer Alternate.
Help.
Demo.
Install.
Quit.
<ENTER> Start
<F2> Next Window
<F1> Help
<PgUp/PgDn>Screen
<F9> Speed Keys
<F10> Alternate
CONTEXTUALIZER ALTERNATE
An Alternate is a new type of on-line assistance for software.
Unlike on-line "Help," it does not explain how to use the software.
Its focus is the context in which the software is likely to be used.
For example, this prototype's Context System offers assistance in four areas:
172
Productivity
Skills
Tactics
"Why?"
1 of 1
PRODUCTIVITY
174
PRODUCTIVITY was selected as a context because a critical national goal is how to accomplish more, in less time, and at a lower cost.
THE OPPORTUNITY TO BE MORE PRODUCTIVE comes directly from:
. Defining contexts from the top down and from the bottom up.
. Providing software tools that are interactive and deliver the contexts each person needs when he or she needs it.
. Managing the contexts so they are focused on high impact areas like key individuals, work groups, departments, or projects.
THE ABILITY to define and manage contexts is an opportunity to guide situations and focus them on higher performance and rapid results.
<Esc> to return

FIG. 15

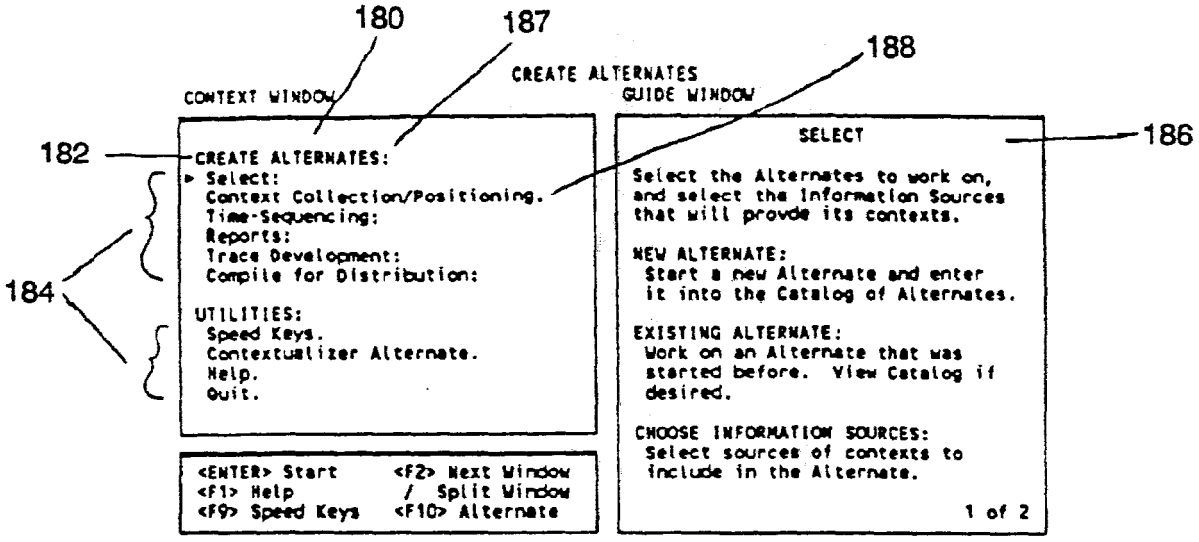

180
187
188
CREATE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
182
186
184
CREATE ALTERNATES:
▸ Select:
Context Collection/Positioning.
Time-Sequencing:
Reports:
Trace Development:
Compile for Distribution:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Quit.
SELECT
Select the Alternates to work on, and select the Information Sources that will provde its contexts.
NEW ALTERNATE:
Start a new Alternate and enter it into the Catalog of Alternates.
EXISTING ALTERNATE:
Work on an Alternate that was started before. View Catalog if desired.
CHOOSE INFORMATION SOURCES:
Select sources of contexts to include in the Alternate.
1 of 2
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
/ Split Window
<F10> Alternate

FIG. 16

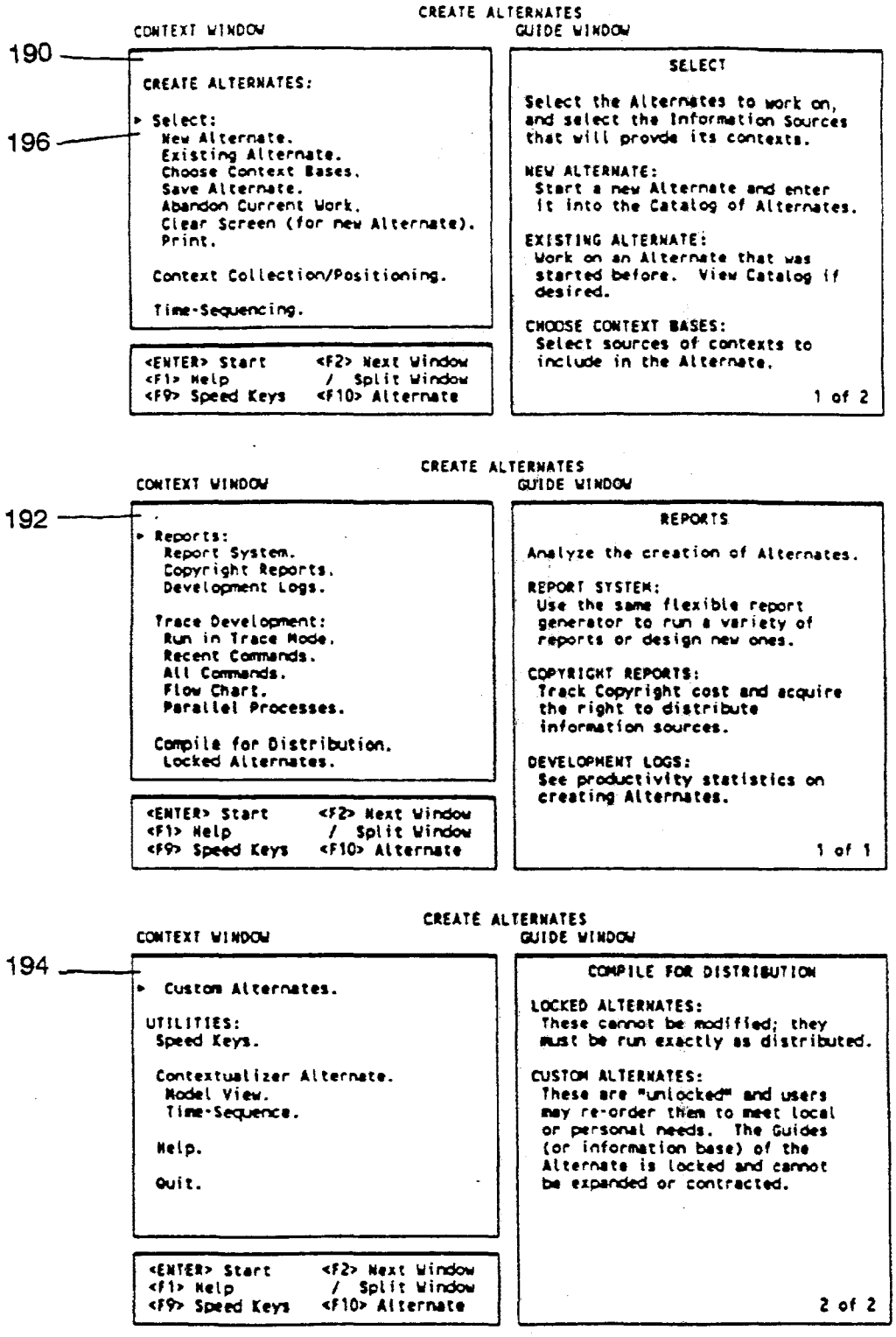

CREATE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
190
196
CREATE ALTERNATES:
▸ Select:
New Alternate.
Existing Alternate.
Choose Context Bases.
Save Alternate.
Abandon Current Work.
Clear Screen (for new Alternate).
Print.
Context Collection/Positioning.
Time-Sequencing.
<ENTER> Start <F2> Next Window
<F1> Help / Split Window
<F9> Speed Keys <F10> Alternate
SELECT
Select the Alternates to work on, and select the Information Sources that will provde its contexts.
NEW ALTERNATE:
Start a new Alternate and enter it into the Catalog of Alternates.
EXISTING ALTERNATE:
Work on an Alternate that was started before. View Catalog if desired.
CHOOSE CONTEXT BASES:
Select sources of contexts to include in the Alternate.
1 of 2
CREATE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
192
▸ Reports:
Report System.
Copyright Reports.
Development Logs.
Trace Development:
Run in Trace Mode.
Recent Commands.
All Commands.
Flow Chart.
Parallel Processes.
Compile for Distribution.
Locked Alternates.
<ENTER> Start <F2> Next Window
<F1> Help / Split Window
<F9> Speed Keys <F10> Alternate
REPORTS
Analyze the creation of Alternates.
REPORT SYSTEM:
Use the same flexible report generator to run a variety of reports or design new ones.
COPYRIGHT REPORTS:
Track Copyright cost and acquire the right to distribute information sources.
DEVELOPMENT LOGS:
See productivity statistics on creating Alternates.
1 of 1
CREATE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
194
▸ Custom Alternates.
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Model View.
Time-Sequence.
Help.
Quit.
<ENTER> Start <F2> Next Window
<F1> Help / Split Window
<F9> Speed Keys <F10> Alternate
COMPILE FOR DISTRIBUTION
LOCKED ALTERNATES:
These cannot be modified; they must be run exactly as distributed.
CUSTOM ALTERNATES:
These are "unlocked" and users may re-order them to meet local or personal needs. The Guides (or information base) of the Alternate is locked and cannot be expanded or contracted.
2 of 2

FIG. 17

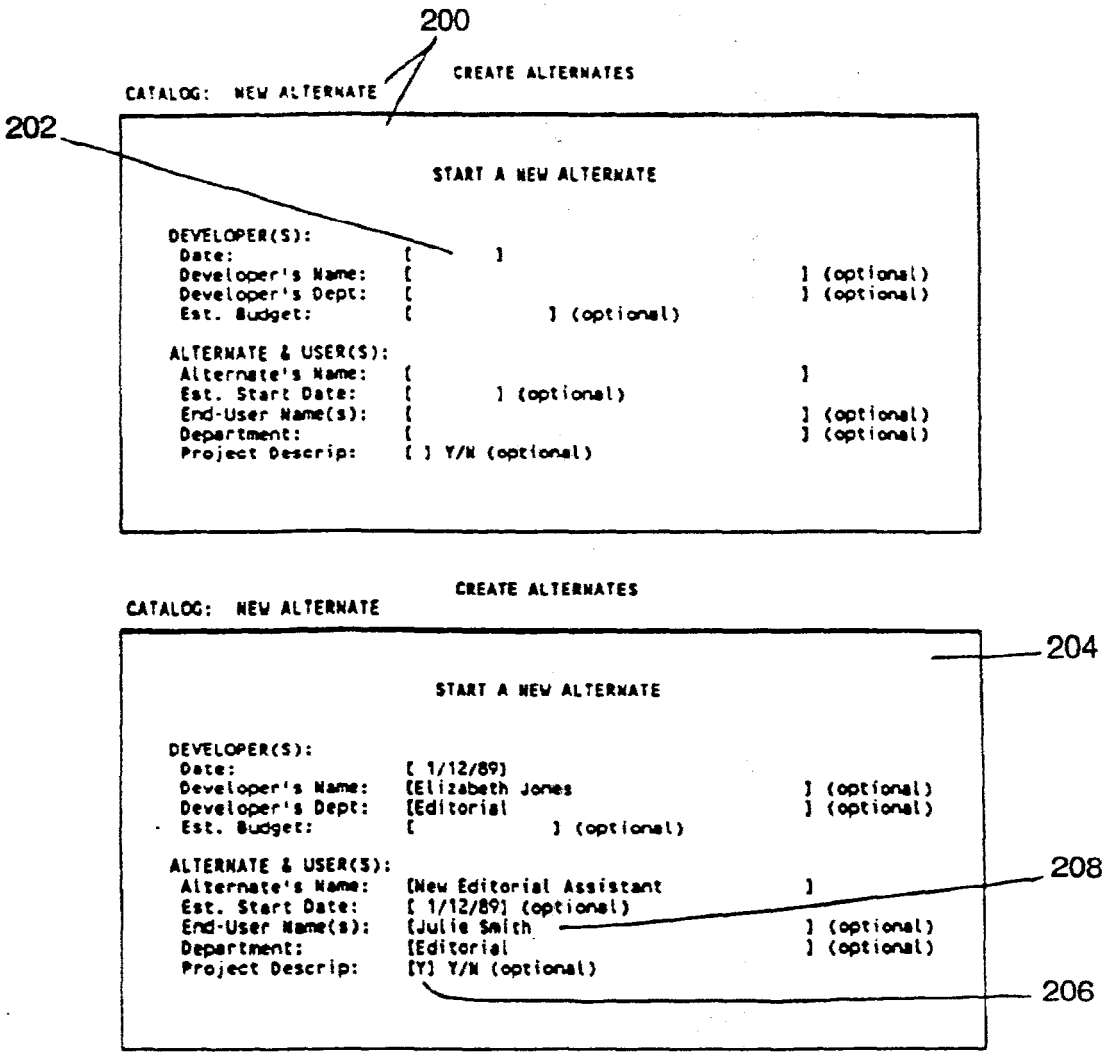

200
CREATE ALTERNATES
CATALOG: NEW ALTERNATE
202
START A NEW ALTERNATE
DEVELOPER(S):
Date: [ ]
Developer's Name: [ ] (optional)
Developer's Dept: [ ] (optional)
Est. Budget: [ ] (optional)
ALTERNATE & USER(S):
Alternate's Name: [ ]
Est. Start Date: [ ] (optional)
End-User Name(s): [ ] (optional)
Department: [ ] (optional)
Project Descrip: [ ] Y/N (optional)
CREATE ALTERNATES
CATALOG: NEW ALTERNATE
204
START A NEW ALTERNATE
DEVELOPER(S):
Date: [1/12/89]
Developer's Name: [Elizabeth Jones] (optional)
Developer's Dept: [Editorial] (optional)
Est. Budget: [ ] (optional)
ALTERNATE & USER(S):
Alternate's Name: [New Editorial Assistant]
208
Est. Start Date: [1/12/89] (optional)
End-User Name(s): [Julie Smith] (optional)
Department: [Editorial] (optional)
Project Descrip: [Y] Y/N (optional)
206

FIG. 18

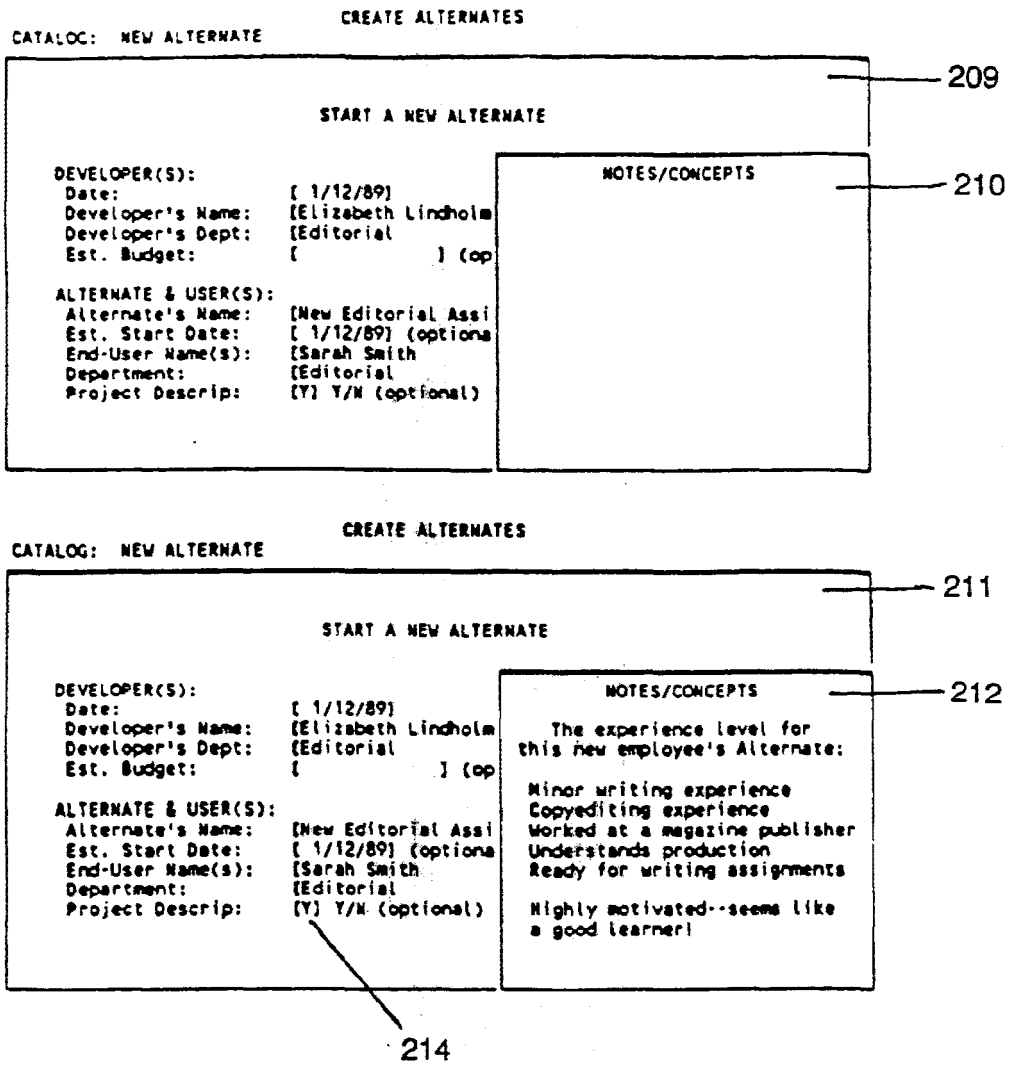

CREATE ALTERNATES
CATALOG: NEW ALTERNATE
START A NEW ALTERNATE
DEVELOPER(S):
Date: [1/12/89]
Developer's Name: [Elizabeth Lindholm
Developer's Dept: [Editorial
Est. Budget: [ ] (op
ALTERNATE & USER(S):
Alternate's Name: [New Editorial Assi
Est. Start Date: [1/12/89] (optiona
End-User Name(s): [Sarah Smith
Department: [Editorial
Project Descrip: [Y] Y/N (optional)
NOTES/CONCEPTS
209
210
CREATE ALTERNATES
CATALOG: NEW ALTERNATE
START A NEW ALTERNATE
DEVELOPER(S):
Date: [1/12/89]
Developer's Name: [Elizabeth Lindholm
Developer's Dept: [Editorial
Est. Budget: [ ] (op
ALTERNATE & USER(S):
Alternate's Name: [New Editorial Assi
Est. Start Date: [1/12/89] (optiona
End-User Name(s): [Sarah Smith
Department: [Editorial
Project Descrip: [Y] Y/N (optional)
NOTES/CONCEPTS
The experience level for this new employee's Alternate:
Minor writing experience
Copyediting experience
Worked at a magazine publisher
Understands production
Ready for writing assignments
Highly motivated--seems like a good learner!
211
212
214

FIG. 19

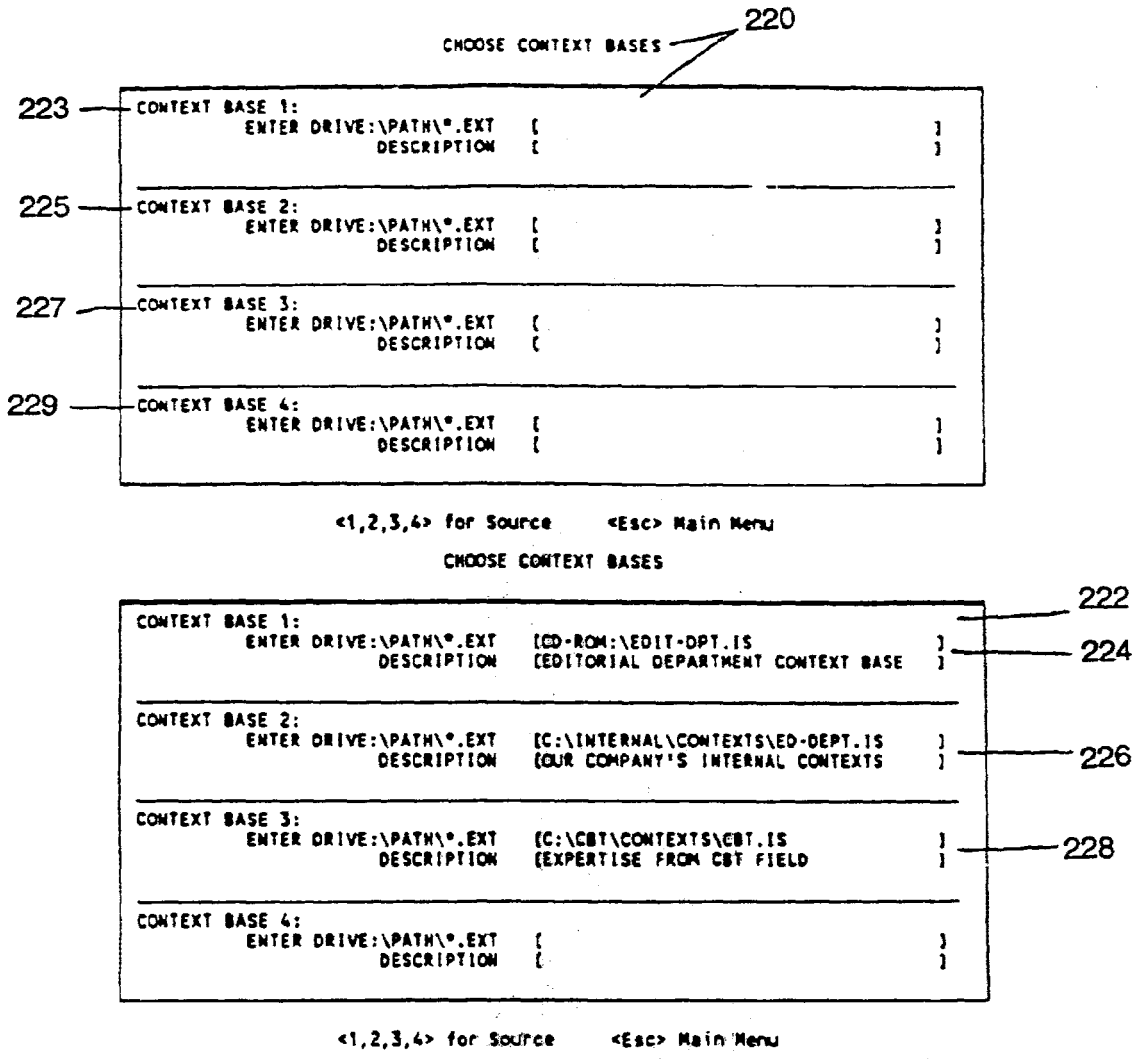
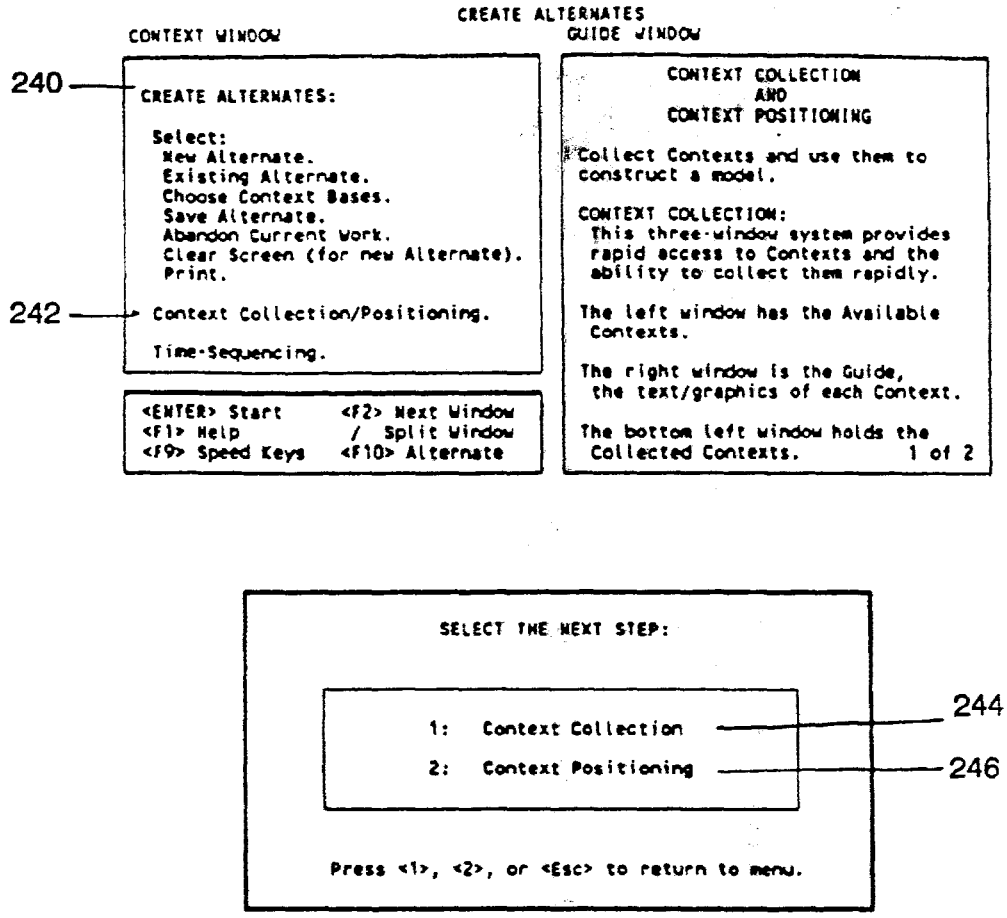

220
CHOOSE CONTEXT BASES
223
CONTEXT BASE 1:
ENTER DRIVE:\PATH*.EXT [ ]
DESCRIPTION [ ]
225
CONTEXT BASE 2:
ENTER DRIVE:\PATH*.EXT [ ]
DESCRIPTION [ ]
227
CONTEXT BASE 3:
ENTER DRIVE:\PATH*.EXT [ ]
DESCRIPTION [ ]
229
CONTEXT BASE 4:
ENTER DRIVE:\PATH*.EXT [ ]
DESCRIPTION [ ]
<1,2,3,4> for Source <Esc> Main Menu
CHOOSE CONTEXT BASES
222
CONTEXT BASE 1:
ENTER DRIVE:\PATH*.EXT [CD-ROM:\EDIT-DPT.IS]
DESCRIPTION [EDITORIAL DEPARTMENT CONTEXT BASE]
224
CONTEXT BASE 2:
ENTER DRIVE:\PATH*.EXT [C:\INTERNAL\CONTEXTS\ED-DEPT.IS]
DESCRIPTION [OUR COMPANY'S INTERNAL CONTEXTS]
226
CONTEXT BASE 3:
ENTER DRIVE:\PATH*.EXT [C:\CBT\CONTEXTS\CBT.IS]
DESCRIPTION [EXPERTISE FROM CBT FIELD]
228
CONTEXT BASE 4:
ENTER DRIVE:\PATH*.EXT [ ]
DESCRIPTION [ ]
<1,2,3,4> for Source <Esc> Main Menu

FIG. 20

Context	Source	Page
Editing the Whole Publication		
Design		
Exploiting the Third Dimension	White2	20
Indexing		
Budget Conscious Indexing	Boston	217
Problems?		
Management Lessons and Warnings	Boston	167
Publication Management Lessons	Boston	164
Publication Management Warnings	Boston	167
Proofreading		
Do Complete Final Readings	Plotnik	8
Proposals		
Producing Proposals	Boston	142
Writing Proposals	Boston	139, 144
Scheduling		
How to Plan and Manage a Schedule	Boston	204
On Being On Time	Mogel	36
Start the Next Issue Immediately	Plotnik	9
Top-Down Planning in Publishing	Boston	170
Space Planning		
Assembling the Issue in Miniature	White2	18
Forms for Planning an Issue	White2	15
Magazines in Three Dimensions	White2	12
Hiring New Employees		
Job Descriptions		
Copy Editor	Mogel	33
Editor	Mogel	24, 32
Editorial Management	Mogel	32
How to Hire a Proofreader	Boston	180
Managing Editor	Mogel	32
Senior Editor	Mogel	33
Resumes		
How Editors Read Resumes	Boston	183
Tests		
Editing Tests for Job Applicants	Boston	178
Information Retrieval		
External Sources		
Information Brokers	Plotnik	81
Modern Libraries	Plotnik	78
Internal Sources		
The Office Bookshelf	Plotnik	82
Invasion of Privacy		
Consent		
Consent for Photographs	Dill	179, 237
Consent to Interviews & Photos	Dill	216

FIG. 21


CREATE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
240
CREATE ALTERNATES:
Select:
New Alternate.
Existing Alternate.
Choose Context Bases.
Save Alternate.
Abandon Current Work.
Clear Screen (for new Alternate).
Print.
242
Context Collection/Positioning.
Time-Sequencing.
<ENTER> Start
<F2> Next Window
<F1> Help
/ Split Window
<F9> Speed Keys
<F10> Alternate
CONTEXT COLLECTION
AND
CONTEXT POSITIONING
Collect Contexts and use them to construct a model.
CONTEXT COLLECTION:
This three-window system provides rapid access to Contexts and the ability to collect them rapidly.
The left window has the Available Contexts.
The right window is the Guide, the text/graphics of each Context.
The bottom left window holds the Collected Contexts.
1 of 2

SELECT THE NEXT STEP:
1: Context Collection
2: Context Positioning
244
246
Press <1>, <2>, or <Esc> to return to menu.

FIG. 22

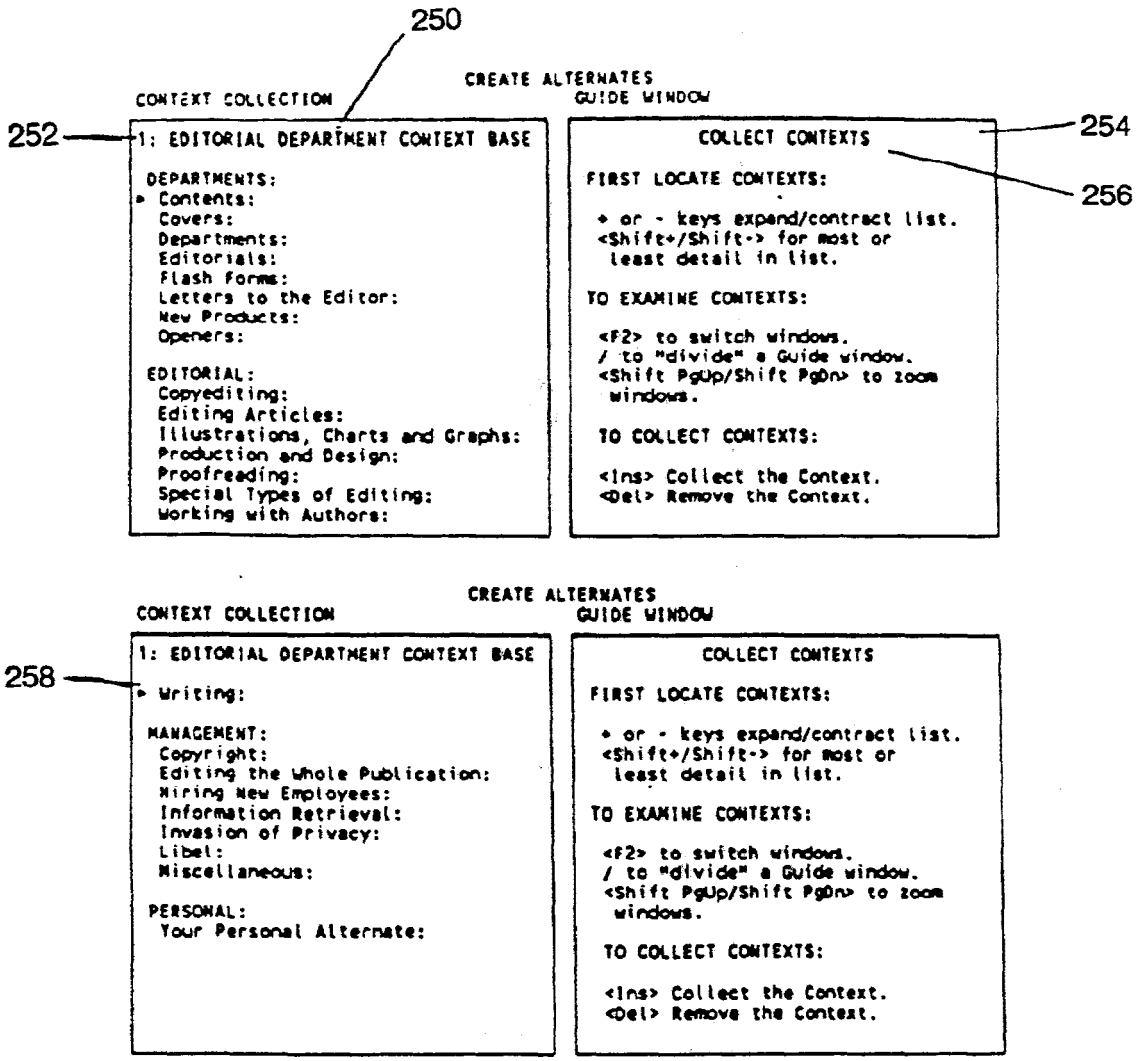

250
CONTEXT COLLECTION
CREATE ALTERNATES GUIDE WINDOW
252
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
▸ Contents:
Covers:
Departments:
Editorials:
Flash Forms:
Letters to the Editor:
New Products:
Openers:
EDITORIAL:
Copyediting:
Editing Articles:
Illustrations, Charts and Graphs:
Production and Design:
Proofreading:
Special Types of Editing:
Working with Authors:
COLLECT CONTEXTS
254
256
FIRST LOCATE CONTEXTS:
+ or - keys expand/contract list.
<Shift+/Shift-> for most or least detail in list.
TO EXAMINE CONTEXTS:
<F2> to switch windows.
/ to "divide" a Guide window.
<Shift PgUp/Shift PgDn> to zoom windows.
TO COLLECT CONTEXTS:
<Ins> Collect the Context.
<Del> Remove the Context.
CREATE ALTERNATES GUIDE WINDOW
CONTEXT COLLECTION
1: EDITORIAL DEPARTMENT CONTEXT BASE
258
▸ Writing:
MANAGEMENT:
Copyright:
Editing the Whole Publication:
Hiring New Employees:
Information Retrieval:
Invasion of Privacy:
Libel:
Miscellaneous:
PERSONAL:
Your Personal Alternate:
COLLECT CONTEXTS
FIRST LOCATE CONTEXTS:
+ or - keys expand/contract list.
<Shift+/Shift-> for most or least detail in list.
TO EXAMINE CONTEXTS:
<F2> to switch windows.
/ to "divide" a Guide window.
<Shift PgUp/Shift PgDn> to zoom windows.
TO COLLECT CONTEXTS:
<Ins> Collect the Context.
<Del> Remove the Context.

FIG. 23

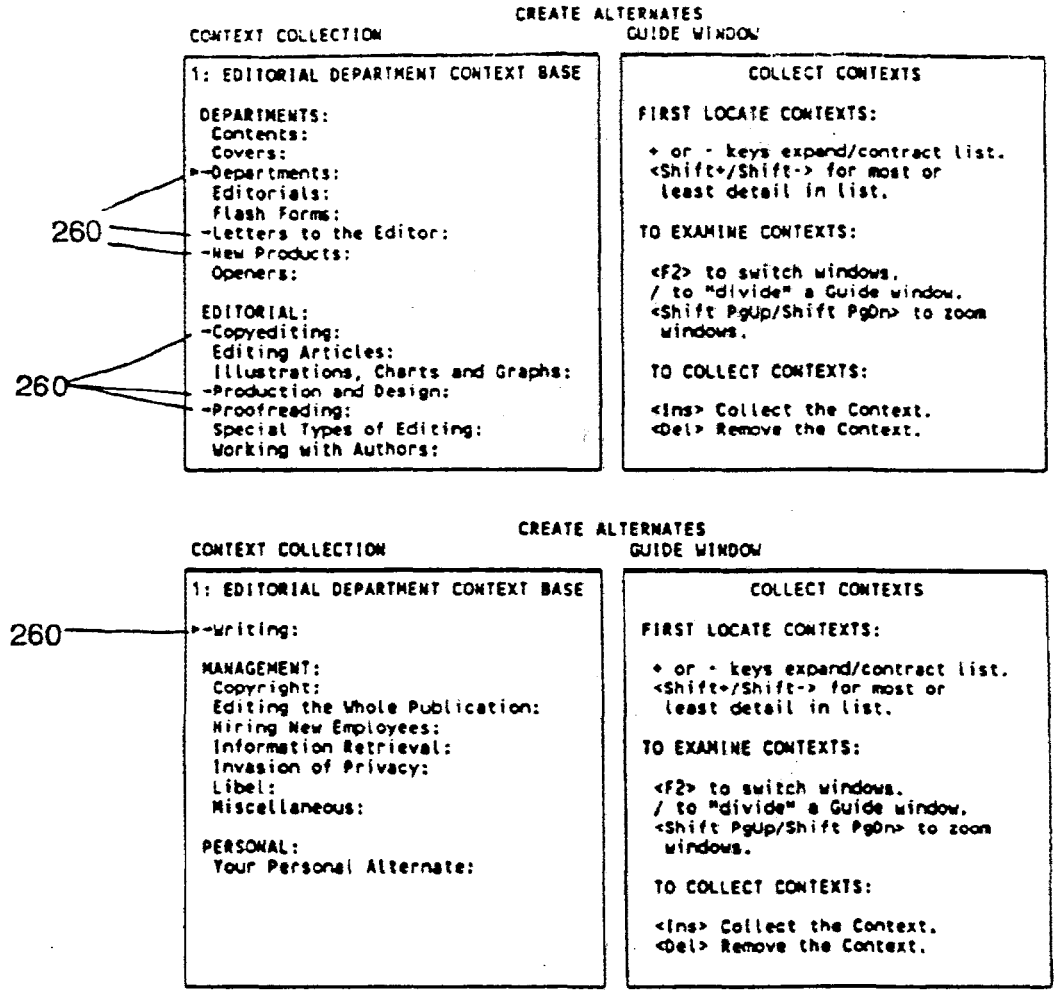

CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
Contents:
Covers:
►-Departments:
Editorials:
Flash Forms:
-Letters to the Editor:
-New Products:
Openers:
EDITORIAL:
-Copyediting:
Editing Articles:
Illustrations, Charts and Graphs:
-Production and Design:
-Proofreading:
Special Types of Editing:
Working with Authors:
260
260
COLLECT CONTEXTS
FIRST LOCATE CONTEXTS:
+ or - keys expand/contract list.
<Shift+/Shift-> for most or least detail in list.
TO EXAMINE CONTEXTS:
<F2> to switch windows.
/ to "divide" a Guide window.
<Shift PgUp/Shift PgDn> to zoom windows.
TO COLLECT CONTEXTS:
<Ins> Collect the Context.
<Del> Remove the Context.
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
260
►-Writing:
MANAGEMENT:
Copyright:
Editing the Whole Publication:
Hiring New Employees:
Information Retrieval:
Invasion of Privacy:
Libel:
Miscellaneous:
PERSONAL:
Your Personal Alternate:
COLLECT CONTEXTS
FIRST LOCATE CONTEXTS:
+ or - keys expand/contract list.
<Shift+/Shift-> for most or least detail in list.
TO EXAMINE CONTEXTS:
<F2> to switch windows.
/ to "divide" a Guide window.
<Shift PgUp/Shift PgDn> to zoom windows.
TO COLLECT CONTEXTS:
<Ins> Collect the Context.
<Del> Remove the Context.

FIG. 24

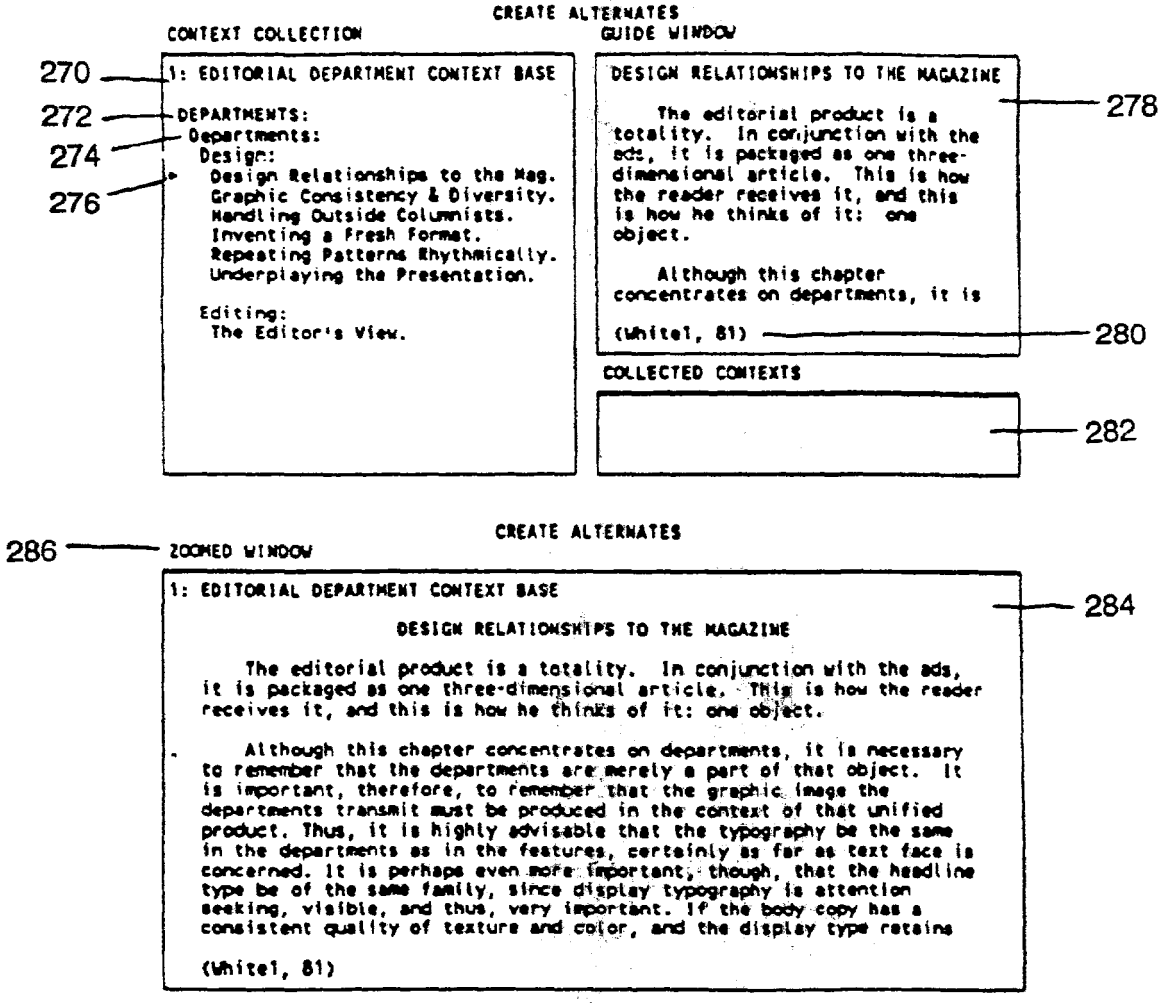

CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
270
1: EDITORIAL DEPARTMENT CONTEXT BASE
272
DEPARTMENTS:
274
Departments:
Design:
276
Design Relationships to the Mag.
Graphic Consistency & Diversity.
Handling Outside Columnists.
Inventing a Fresh Format.
Repeating Patterns Rhythmically.
Underplaying the Presentation.
Editing:
The Editor's View.
DESIGN RELATIONSHIPS TO THE MAGAZINE
278
The editorial product is a totality. In conjunction with the ads, it is packaged as one three-dimensional article. This is how the reader receives it, and this is how he thinks of it: one object.
Although this chapter concentrates on departments, it is
(Whitel, 81)
280
COLLECTED CONTEXTS
282
CREATE ALTERNATES
286
ZOOMED WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
284
DESIGN RELATIONSHIPS TO THE MAGAZINE
The editorial product is a totality. In conjunction with the ads, it is packaged as one three-dimensional article. This is how the reader receives it, and this is how he thinks of it: one object.
Although this chapter concentrates on departments, it is necessary to remember that the departments are merely a part of that object. It is important, therefore, to remember that the graphic image the departments transmit must be produced in the context of that unified product. Thus, it is highly advisable that the typography be the same in the departments as in the features, certainly as far as text face is concerned. It is perhaps even more important, though, that the headline type be of the same family, since display typography is attention seeking, visible, and thus, very important. If the body copy has a consistent quality of texture and color, and the display type retains
(Whitel, 81)

FIG. 25

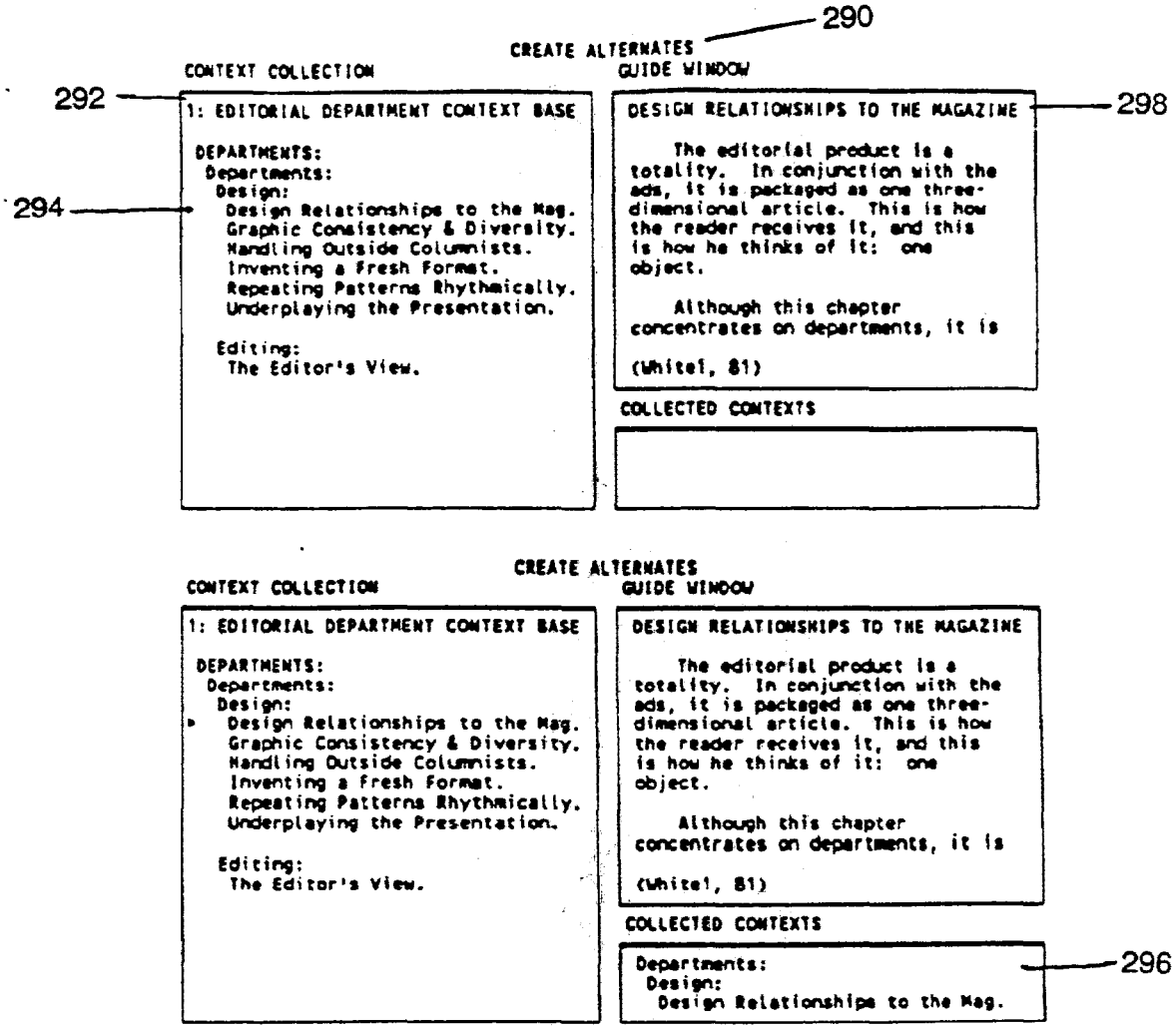

290
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
292
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
Departments:
Design:
294
Design Relationships to the Mag.
Graphic Consistency & Diversity.
Handling Outside Columnists.
Inventing a Fresh Format.
Repeating Patterns Rhythmically.
Underplaying the Presentation.
Editing:
The Editor's View.
DESIGN RELATIONSHIPS TO THE MAGAZINE
298
The editorial product is a totality. In conjunction with the ads, it is packaged as one three-dimensional article. This is how the reader receives it, and this is how he thinks of it: one object.
Although this chapter concentrates on departments, it is
(White1, 81)
COLLECTED CONTEXTS
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
Departments:
Design:
Design Relationships to the Mag.
Graphic Consistency & Diversity.
Handling Outside Columnists.
Inventing a Fresh Format.
Repeating Patterns Rhythmically.
Underplaying the Presentation.
Editing:
The Editor's View.
DESIGN RELATIONSHIPS TO THE MAGAZINE
The editorial product is a totality. In conjunction with the ads, it is packaged as one three-dimensional article. This is how the reader receives it, and this is how he thinks of it: one object.
Although this chapter concentrates on departments, it is
(White1, 81)
COLLECTED CONTEXTS
Departments:
Design:
Design Relationships to the Mag.
296

FIG. 26

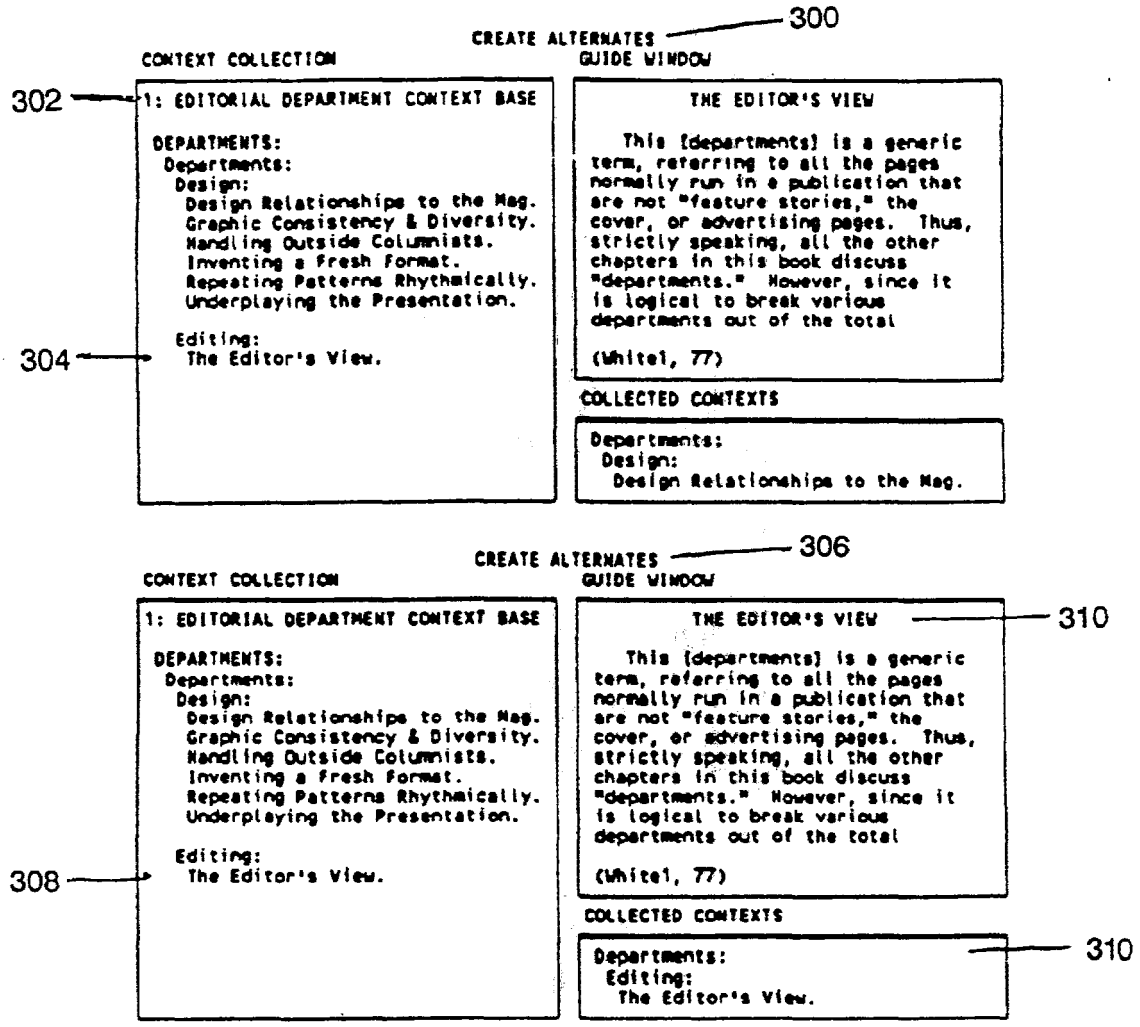

CREATE ALTERNATES
300
CONTEXT COLLECTION
GUIDE WINDOW
302
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
Departments:
Design:
Design Relationships to the Mag.
Graphic Consistency & Diversity.
Handling Outside Columnists.
Inventing a Fresh Format.
Repeating Patterns Rhythmically.
Underplaying the Presentation.
Editing:
304
The Editor's View.
THE EDITOR'S VIEW
This [departments] is a generic term, referring to all the pages normally run in a publication that are not "feature stories," the cover, or advertising pages. Thus, strictly speaking, all the other chapters in this book discuss "departments." However, since it is logical to break various departments out of the total
(White1, 77)
COLLECTED CONTEXTS
Departments:
Design:
Design Relationships to the Mag.
CREATE ALTERNATES
306
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
Departments:
Design:
Design Relationships to the Mag.
Graphic Consistency & Diversity.
Handling Outside Columnists.
Inventing a Fresh Format.
Repeating Patterns Rhythmically.
Underplaying the Presentation.
Editing:
308
The Editor's View.
THE EDITOR'S VIEW
310
This [departments] is a generic term, referring to all the pages normally run in a publication that are not "feature stories," the cover, or advertising pages. Thus, strictly speaking, all the other chapters in this book discuss "departments." However, since it is logical to break various departments out of the total
(White1, 77)
COLLECTED CONTEXTS
Departments:
Editing:
The Editor's View.
310

FIG. 27

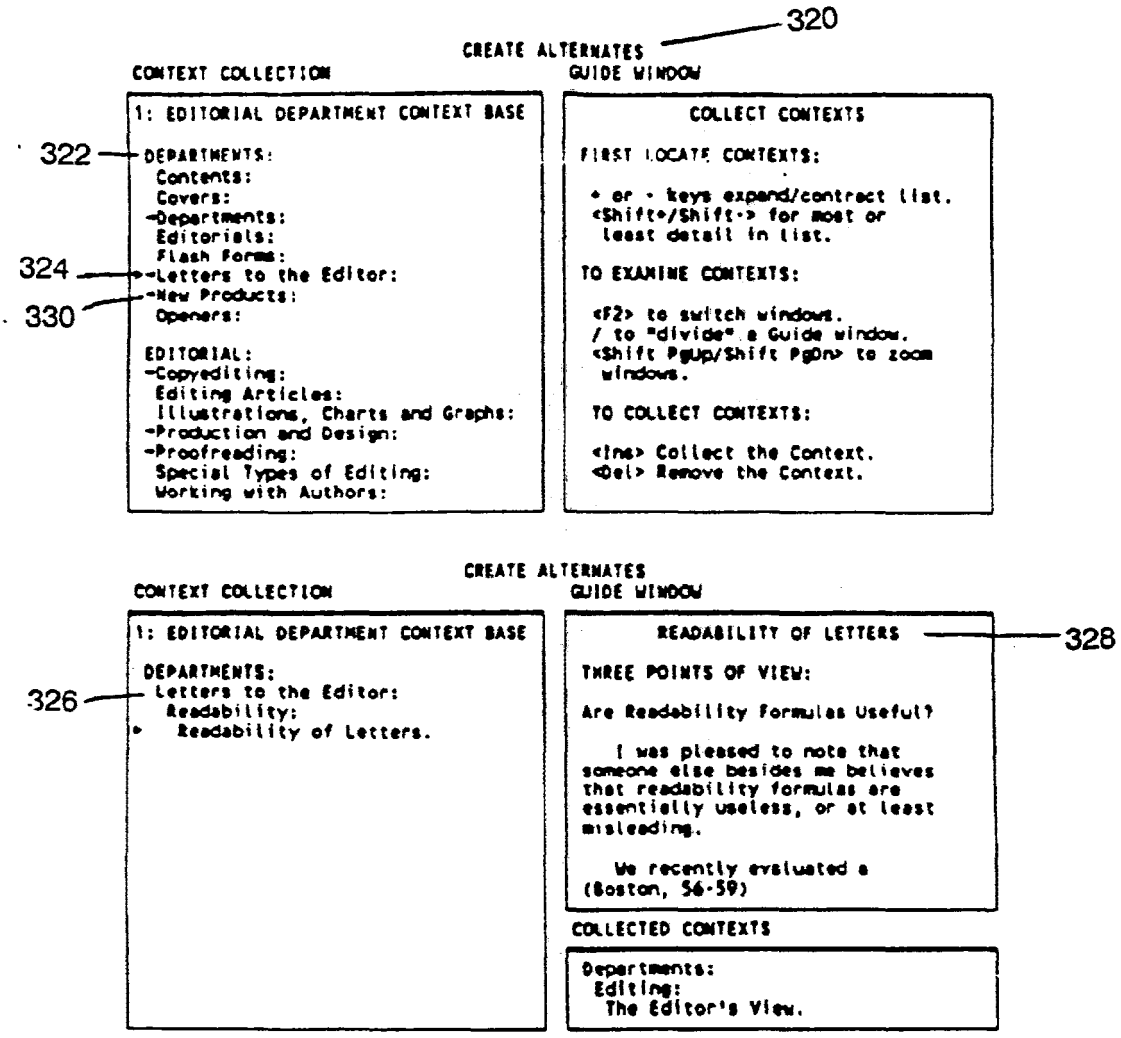

320
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
322
DEPARTMENTS:
Contents:
Covers:
-Departments:
Editorials:
Flash Forms:
324
-Letters to the Editor:
-New Products:
330
Openers:
EDITORIAL:
-Copyediting:
Editing Articles:
Illustrations, Charts and Graphs:
-Production and Design:
-Proofreading:
Special Types of Editing:
Working with Authors:
COLLECT CONTEXTS
FIRST LOCATE CONTEXTS:
+ or - keys expand/contract list.
<Shift+/Shift-> for most or least detail in list.
TO EXAMINE CONTEXTS:
<F2> to switch windows.
/ to "divide" a Guide window.
<Shift PgUp/Shift PgDn> to zoom windows.
TO COLLECT CONTEXTS:
<Ins> Collect the Context.
<Del> Remove the Context.
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
326
Letters to the Editor:
Readability:
Readability of Letters.
READABILITY OF LETTERS
328
THREE POINTS OF VIEW:
Are Readability Formulas Useful?
I was pleased to note that someone else besides me believes that readability formulas are essentially useless, or at least misleading.
We recently evaluated a
(Boston, 56-59)
COLLECTED CONTEXTS
Departments:
Editing:
The Editor's View.

FIG. 28

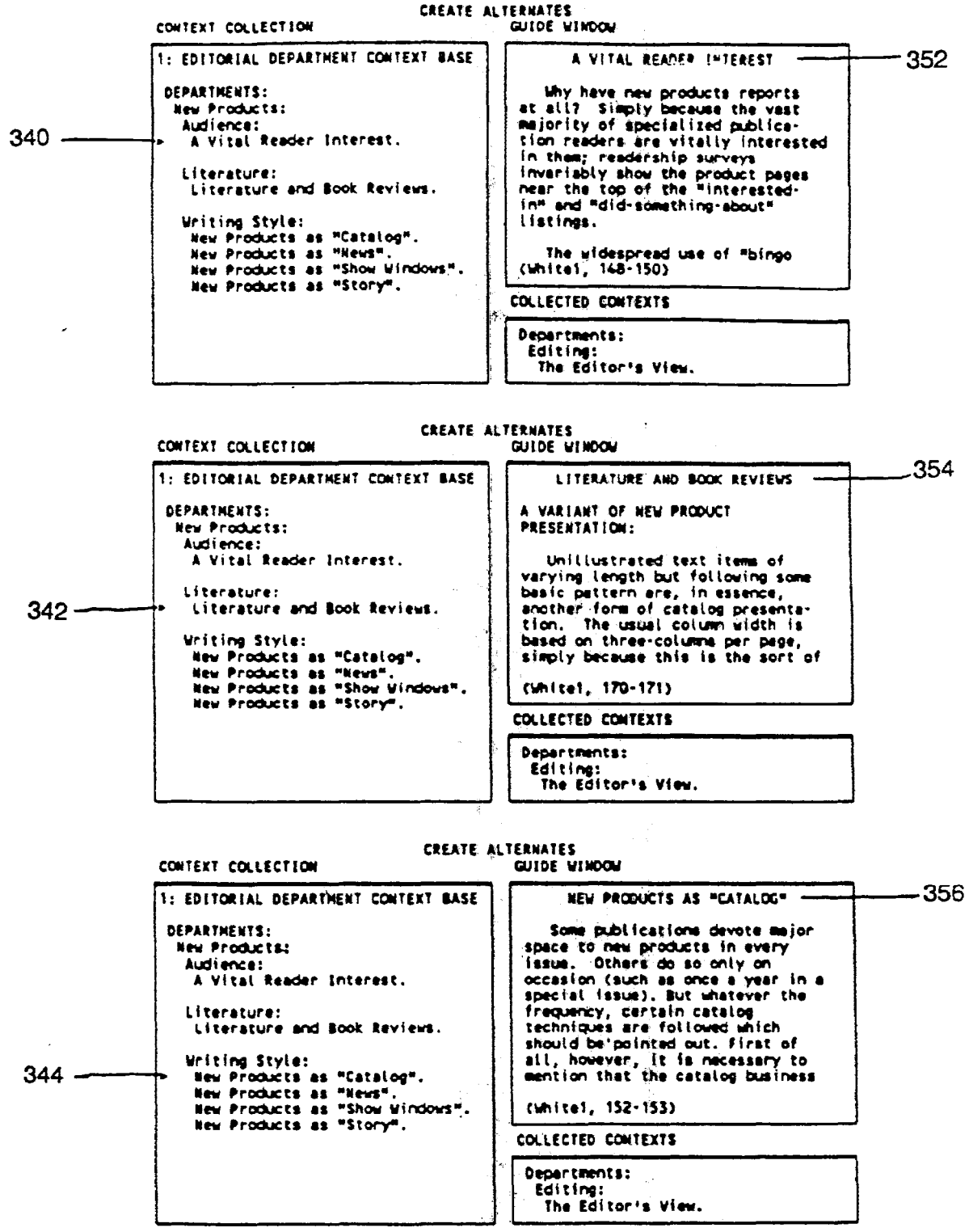

CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
New Products:
Audience:
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News".
New Products as "Show Windows".
New Products as "Story".
340
A VITAL READER INTEREST
352
Why have new products reports at all? Simply because the vast majority of specialized publication readers are vitally interested in them; readership surveys invariably show the product pages near the top of the "interested-in" and "did-something-about" listings.
The widespread use of "bingo
(White1, 148-150)
COLLECTED CONTEXTS
Departments:
Editing:
The Editor's View.
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
New Products:
Audience:
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News".
New Products as "Show Windows".
New Products as "Story".
342
LITERATURE AND BOOK REVIEWS
354
A VARIANT OF NEW PRODUCT PRESENTATION:
Unillustrated text items of varying length but following some basic pattern are, in essence, another form of catalog presentation. The usual column width is based on three-columns per page, simply because this is the sort of
(White1, 170-171)
COLLECTED CONTEXTS
Departments:
Editing:
The Editor's View.
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
New Products:
Audience:
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News".
New Products as "Show Windows".
New Products as "Story".
344
NEW PRODUCTS AS "CATALOG"
356
Some publications devote major space to new products in every issue. Others do so only on occasion (such as once a year in a special issue). But whatever the frequency, certain catalog techniques are followed which should be pointed out. First of all, however, it is necessary to mention that the catalog business
(White1, 152-153)
COLLECTED CONTEXTS
Departments:
Editing:
The Editor's View.

FIG. 29

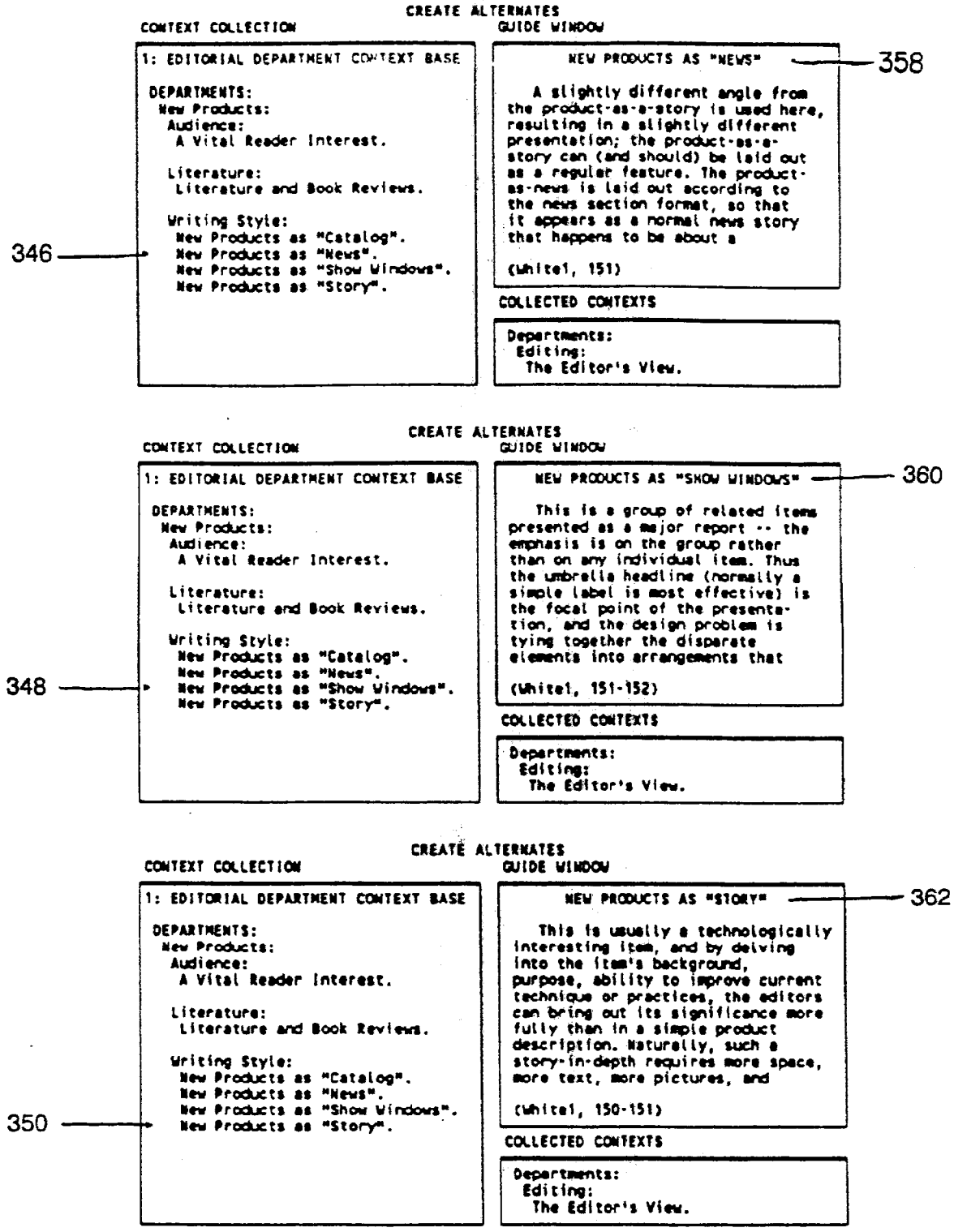

CREATE ALTERNATES
CONTEXT COLLECTION
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
New Products:
Audience:
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News".
New Products as "Show Windows".
New Products as "Story".
346
GUIDE WINDOW
NEW PRODUCTS AS "NEWS"
358
A slightly different angle from the product-as-a-story is used here, resulting in a slightly different presentation; the product-as-a-story can (and should) be laid out as a regular feature. The product-as-news is laid out according to the news section format, so that it appears as a normal news story that happens to be about a
(White1, 151)
COLLECTED CONTEXTS
Departments:
Editing:
The Editor's View.
CREATE ALTERNATES
CONTEXT COLLECTION
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
New Products:
Audience:
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News".
New Products as "Show Windows".
New Products as "Story".
348
GUIDE WINDOW
NEW PRODUCTS AS "SHOW WINDOWS"
360
This is a group of related items presented as a major report -- the emphasis is on the group rather than on any individual item. Thus the umbrella headline (normally a simple label is most effective) is the focal point of the presentation, and the design problem is tying together the disparate elements into arrangements that
(White1, 151-152)
COLLECTED CONTEXTS
Departments:
Editing:
The Editor's View.
CREATE ALTERNATES
CONTEXT COLLECTION
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
New Products:
Audience:
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News".
New Products as "Show Windows".
New Products as "Story".
350
GUIDE WINDOW
NEW PRODUCTS AS "STORY"
362
This is usually a technologically interesting item, and by delving into the item's background, purpose, ability to improve current technique or practices, the editors can bring out its significance more fully than in a simple product description. Naturally, such a story-in-depth requires more space, more text, more pictures, and
(White1, 150-151)
COLLECTED CONTEXTS
Departments:
Editing:
The Editor's View.

FIG. 30

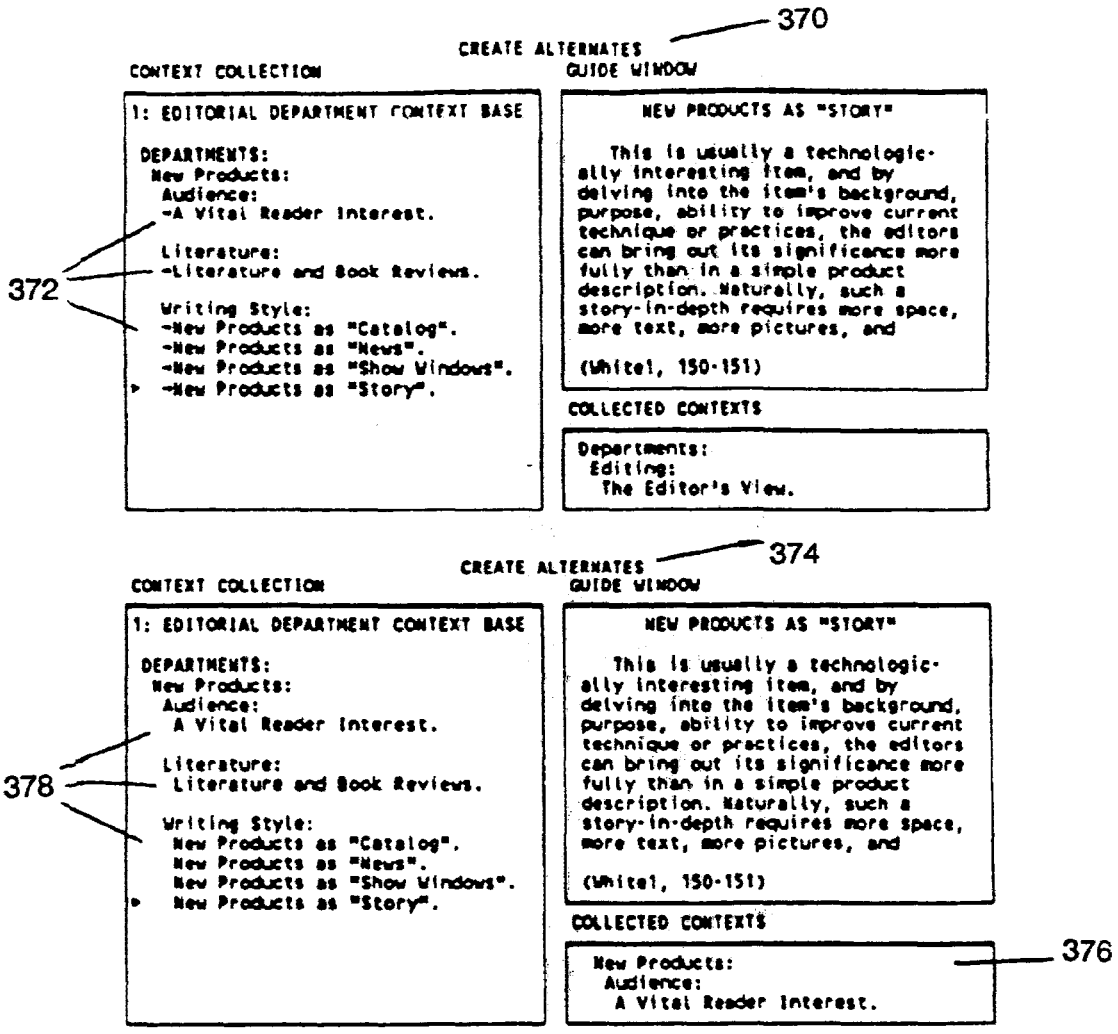

370
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
New Products:
Audience:
-A Vital Reader Interest.
Literature:
-Literature and Book Reviews.
Writing Style:
-New Products as "Catalog".
-New Products as "News".
-New Products as "Show Windows".
-New Products as "Story".
372
NEW PRODUCTS AS "STORY"
This is usually a technologically interesting item, and by delving into the item's background, purpose, ability to improve current technique or practices, the editors can bring out its significance more fully than in a simple product description. Naturally, such a story-in-depth requires more space, more text, more pictures, and
(White1, 150-151)
COLLECTED CONTEXTS
Departments:
Editing:
The Editor's View.
374
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
1: EDITORIAL DEPARTMENT CONTEXT BASE
DEPARTMENTS:
New Products:
Audience:
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News".
New Products as "Show Windows".
New Products as "Story".
378
NEW PRODUCTS AS "STORY"
This is usually a technologically interesting item, and by delving into the item's background, purpose, ability to improve current technique or practices, the editors can bring out its significance more fully than in a simple product description. Naturally, such a story-in-depth requires more space, more text, more pictures, and
(White1, 150-151)
COLLECTED CONTEXTS
New Products:
Audience:
A Vital Reader Interest.
376

FIG. 31

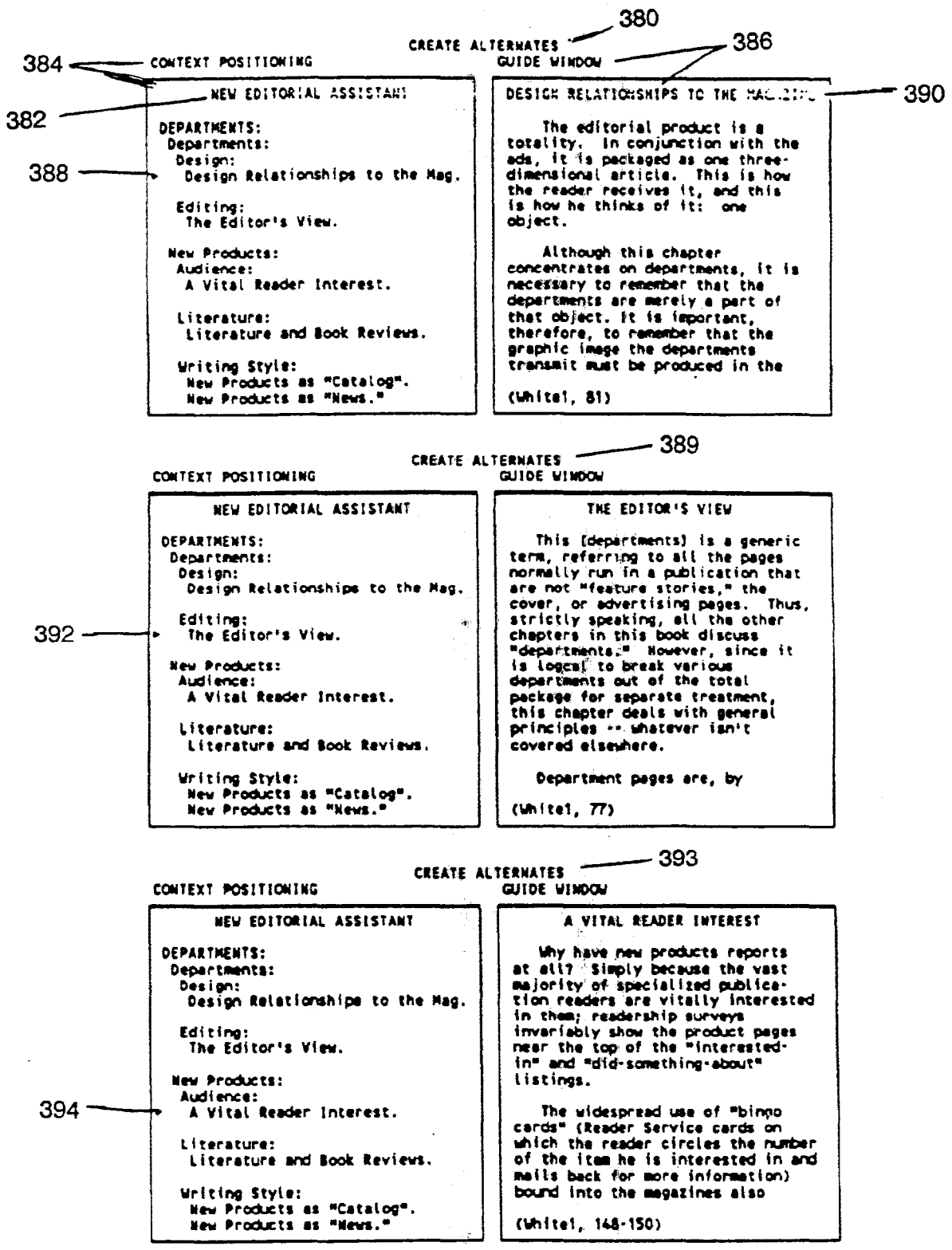

380
CREATE ALTERNATES
384
CONTEXT POSITIONING
386
GUIDE WINDOW
382
NEW EDITORIAL ASSISTANT
DEPARTMENTS:
Departments:
Design:
388
Design Relationships to the Mag.
Editing:
The Editor's View.
New Products:
Audience:
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News."
DESIGN RELATIONSHIPS TO THE MAGAZINE
390
The editorial product is a totality. In conjunction with the ads, it is packaged as one three-dimensional article. This is how the reader receives it, and this is how he thinks of it: one object.
Although this chapter concentrates on departments, it is necessary to remember that the departments are merely a part of that object. It is important, therefore, to remember that the graphic image the departments transmit must be produced in the
(White1, 81)
389
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
DEPARTMENTS:
Departments:
Design:
Design Relationships to the Mag.
Editing:
392
The Editor's View.
New Products:
Audience:
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News."
THE EDITOR'S VIEW
This [departments] is a generic term, referring to all the pages normally run in a publication that are not "feature stories," the cover, or advertising pages. Thus, strictly speaking, all the other chapters in this book discuss "departments." However, since it is logical to break various departments out of the total package for separate treatment, this chapter deals with general principles -- whatever isn't covered elsewhere.
Department pages are, by
(White1, 77)
393
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
DEPARTMENTS:
Departments:
Design:
Design Relationships to the Mag.
Editing:
The Editor's View.
New Products:
Audience:
394
A Vital Reader Interest.
Literature:
Literature and Book Reviews.
Writing Style:
New Products as "Catalog".
New Products as "News."
A VITAL READER INTEREST
Why have new products reports at all? Simply because the vast majority of specialized publication readers are vitally interested in them; readership surveys invariably show the product pages near the top of the "interested-in" and "did-something-about" listings.
The widespread use of "bingo cards" (Reader Service cards on which the reader circles the number of the item he is interested in and mails back for more information) bound into the magazines also
(White1, 148-150)

FIG. 32

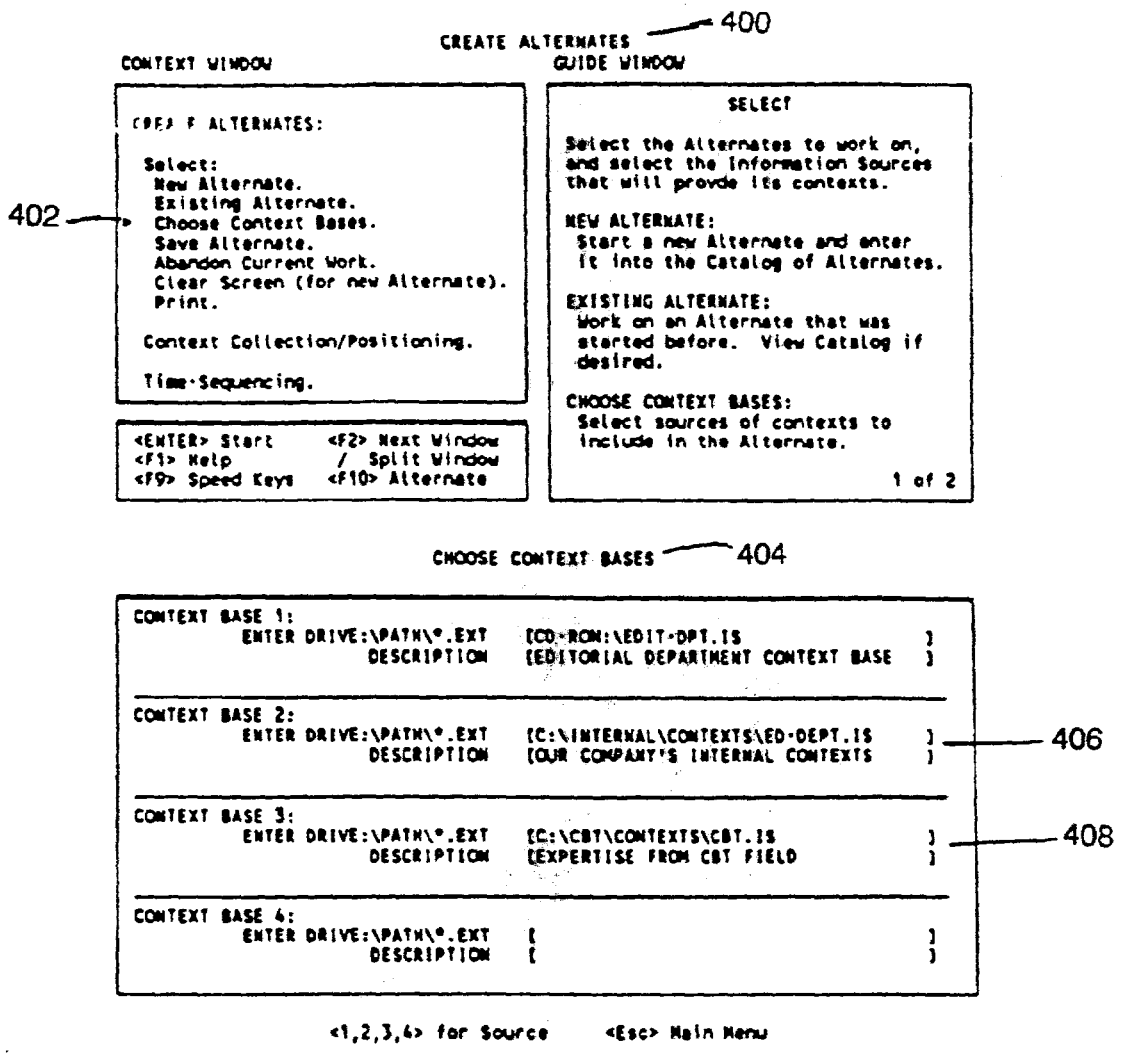

CREATE ALTERNATES
400
CONTEXT WINDOW
GUIDE WINDOW
CREATE ALTERNATES:
Select:
New Alternate.
Existing Alternate.
Choose Context Bases.
Save Alternate.
Abandon Current Work.
Clear Screen (for new Alternate).
Print.
Context Collection/Positioning.
Time-Sequencing.
402
<ENTER> Start
<F2> Next Window
<F1> Help
/ Split Window
<F9> Speed Keys
<F10> Alternate
SELECT
Select the Alternates to work on, and select the Information Sources that will provde its contexts.
NEW ALTERNATE:
Start a new Alternate and enter it into the Catalog of Alternates.
EXISTING ALTERNATE:
Work on an Alternate that was started before. View Catalog if desired.
CHOOSE CONTEXT BASES:
Select sources of contexts to include in the Alternate.
1 of 2
CHOOSE CONTEXT BASES
404
CONTEXT BASE 1:
ENTER DRIVE:\PATH*.EXT [CD-ROM:\EDIT-DPT.IS]
DESCRIPTION [EDITORIAL DEPARTMENT CONTEXT BASE]
CONTEXT BASE 2:
ENTER DRIVE:\PATH*.EXT [C:\INTERNAL\CONTEXTS\ED-DEPT.IS]
DESCRIPTION [OUR COMPANY'S INTERNAL CONTEXTS]
406
CONTEXT BASE 3:
ENTER DRIVE:\PATH*.EXT [C:\CBT\CONTEXTS\CBT.IS]
DESCRIPTION [EXPERTISE FROM CBT FIELD]
408
CONTEXT BASE 4:
ENTER DRIVE:\PATH*.EXT [ ]
DESCRIPTION [ ]
<1,2,3,4> for Source
<Esc> Main Menu

FIG. 33

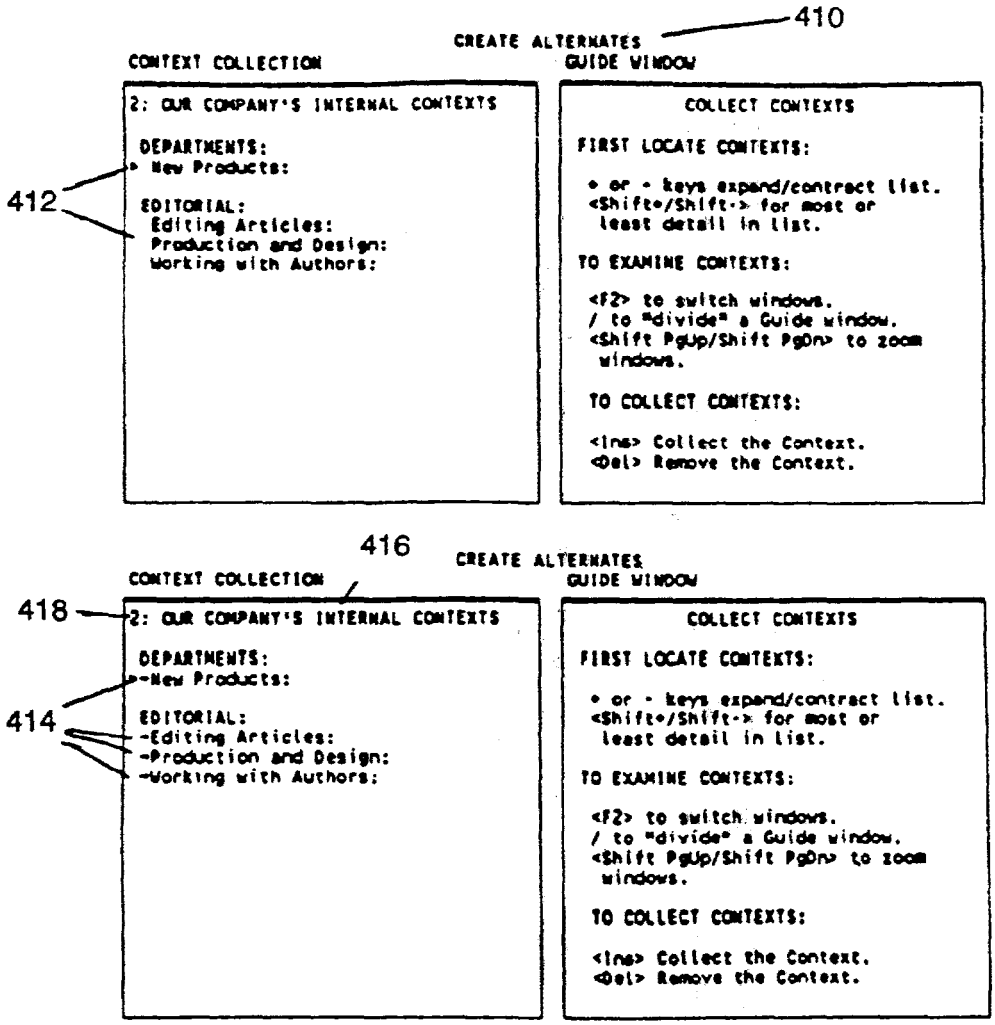

410
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
2: OUR COMPANY'S INTERNAL CONTEXTS
DEPARTMENTS:
New Products:
EDITORIAL:
Editing Articles:
Production and Design:
Working with Authors:
412
COLLECT CONTEXTS
FIRST LOCATE CONTEXTS:
* or - keys expand/contract list.
<Shift*/Shift-> for most or least detail in list.
TO EXAMINE CONTEXTS:
<F2> to switch windows.
/ to "divide" a Guide window.
<Shift PgUp/Shift PgDn> to zoom windows.
TO COLLECT CONTEXTS:
<Ins> Collect the Context.
<Del> Remove the Context.
416
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
418
2: OUR COMPANY'S INTERNAL CONTEXTS
DEPARTMENTS:
-New Products:
EDITORIAL:
-Editing Articles:
-Production and Design:
-Working with Authors:
414
COLLECT CONTEXTS
FIRST LOCATE CONTEXTS:
* or - keys expand/contract list.
<Shift*/Shift-> for most or least detail in list.
TO EXAMINE CONTEXTS:
<F2> to switch windows.
/ to "divide" a Guide window.
<Shift PgUp/Shift PgDn> to zoom windows.
TO COLLECT CONTEXTS:
<Ins> Collect the Context.
<Del> Remove the Context.

FIG. 34

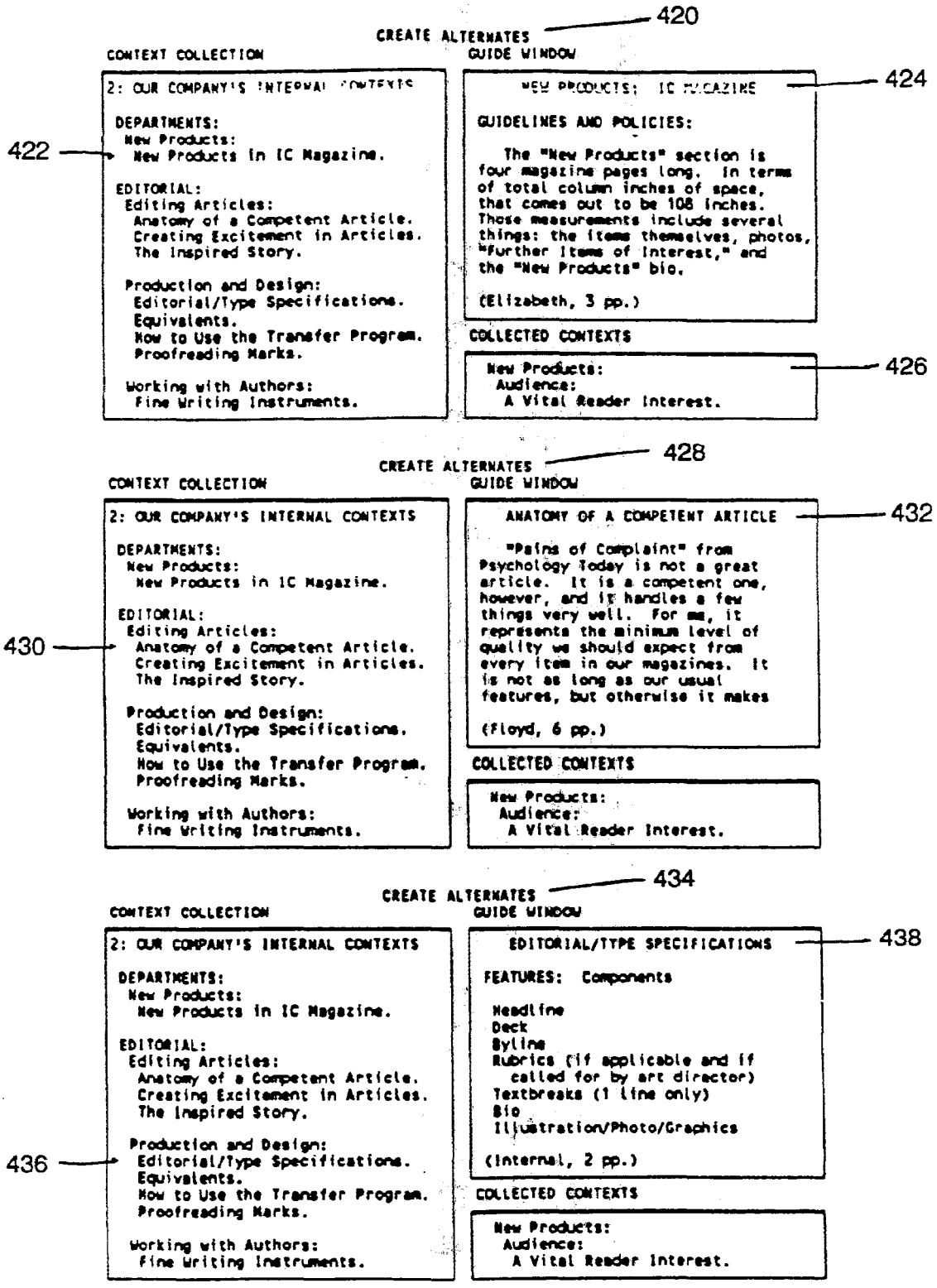

420
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
2: OUR COMPANY'S INTERNAL CONTEXTS
DEPARTMENTS:
New Products:
New Products in IC Magazine.
EDITORIAL:
Editing Articles:
Anatomy of a Competent Article.
Creating Excitement in Articles.
The Inspired Story.
Production and Design:
Editorial/Type Specifications.
Equivalents.
How to Use the Transfer Program.
Proofreading Marks.
Working with Authors:
Fine Writing Instruments.
422
NEW PRODUCTS: IC MAGAZINE
424
GUIDELINES AND POLICIES:
The "New Products" section is four magazine pages long. In terms of total column inches of space, that comes out to be 108 inches. Those measurements include several things: the items themselves, photos, "Further Items of Interest," and the "New Products" bio.
(Elizabeth, 3 pp.)
COLLECTED CONTEXTS
New Products:
Audience:
A Vital Reader Interest.
426
428
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
2: OUR COMPANY'S INTERNAL CONTEXTS
DEPARTMENTS:
New Products:
New Products in IC Magazine.
EDITORIAL:
Editing Articles:
Anatomy of a Competent Article.
Creating Excitement in Articles.
The Inspired Story.
Production and Design:
Editorial/Type Specifications.
Equivalents.
How to Use the Transfer Program.
Proofreading Marks.
Working with Authors:
Fine Writing Instruments.
430
ANATOMY OF A COMPETENT ARTICLE
432
"Pains of Complaint" from Psychology Today is not a great article. It is a competent one, however, and it handles a few things very well. For me, it represents the minimum level of quality we should expect from every item in our magazines. It is not as long as our usual features, but otherwise it makes
(Floyd, 6 pp.)
COLLECTED CONTEXTS
New Products:
Audience:
A Vital Reader Interest.
434
CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
2: OUR COMPANY'S INTERNAL CONTEXTS
DEPARTMENTS:
New Products:
New Products in IC Magazine.
EDITORIAL:
Editing Articles:
Anatomy of a Competent Article.
Creating Excitement in Articles.
The Inspired Story.
Production and Design:
Editorial/Type Specifications.
Equivalents.
How to Use the Transfer Program.
Proofreading Marks.
Working with Authors:
Fine Writing Instruments.
436
EDITORIAL/TYPE SPECIFICATIONS
438
FEATURES: Components
Headline
Deck
Byline
Rubrics (if applicable and if called for by art director)
Textbreaks (1 line only)
Bio
Illustration/Photo/Graphics
(Internal, 2 pp.)
COLLECTED CONTEXTS
New Products:
Audience:
A Vital Reader Interest.

FIG. 35

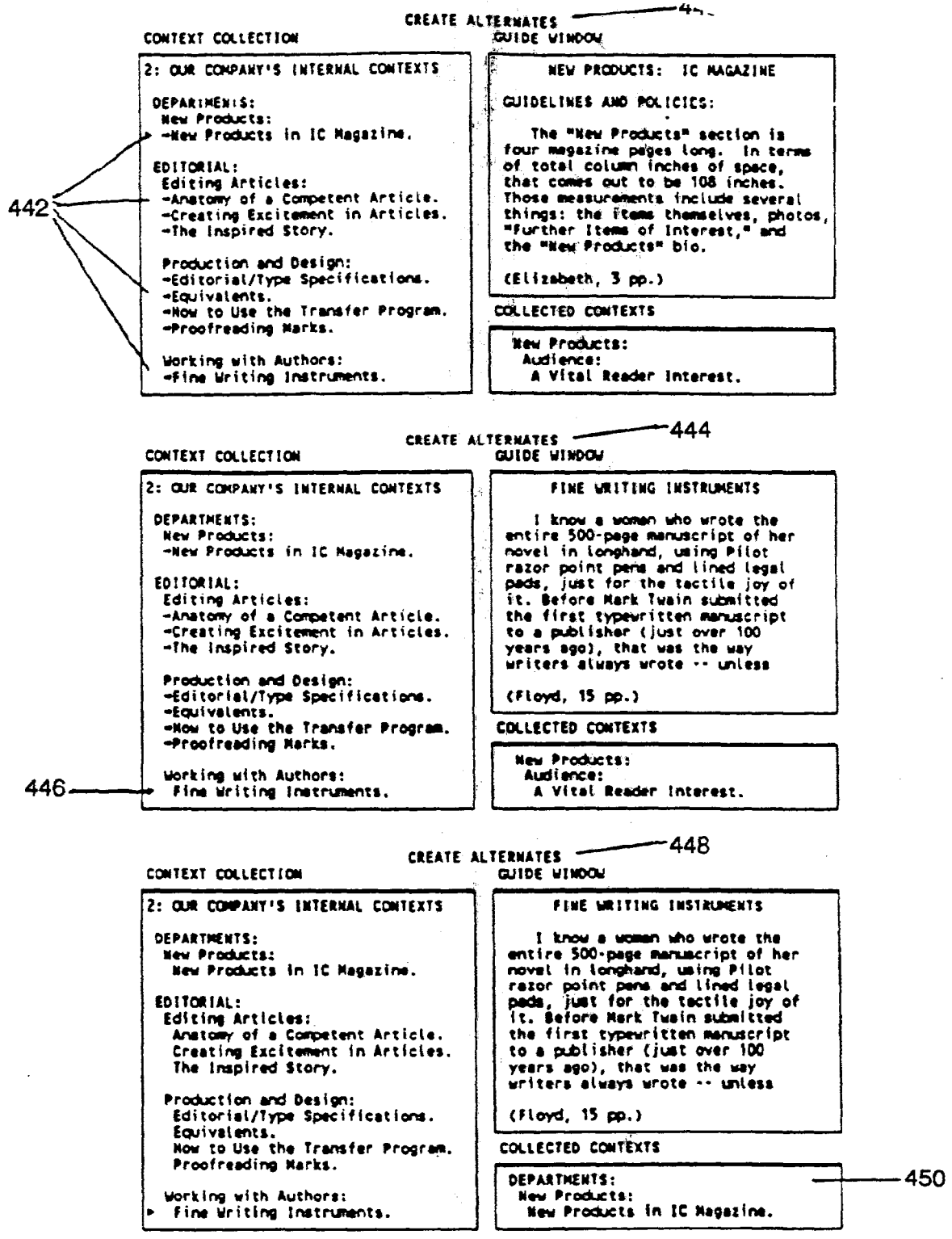

CREATE ALTERNATES
CONTEXT COLLECTION
GUIDE WINDOW
2: OUR COMPANY'S INTERNAL CONTEXTS
DEPARTMENTS:
New Products:
-New Products in IC Magazine.
EDITORIAL:
Editing Articles:
-Anatomy of a Competent Article.
-Creating Excitement in Articles.
-The Inspired Story.
Production and Design:
-Editorial/Type Specifications.
-Equivalents.
-How to Use the Transfer Program.
-Proofreading Marks.
Working with Authors:
-Fine Writing Instruments.
442
NEW PRODUCTS: IC MAGAZINE
GUIDELINES AND POLICIES:
The "New Products" section is four magazine pages long. In terms of total column inches of space, that comes out to be 108 inches. Those measurements include several things: the items themselves, photos, "Further Items of Interest," and the "New Products" bio.
(Elizabeth, 3 pp.)
COLLECTED CONTEXTS
New Products:
Audience:
A Vital Reader Interest.
CREATE ALTERNATES
444
CONTEXT COLLECTION
GUIDE WINDOW
2: OUR COMPANY'S INTERNAL CONTEXTS
DEPARTMENTS:
New Products:
-New Products in IC Magazine.
EDITORIAL:
Editing Articles:
-Anatomy of a Competent Article.
-Creating Excitement in Articles.
-The Inspired Story.
Production and Design:
-Editorial/Type Specifications.
-Equivalents.
-How to Use the Transfer Program.
-Proofreading Marks.
Working with Authors:
Fine Writing Instruments.
446
FINE WRITING INSTRUMENTS
I know a woman who wrote the entire 500-page manuscript of her novel in longhand, using Pilot razor point pens and lined legal pads, just for the tactile joy of it. Before Mark Twain submitted the first typewritten manuscript to a publisher (just over 100 years ago), that was the way writers always wrote -- unless
(Floyd, 15 pp.)
COLLECTED CONTEXTS
New Products:
Audience:
A Vital Reader Interest.
CREATE ALTERNATES
448
CONTEXT COLLECTION
GUIDE WINDOW
2: OUR COMPANY'S INTERNAL CONTEXTS
DEPARTMENTS:
New Products:
New Products in IC Magazine.
EDITORIAL:
Editing Articles:
Anatomy of a Competent Article.
Creating Excitement in Articles.
The Inspired Story.
Production and Design:
Editorial/Type Specifications.
Equivalents.
How to Use the Transfer Program.
Proofreading Marks.
Working with Authors:
Fine Writing Instruments.
FINE WRITING INSTRUMENTS
I know a woman who wrote the entire 500-page manuscript of her novel in longhand, using Pilot razor point pens and lined legal pads, just for the tactile joy of it. Before Mark Twain submitted the first typewritten manuscript to a publisher (just over 100 years ago), that was the way writers always wrote -- unless
(Floyd, 15 pp.)
COLLECTED CONTEXTS
DEPARTMENTS:
New Products:
New Products in IC Magazine.
450

FIG. 36

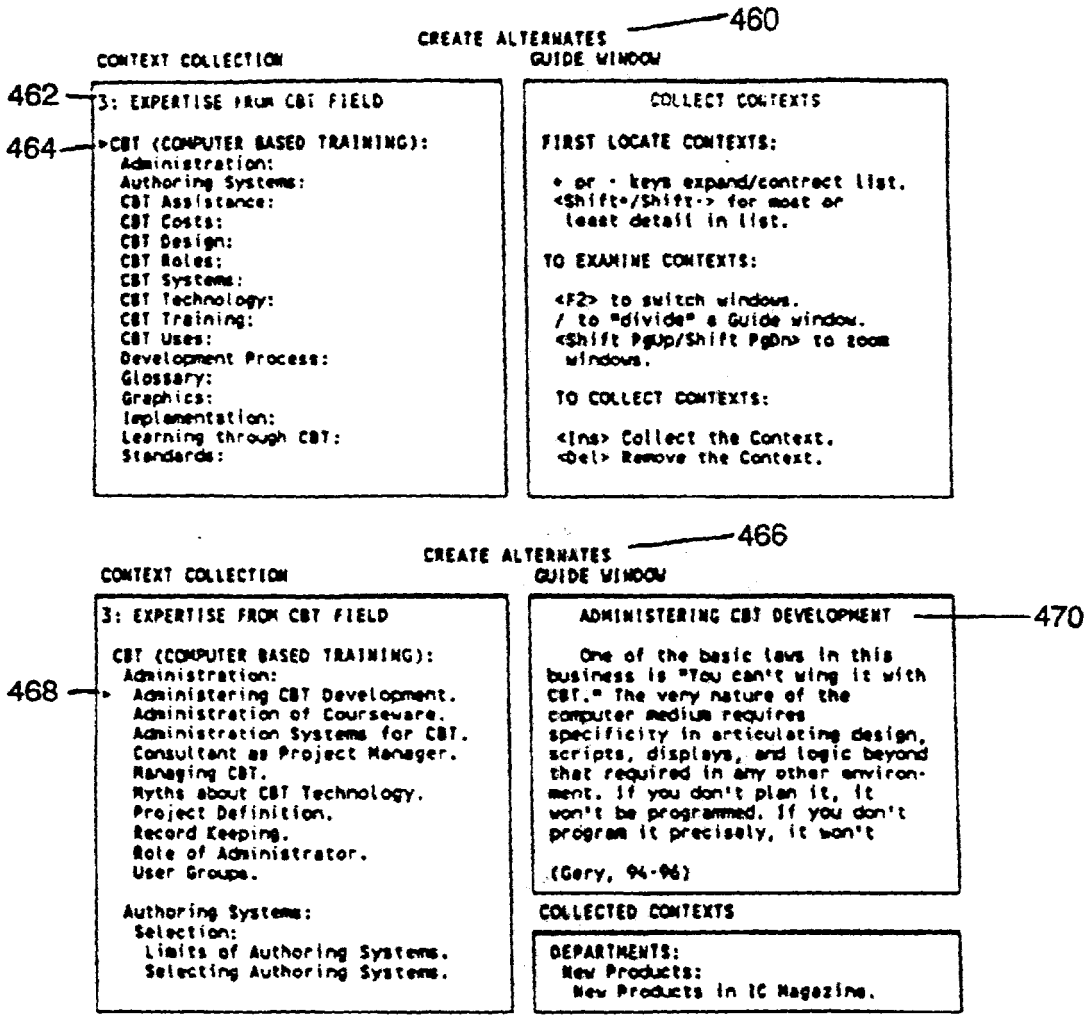

CREATE ALTERNATES
460
CONTEXT COLLECTION
GUIDE WINDOW
462
3: EXPERTISE FROM CBT FIELD
464
CBT (COMPUTER BASED TRAINING):
Administration:
Authoring Systems:
CBT Assistance:
CBT Costs:
CBT Design:
CBT Roles:
CBT Systems:
CBT Technology:
CBT Training:
CBT Uses:
Development Process:
Glossary:
Graphics:
Implementation:
Learning through CBT:
Standards:
COLLECT CONTEXTS
FIRST LOCATE CONTEXTS:
+ or - keys expand/contract list.
<Shift+/Shift-> for most or least detail in list.
TO EXAMINE CONTEXTS:
<F2> to switch windows.
/ to "divide" a Guide window.
<Shift PgUp/Shift PgDn> to zoom windows.
TO COLLECT CONTEXTS:
<Ins> Collect the Context.
<Del> Remove the Context.
CREATE ALTERNATES
466
CONTEXT COLLECTION
GUIDE WINDOW
3: EXPERTISE FROM CBT FIELD
CBT (COMPUTER BASED TRAINING):
Administration:
468
Administering CBT Development.
Administration of Courseware.
Administration Systems for CBT.
Consultant as Project Manager.
Managing CBT.
Myths about CBT Technology.
Project Definition.
Record Keeping.
Role of Administrator.
User Groups.
Authoring Systems:
Selection:
Limits of Authoring Systems.
Selecting Authoring Systems.
ADMINISTERING CBT DEVELOPMENT
470
One of the basic laws in this business is "You can't wing it with CBT." The very nature of the computer medium requires specificity in articulating design, scripts, displays, and logic beyond that required in any other environment. If you don't plan it, it won't be programmed. If you don't program it precisely, it won't
(Gery, 94-96)
COLLECTED CONTEXTS
DEPARTMENTS:
New Products:
New Products in IC Magazine.

FIG. 37

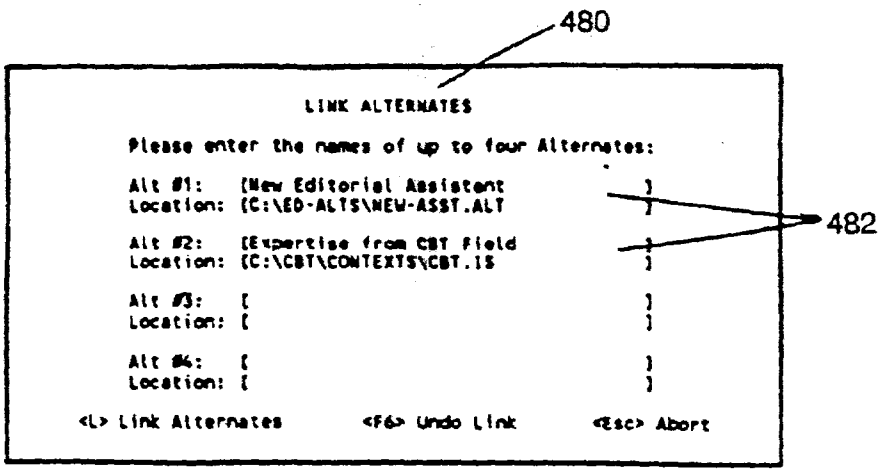

480
LINK ALTERNATES
Please enter the names of up to four Alternates:
Alt #1: [New Editorial Assistent]
Location: [C:\ED-ALTS\NEW-ASST.ALT]
Alt #2: [Expertise from CBT Field]
Location: [C:\CBT\CONTEXTS\CBT.IS]
Alt #3: [ ]
Location: [ ]
Alt #4: [ ]
Location: [ ]
<L> Link Alternates
<F6> Undo Link
<Esc> Abort
482

FIG. 38

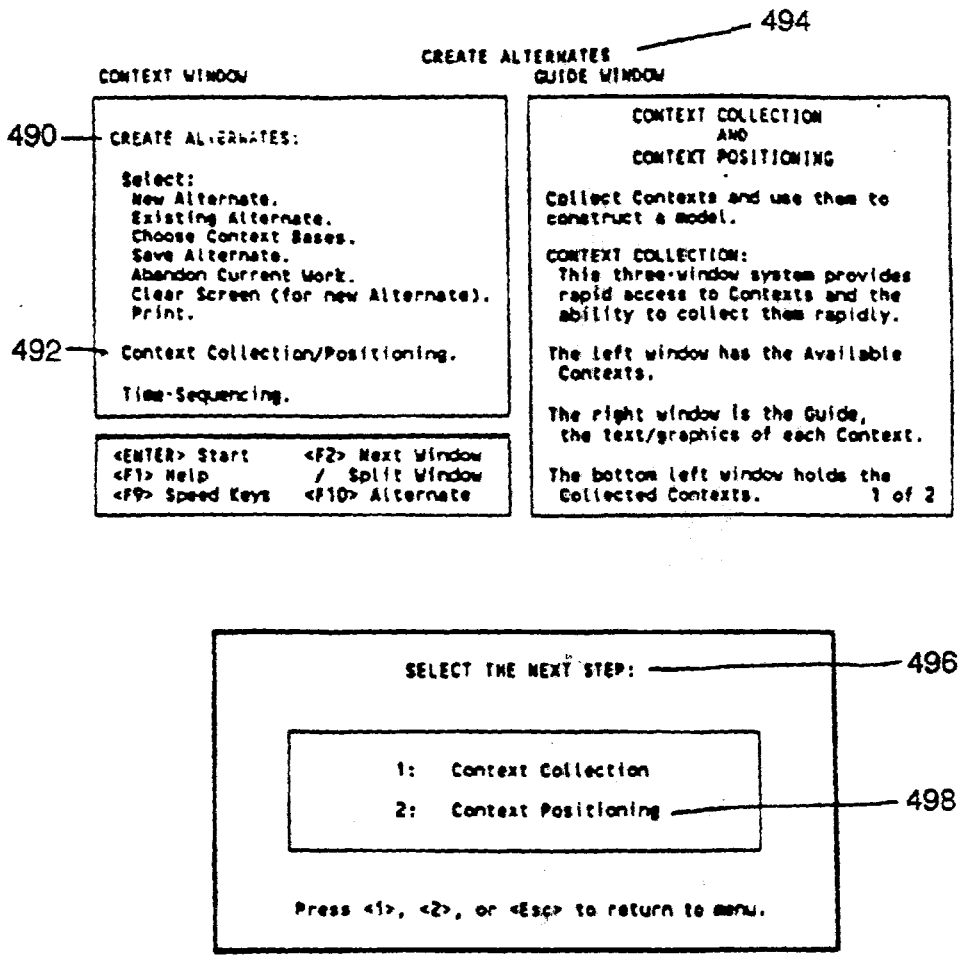

494
CREATE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
490
CREATE ALTERNATES:
Select:
New Alternate.
Existing Alternate.
Choose Context Bases.
Save Alternate.
Abandon Current Work.
Clear Screen (for new Alternate).
Print.
492
Context Collection/Positioning.
Time-Sequencing.
<ENTER> Start
<F2> Next Window
<F1> Help
/ Split Window
<F9> Speed Keys
<F10> Alternate
CONTEXT COLLECTION
AND
CONTEXT POSITIONING
Collect Contexts and use them to construct a model.
CONTEXT COLLECTION:
This three-window system provides rapid access to Contexts and the ability to collect them rapidly.
The left window has the Available Contexts.
The right window is the Guide, the text/graphics of each Context.
The bottom left window holds the Collected Contexts.
1 of 2
SELECT THE NEXT STEP:
496
1: Context Collection
2: Context Positioning
498
Press <1>, <2>, or <Esc> to return to menu.

FIG. 39

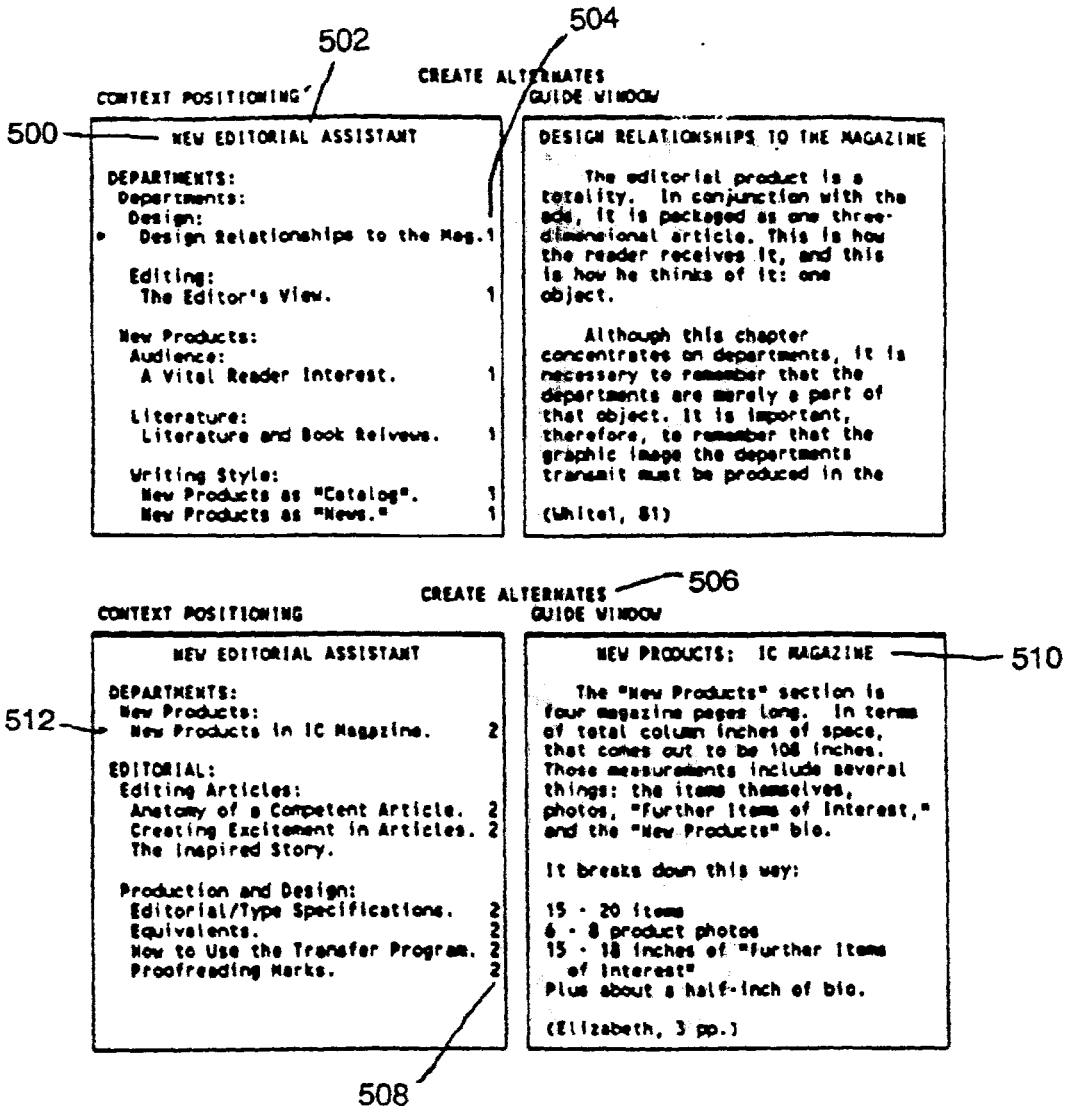

502
504
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
500
NEW EDITORIAL ASSISTANT
DEPARTMENTS:
Departments:
Design:
Design Relationships to the Mag. 1
Editing:
The Editor's View. 1
New Products:
Audience:
A Vital Reader Interest. 1
Literature:
Literature and Book Reivews. 1
Writing Style:
New Products as "Catalog". 1
New Products as "News." 1
DESIGN RELATIONSHIPS TO THE MAGAZINE
The editorial product is a totality. In conjunction with the ads, it is packaged as one three-dimensional article. This is how the reader receives it, and this is how he thinks of it: one object.
Although this chapter concentrates on departments, it is necessary to remember that the departments are merely a part of that object. It is important, therefore, to remember that the graphic image the departments transmit must be produced in the
(Whitel, 81)
CREATE ALTERNATES
506
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
DEPARTMENTS:
New Products:
512
New Products in IC Magazine. 2
EDITORIAL:
Editing Articles:
Anatomy of a Competent Article. 2
Creating Excitement in Articles. 2
The Inspired Story.
Production and Design:
Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Program. 2
Proofreading Marks. 2
508
NEW PRODUCTS: IC MAGAZINE
510
The "New Products" section is four magazine pages long. In terms of total column inches of space, that comes out to be 108 inches. Those measurements include several things: the items themselves, photos, "Further Items of Interest," and the "New Products" bio.
It breaks down this way:
15 - 20 items
6 - 8 product photos
15 - 18 inches of "Further Items of Interest"
Plus about a half-inch of bio.
(Elizabeth, 3 pp.)

FIG. 40

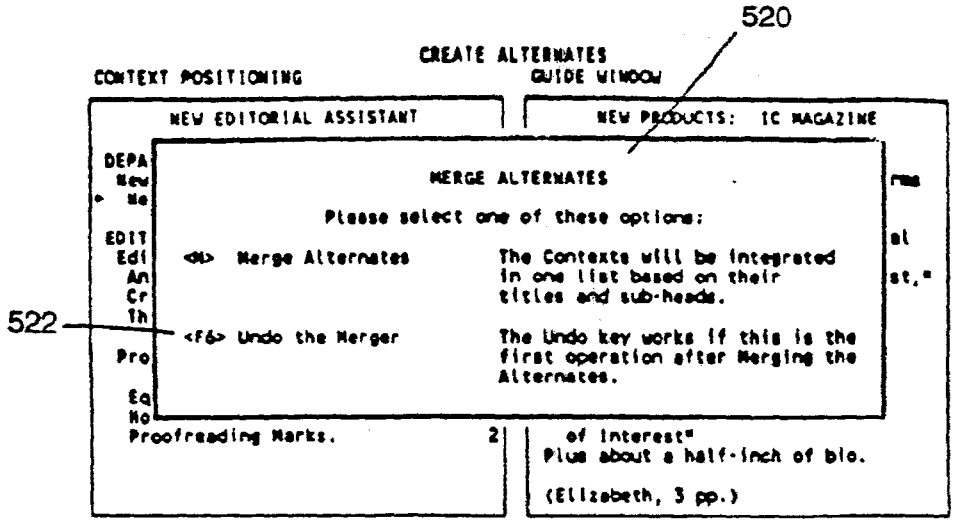

520
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
NEW PRODUCTS: IC MAGAZINE
MERGE ALTERNATES
Please select one of these options:
<M> Merge Alternates
The Contexts will be integrated in one list based on their titles and sub-heads.
522
<F6> Undo the Merger
The Undo key works if this is the first operation after Merging the Alternates.
Proofreading Marks.
of interest"
Plus about a half-inch of bio.
(Elizabeth, 3 pp.)

FIG. 41

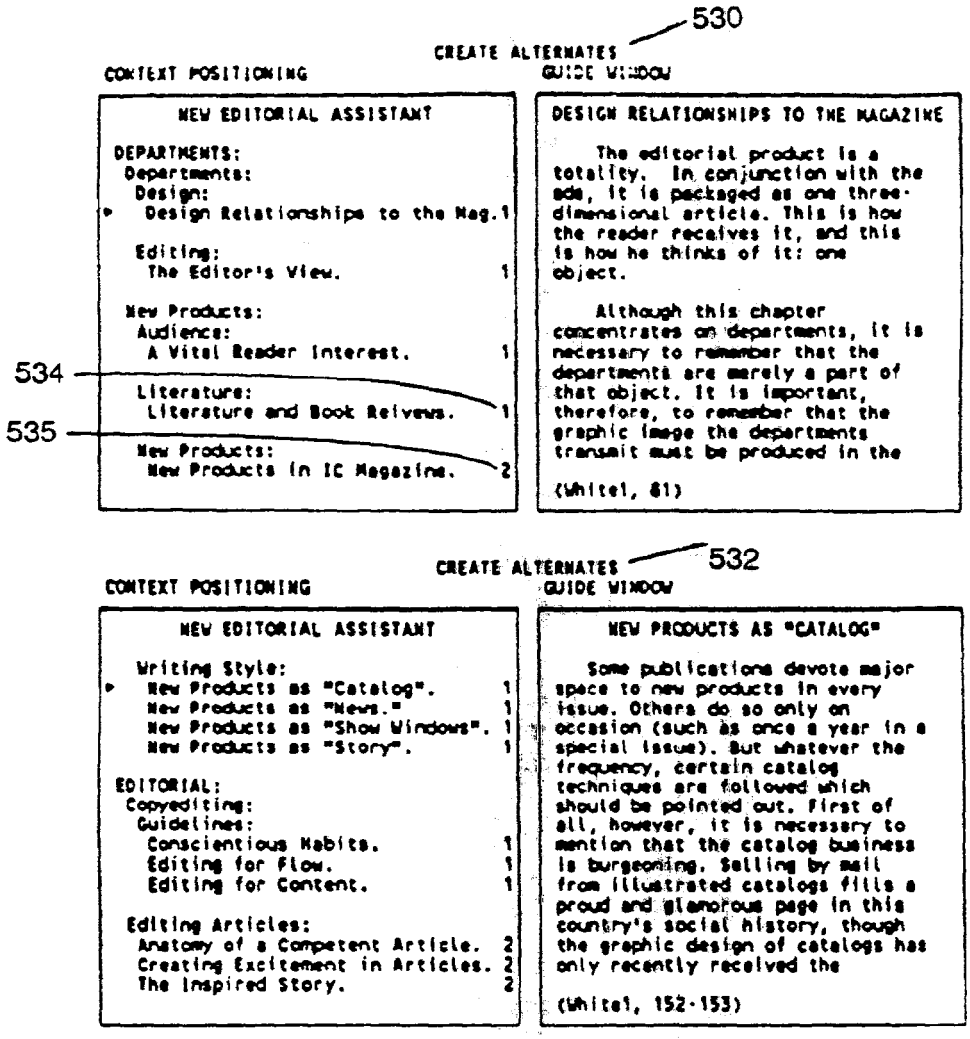

530
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
DEPARTMENTS:
Departments:
Design:
Design Relationships to the Mag. 1
Editing:
The Editor's View. 1
New Products:
Audience:
A Vital Reader Interest. 1
Literature:
Literature and Book Reivews. 1
New Products:
New Products in IC Magazine. 2
534
535
DESIGN RELATIONSHIPS TO THE MAGAZINE
The editorial product is a totality. In conjunction with the ads, it is packaged as one three-dimensional article. This is how the reader receives it, and this is how he thinks of it: one object.
Although this chapter concentrates on departments, it is necessary to remember that the departments are merely a part of that object. It is important, therefore, to remember that the graphic image the departments transmit must be produced in the
(White1, 81)
CREATE ALTERNATES
532
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
Writing Style:
New Products as "Catalog". 1
New Products as "News." 1
New Products as "Show Windows". 1
New Products as "Story". 1
EDITORIAL:
Copyediting:
Guidelines:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1
Editing Articles:
Anatomy of a Competent Article. 2
Creating Excitement in Articles. 2
The Inspired Story. 2
NEW PRODUCTS AS "CATALOG"
Some publications devote major space to new products in every issue. Others do so only on occasion (such as once a year in a special issue). But whatever the frequency, certain catalog techniques are followed which should be pointed out. First of all, however, it is necessary to mention that the catalog business is burgeoning. Selling by mail from illustrated catalogs fills a proud and glamorous page in this country's social history, though the graphic design of catalogs has only recently received the
(White1, 152-153)

FIG. 42

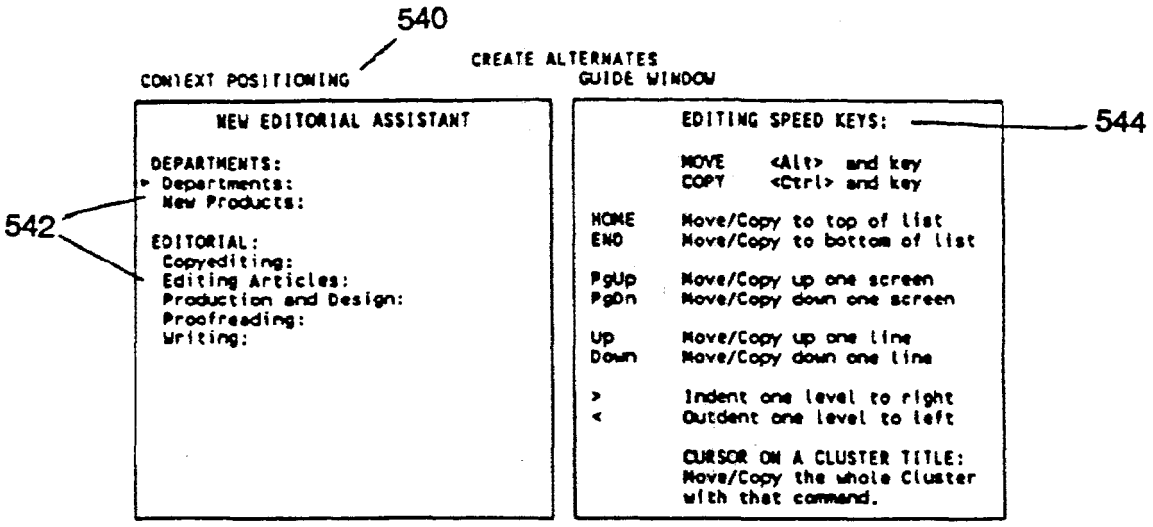

540
CONTEXT POSITIONING
CREATE ALTERNATES GUIDE WINDOW
NEW EDITORIAL ASSISTANT
DEPARTMENTS:
Departments:
New Products:
EDITORIAL:
Copyediting:
Editing Articles:
Production and Design:
Proofreading:
Writing:
542
EDITING SPEED KEYS:
544
MOVE <Alt> and key
COPY <Ctrl> and key
HOME Move/Copy to top of list
END Move/Copy to bottom of list
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
Up Move/Copy up one line
Down Move/Copy down one line
> Indent one level to right
< Outdent one level to left
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster
with that command.

FIG. 43

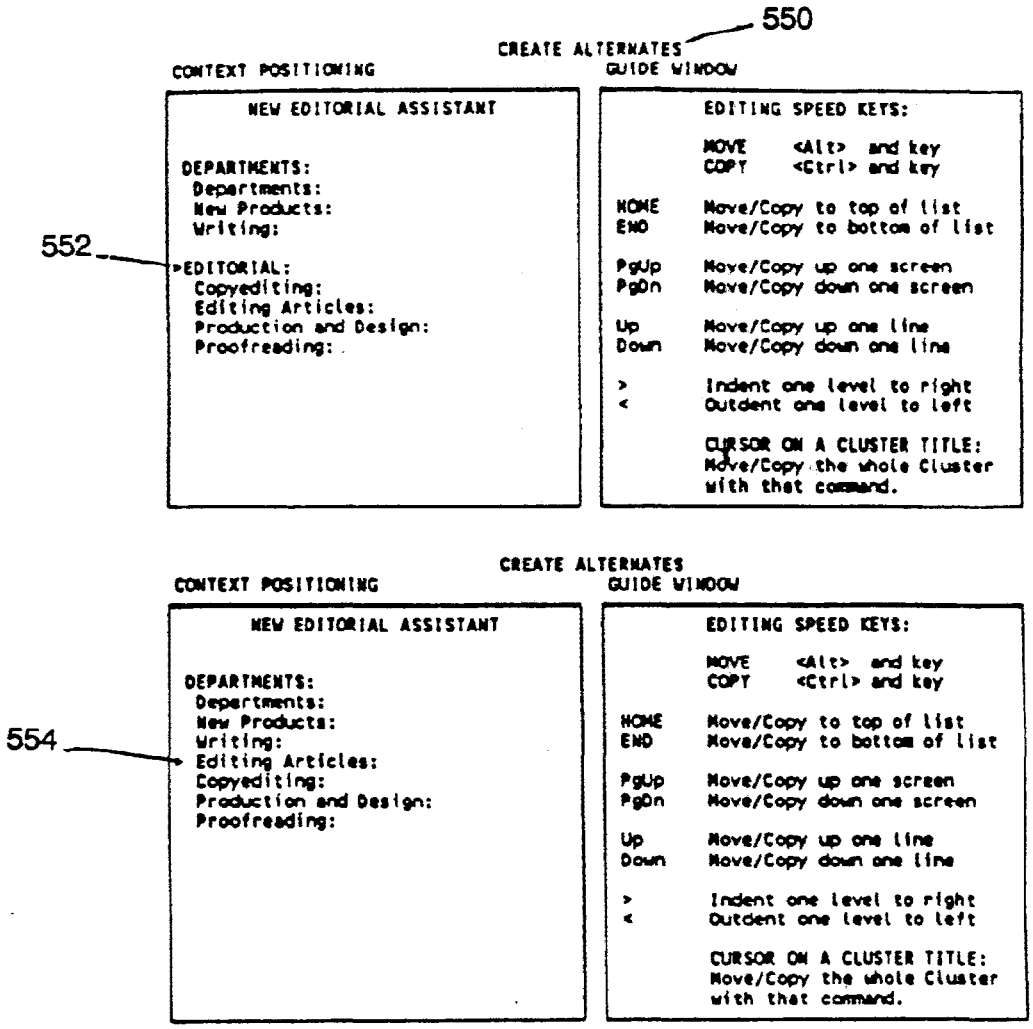

550
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
DEPARTMENTS:
Departments:
New Products:
Writing:
552
>EDITORIAL:
Copyediting:
Editing Articles:
Production and Design:
Proofreading:
EDITING SPEED KEYS:
MOVE <Alt> and key
COPY <Ctrl> and key
HOME Move/Copy to top of list
END Move/Copy to bottom of list
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
Up Move/Copy up one line
Down Move/Copy down one line
> Indent one level to right
< Outdent one level to left
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster
with that command.
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
DEPARTMENTS:
Departments:
New Products:
Writing:
554
Editing Articles:
Copyediting:
Production and Design:
Proofreading:
EDITING SPEED KEYS:
MOVE <Alt> and key
COPY <Ctrl> and key
HOME Move/Copy to top of list
END Move/Copy to bottom of list
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
Up Move/Copy up one line
Down Move/Copy down one line
> Indent one level to right
< Outdent one level to left
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster
with that command.

FIG. 44

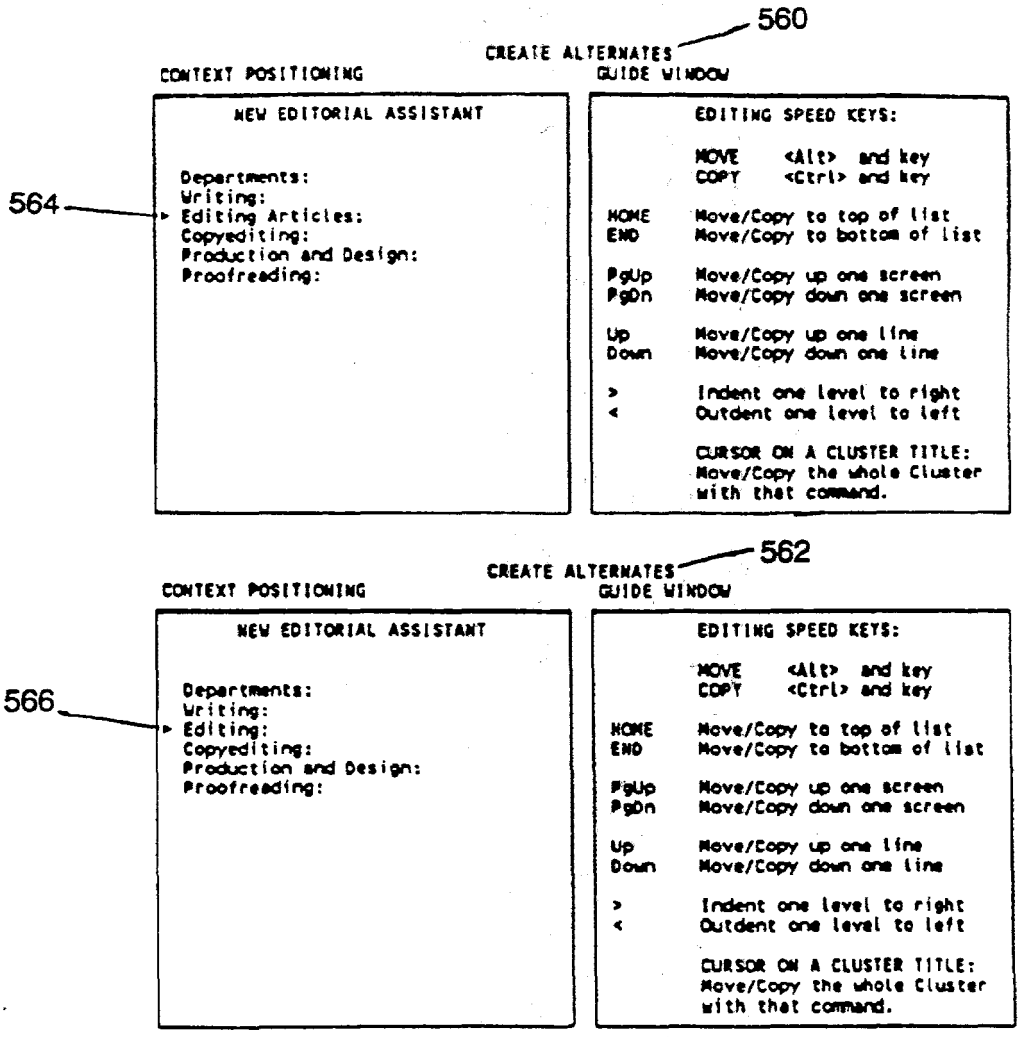

560
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
Departments:
Writing:
Editing Articles:
Copyediting:
Production and Design:
Proofreading:
564
EDITING SPEED KEYS:
MOVE <Alt> and key
COPY <Ctrl> and key
HOME Move/Copy to top of list
END Move/Copy to bottom of list
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
Up Move/Copy up one line
Down Move/Copy down one line
> Indent one level to right
< Outdent one level to left
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster
with that command.
562
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
Departments:
Writing:
Editing:
Copyediting:
Production and Design:
Proofreading:
566
EDITING SPEED KEYS:
MOVE <Alt> and key
COPY <Ctrl> and key
HOME Move/Copy to top of list
END Move/Copy to bottom of list
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
Up Move/Copy up one line
Down Move/Copy down one line
> Indent one level to right
< Outdent one level to left
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster
with that command.

FIG. 45

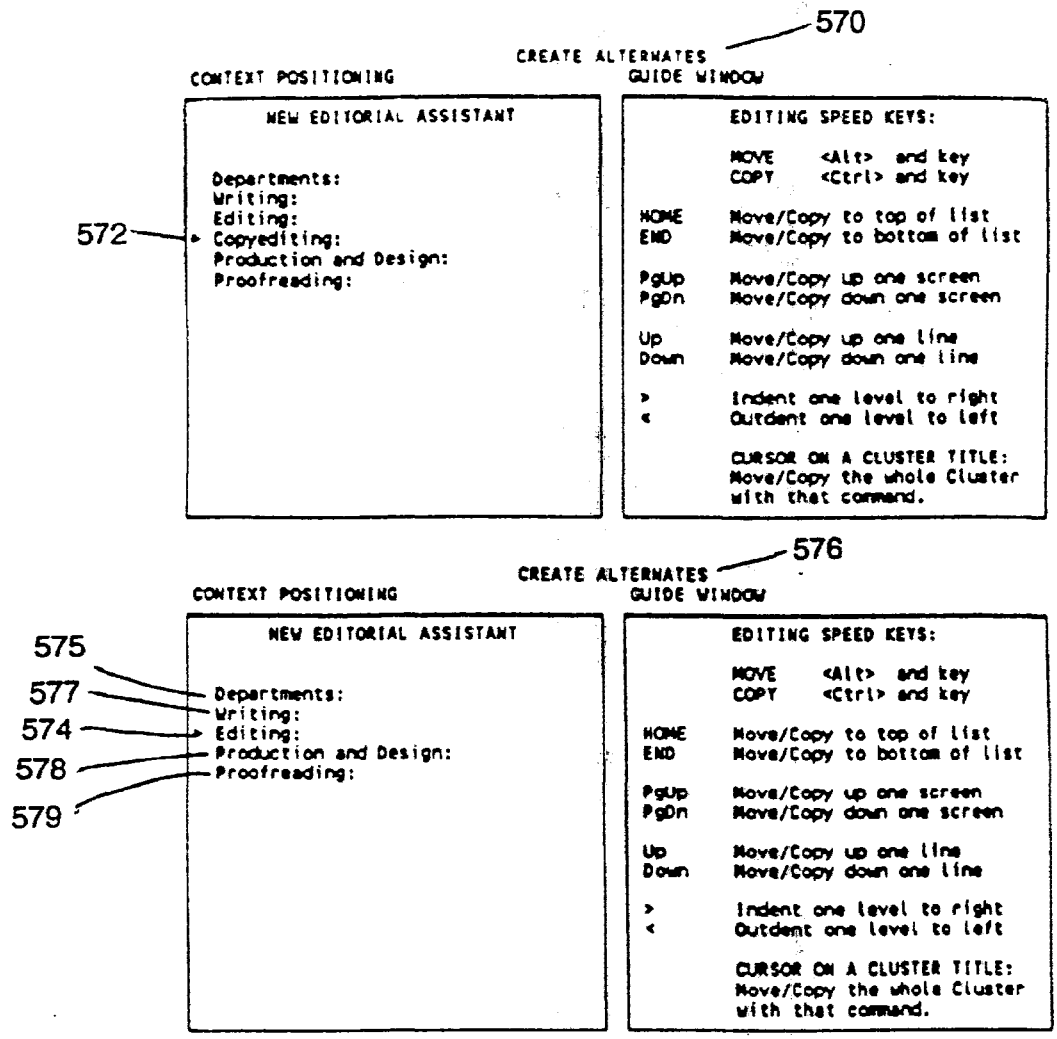

570
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
Departments:
Writing:
Editing:
Copyediting:
Production and Design:
Proofreading:
572
EDITING SPEED KEYS:
MOVE <Alt> and key
COPY <Ctrl> and key
HOME Move/Copy to top of list
END Move/Copy to bottom of list
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
Up Move/Copy up one line
Down Move/Copy down one line
> Indent one level to right
< Outdent one level to left
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster
with that command.
576
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
575
577
574
578
579
Departments:
Writing:
Editing:
Production and Design:
Proofreading:
EDITING SPEED KEYS:
MOVE <Alt> and key
COPY <Ctrl> and key
HOME Move/Copy to top of list
END Move/Copy to bottom of list
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
Up Move/Copy up one line
Down Move/Copy down one line
> Indent one level to right
< Outdent one level to left
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster
with that command.

FIG. 46

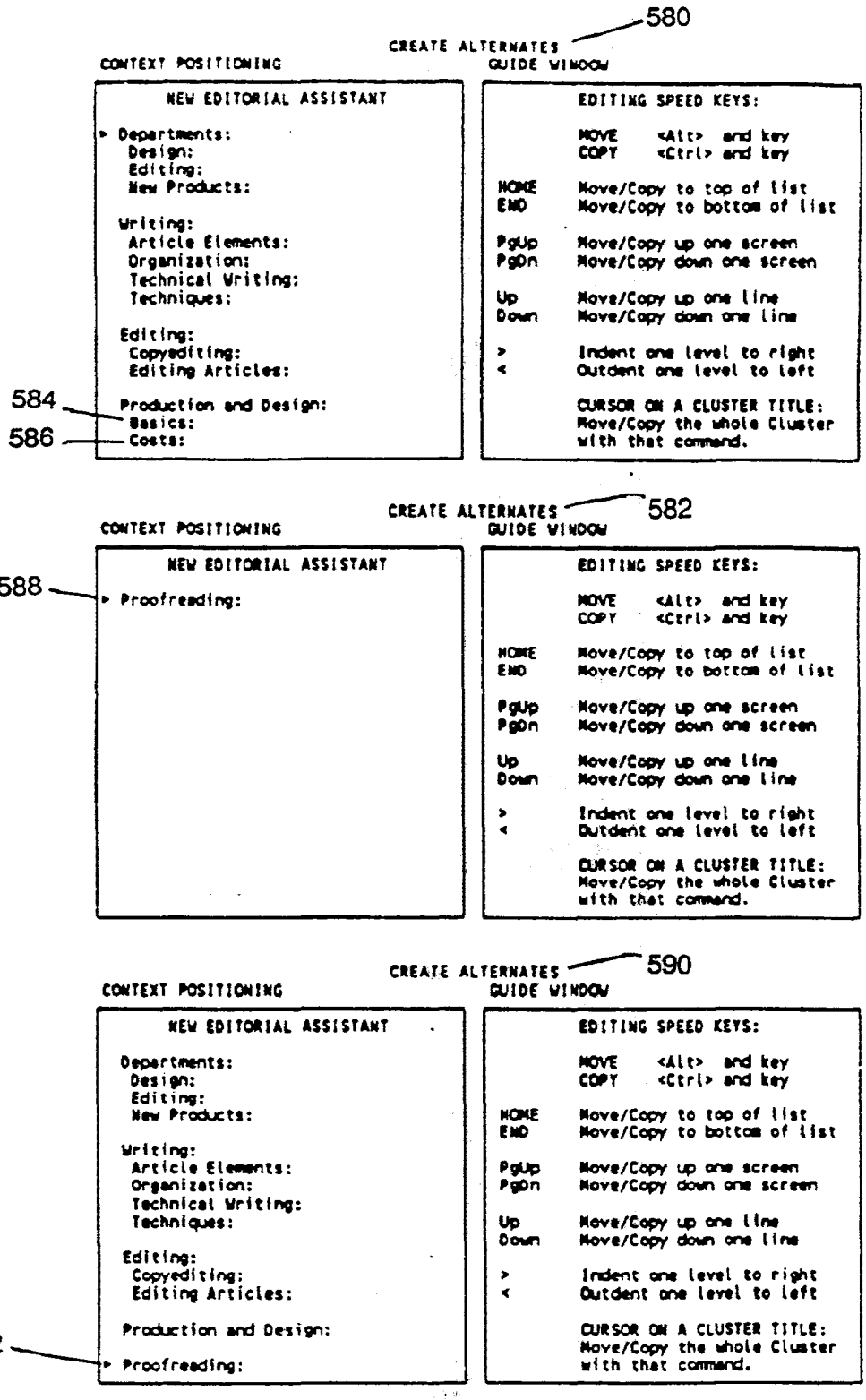

580
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
▸ Departments:
Design:
Editing:
New Products:
Writing:
Article Elements:
Organization:
Technical Writing:
Techniques:
Editing:
Copyediting:
Editing Articles:
Production and Design:
Basics:
Costs:
584
586
EDITING SPEED KEYS:
MOVE <Alt> and key
COPY <Ctrl> and key
HOME Move/Copy to top of list
END Move/Copy to bottom of list
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
Up Move/Copy up one line
Down Move/Copy down one line
> Indent one level to right
< Outdent one level to left
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster
with that command.
582
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
588
NEW EDITORIAL ASSISTANT
▸ Proofreading:
590
CREATE ALTERNATES
CONTEXT POSITIONING
GUIDE WINDOW
NEW EDITORIAL ASSISTANT
Departments:
Design:
Editing:
New Products:
Writing:
Article Elements:
Organization:
Technical Writing:
Techniques:
Editing:
Copyediting:
Editing Articles:
Production and Design:
592
▸ Proofreading:

FIG. 47

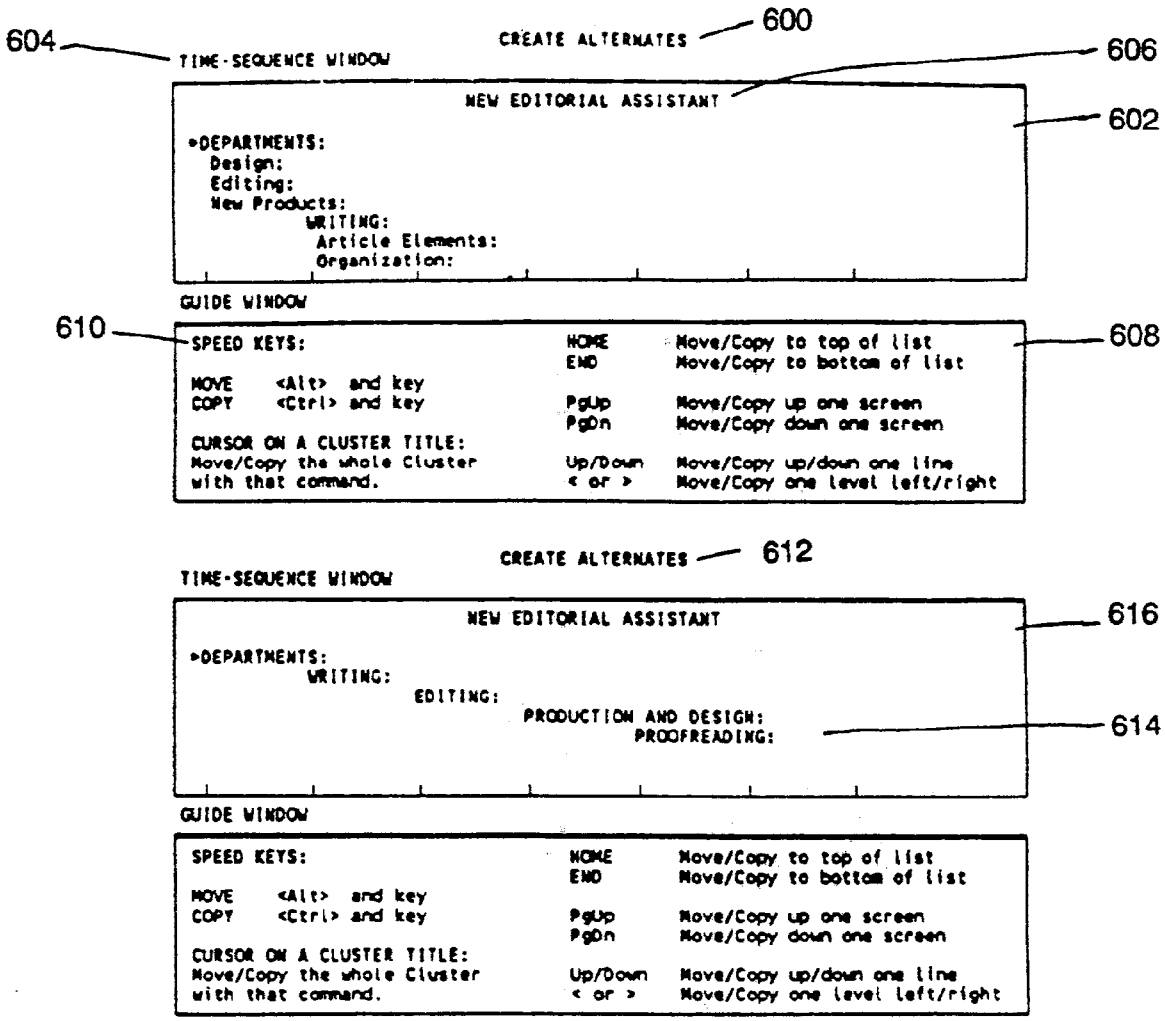

604
TIME-SEQUENCE WINDOW
CREATE ALTERNATES
600
606
NEW EDITORIAL ASSISTANT
602
•DEPARTMENTS:
Design:
Editing:
New Products:
WRITING:
Article Elements:
Organization:
GUIDE WINDOW
610
SPEED KEYS:
HOME Move/Copy to top of list
END Move/Copy to bottom of list
608
MOVE <Alt> and key
COPY <Ctrl> and key
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster with that command.
Up/Down Move/Copy up/down one line
< or > Move/Copy one level left/right
CREATE ALTERNATES
612
TIME-SEQUENCE WINDOW
NEW EDITORIAL ASSISTANT
616
•DEPARTMENTS:
WRITING:
EDITING:
PRODUCTION AND DESIGN:
PROOFREADING:
614
GUIDE WINDOW
SPEED KEYS:
HOME Move/Copy to top of list
END Move/Copy to bottom of list
MOVE <Alt> and key
COPY <Ctrl> and key
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster with that command.
Up/Down Move/Copy up/down one line
< or > Move/Copy one level left/right

FIG. 48

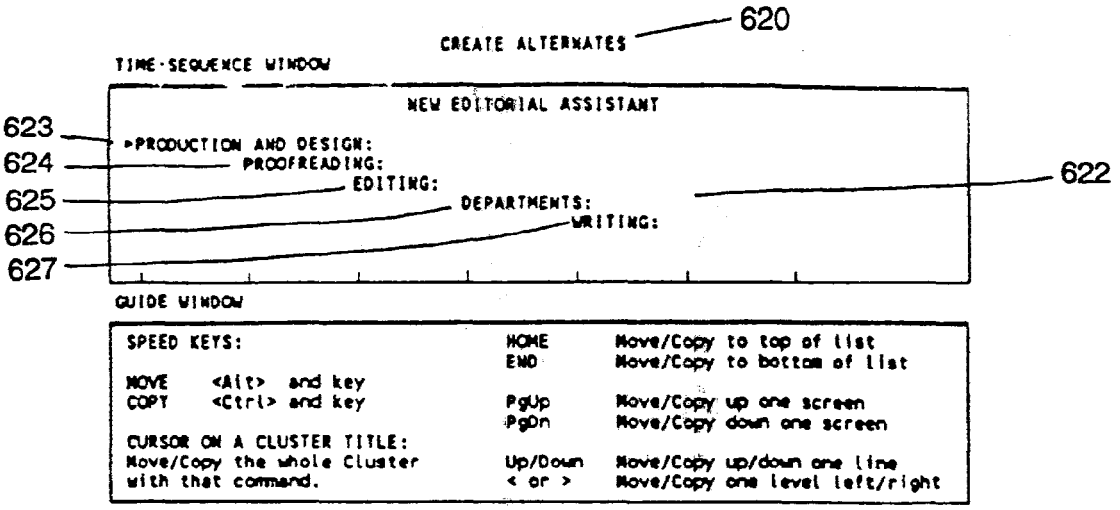

620
CREATE ALTERNATES
TIME-SEQUENCE WINDOW
NEW EDITORIAL ASSISTANT
623
624
625
626
627
622
▸PRODUCTION AND DESIGN:
PROOFREADING:
EDITING:
DEPARTMENTS:
WRITING:
GUIDE WINDOW
SPEED KEYS:
MOVE <Alt> and key
COPY <Ctrl> and key
CURSOR ON A CLUSTER TITLE:
Move/Copy the whole Cluster with that command.
HOME Move/Copy to top of list
END Move/Copy to bottom of list
PgUp Move/Copy up one screen
PgDn Move/Copy down one screen
Up/Down Move/Copy up/down one line
< or > Move/Copy one level left/right

FIG. 49

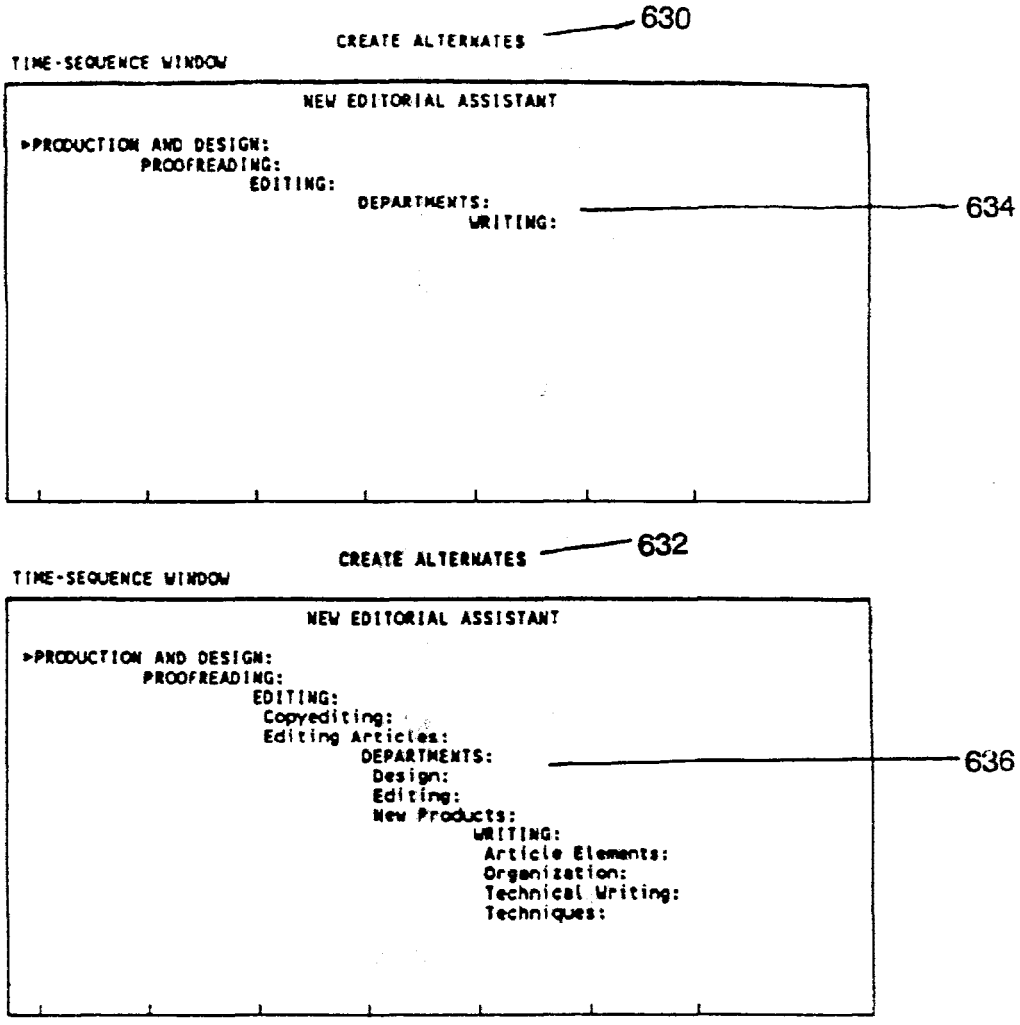

CREATE ALTERNATES
630
TIME-SEQUENCE WINDOW
NEW EDITORIAL ASSISTANT
▸PRODUCTION AND DESIGN:
PROOFREADING:
EDITING:
DEPARTMENTS:
WRITING:
634
CREATE ALTERNATES
632
TIME-SEQUENCE WINDOW
NEW EDITORIAL ASSISTANT
▸PRODUCTION AND DESIGN:
PROOFREADING:
EDITING:
Copyediting:
Editing Articles:
DEPARTMENTS:
Design:
Editing:
New Products:
WRITING:
Article Elements:
Organization:
Technical Writing:
Techniques:
636

FIG. 50

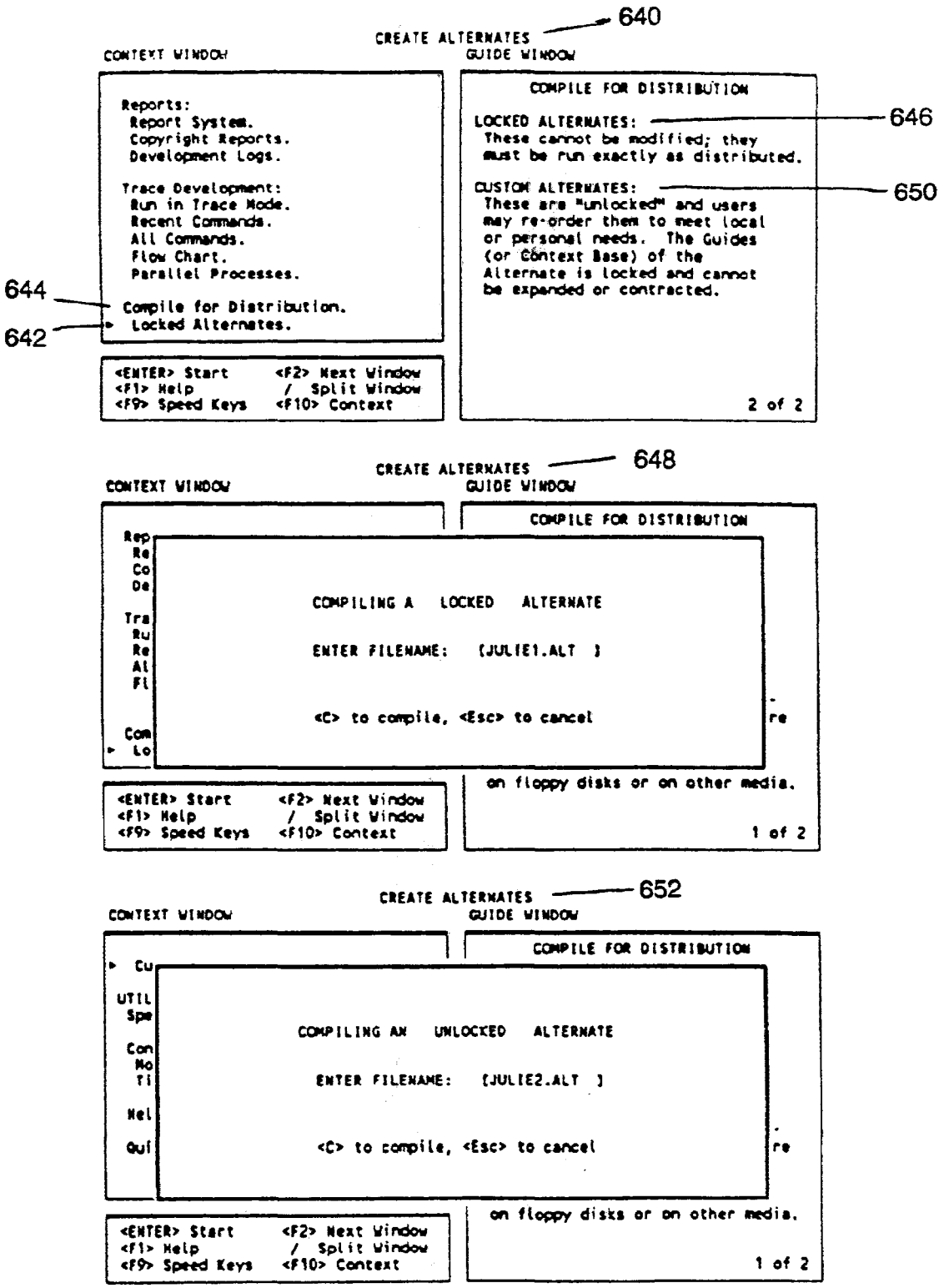

640
CREATE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
Reports:
Report System.
Copyright Reports.
Development Logs.
Trace Development:
Run in Trace Mode.
Recent Commands.
All Commands.
Flow Chart.
Parallel Processes.
644
Compile for Distribution.
642
Locked Alternates.
<ENTER> Start
<F2> Next Window
<F1> Help
/ Split Window
<F9> Speed Keys
<F10> Context
COMPILE FOR DISTRIBUTION
LOCKED ALTERNATES:
646
These cannot be modified; they must be run exactly as distributed.
CUSTOM ALTERNATES:
650
These are "unlocked" and users may re-order them to meet local or personal needs. The Guides (or Context Base) of the Alternate is locked and cannot be expanded or contracted.
2 of 2
CREATE ALTERNATES
648
CONTEXT WINDOW
GUIDE WINDOW
COMPILE FOR DISTRIBUTION
COMPILING A LOCKED ALTERNATE
ENTER FILENAME: [JULIE1.ALT]
<C> to compile, <Esc> to cancel
on floppy disks or on other media.
1 of 2
CREATE ALTERNATES
652
CONTEXT WINDOW
GUIDE WINDOW
COMPILE FOR DISTRIBUTION
COMPILING AN UNLOCKED ALTERNATE
ENTER FILENAME: [JULIE2.ALT]
<C> to compile, <Esc> to cancel
on floppy disks or on other media.
1 of 2

FIG. 51

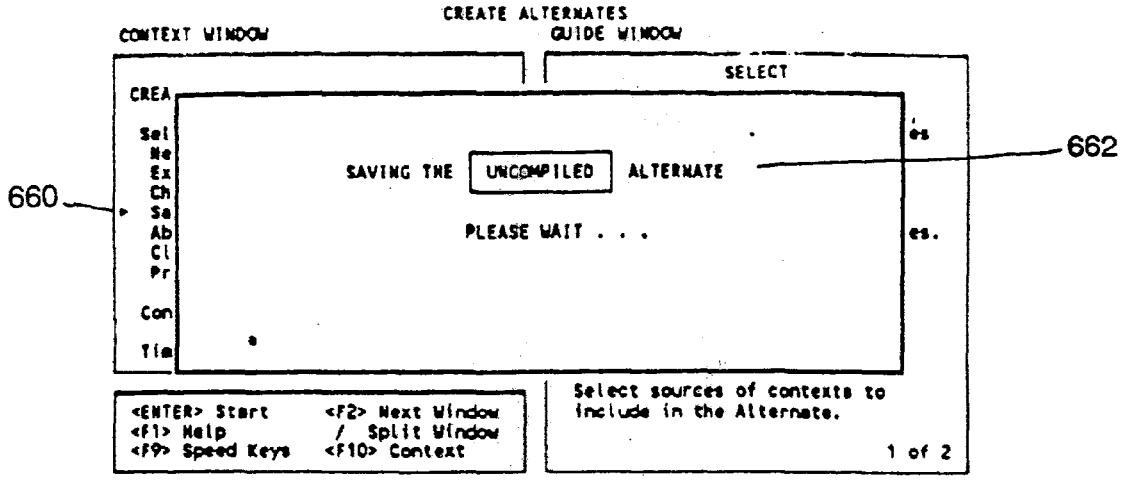

CREATE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
SELECT
CREA
Sel
Ne
Ex
Ch
Sa
Ab
Cl
Pr
Con
Tim
SAVING THE
UNCOMPILED
ALTERNATE
PLEASE WAIT . . .
660
662
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
/ Split Window
<F10> Context
Select sources of contexts to include in the Alternate.
1 of 2

FIG. 52

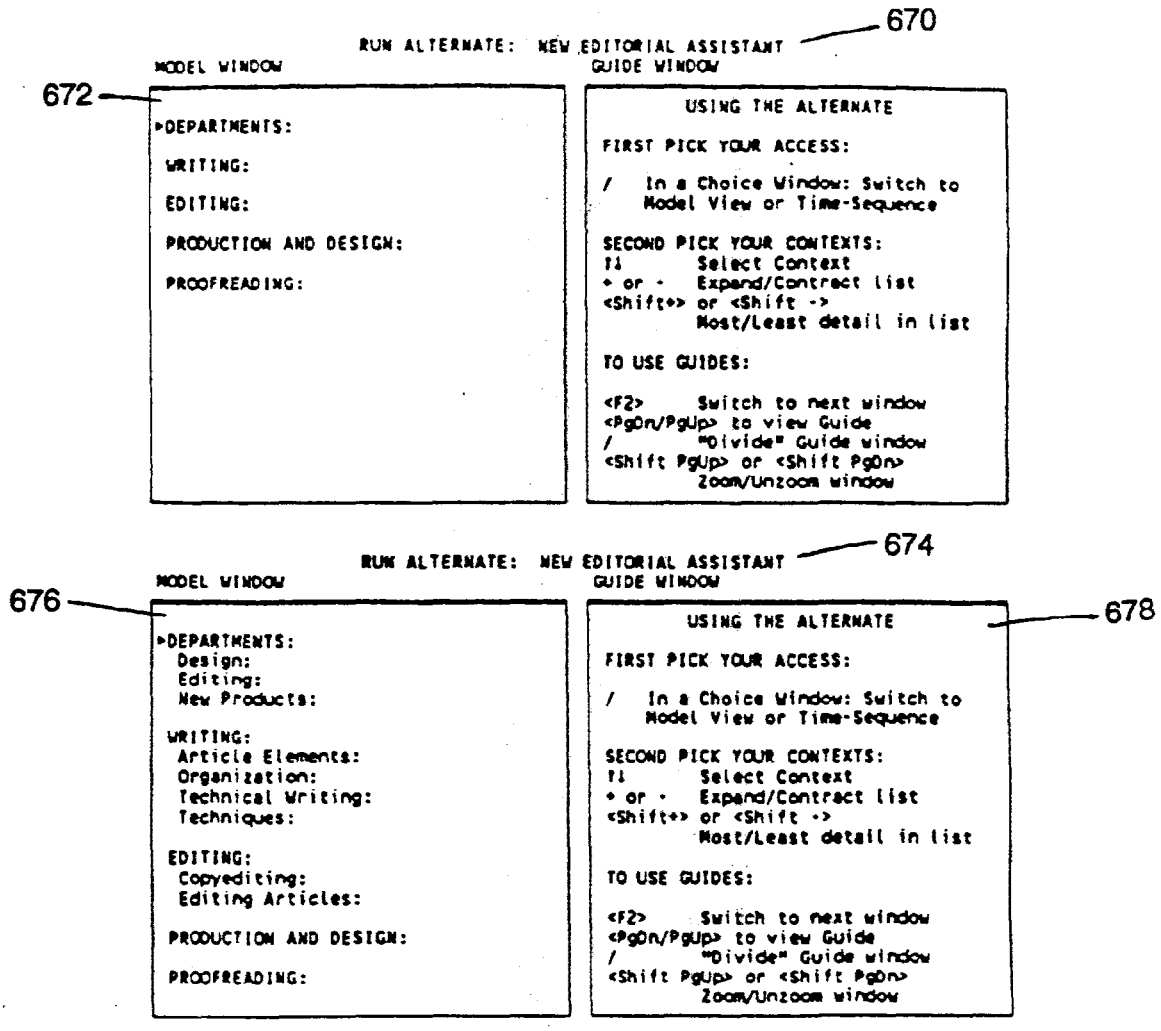

670
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
MODEL WINDOW
GUIDE WINDOW
672
▸DEPARTMENTS:
WRITING:
EDITING:
PRODUCTION AND DESIGN:
PROOFREADING:
USING THE ALTERNATE
FIRST PICK YOUR ACCESS:
/ In a Choice Window: Switch to Model View or Time-Sequence
SECOND PICK YOUR CONTEXTS:
↑↓ Select Context
+ or - Expand/Contract list
<Shift+> or <Shift ->
Most/Least detail in list
TO USE GUIDES:
<F2> Switch to next window
<PgDn/PgUp> to view Guide
/ "Divide" Guide window
<Shift PgUp> or <Shift PgDn>
Zoom/Unzoom window
674
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
MODEL WINDOW
GUIDE WINDOW
676
678
▸DEPARTMENTS:
Design:
Editing:
New Products:
WRITING:
Article Elements:
Organization:
Technical Writing:
Techniques:
EDITING:
Copyediting:
Editing Articles:
PRODUCTION AND DESIGN:
PROOFREADING:
USING THE ALTERNATE
FIRST PICK YOUR ACCESS:
/ In a Choice Window: Switch to Model View or Time-Sequence
SECOND PICK YOUR CONTEXTS:
↑↓ Select Context
+ or - Expand/Contract list
<Shift+> or <Shift ->
Most/Least detail in list
TO USE GUIDES:
<F2> Switch to next window
<PgDn/PgUp> to view Guide
/ "Divide" Guide window
<Shift PgUp> or <Shift PgDn>
Zoom/Unzoom window

FIG. 53

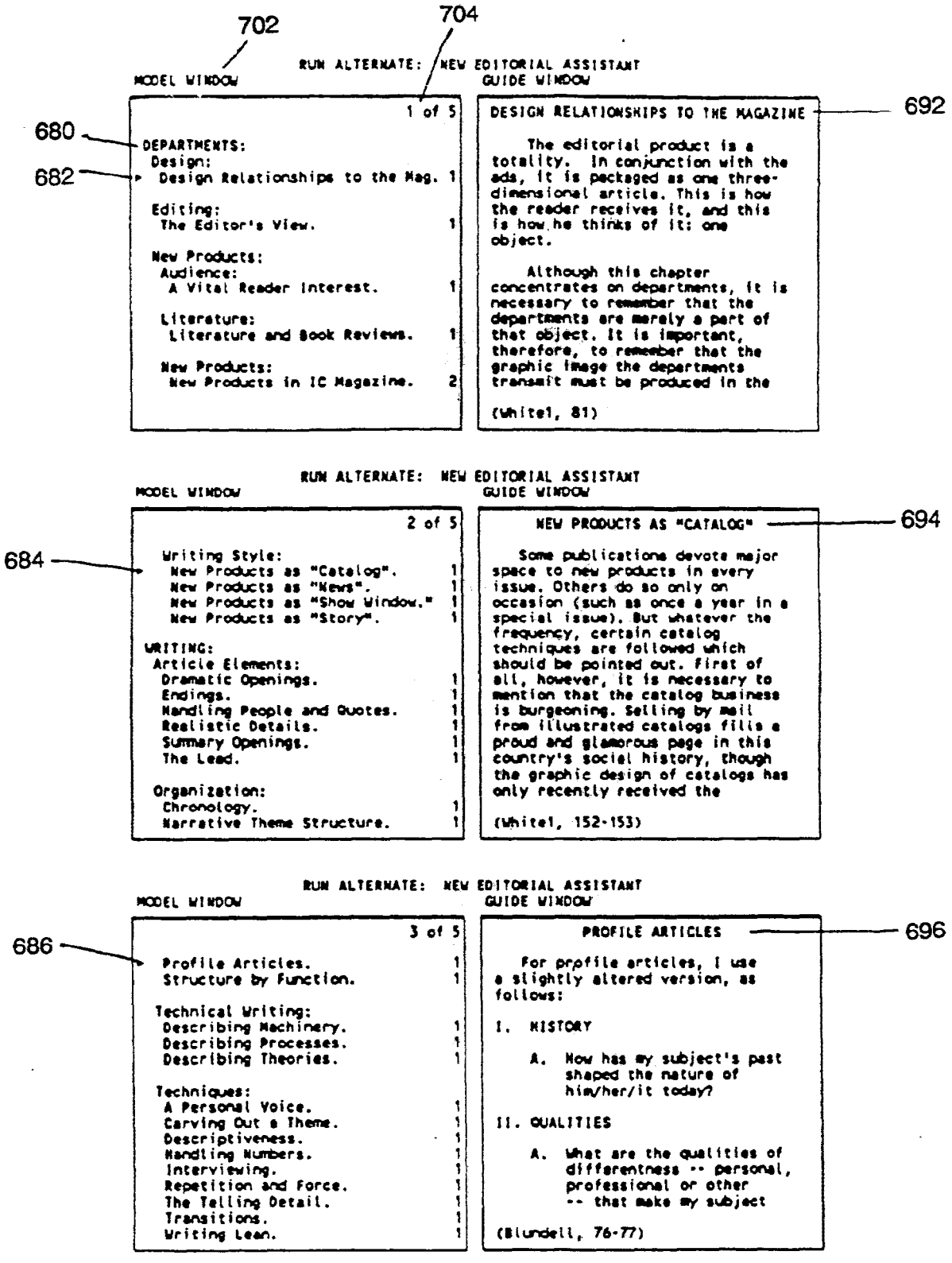

702
704
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
MODEL WINDOW
GUIDE WINDOW
1 of 5
DEPARTMENTS:
Design:
Design Relationships to the Mag. 1
Editing:
The Editor's View. 1
New Products:
Audience:
A Vital Reader Interest. 1
Literature:
Literature and Book Reviews. 1
New Products:
New Products in IC Magazine. 2
680
682
692
DESIGN RELATIONSHIPS TO THE MAGAZINE
The editorial product is a totality. In conjunction with the ads, it is packaged as one three-dimensional article. This is how the reader receives it, and this is how he thinks of it: one object.
Although this chapter concentrates on departments, it is necessary to remember that the departments are merely a part of that object. It is important, therefore, to remember that the graphic image the departments transmit must be produced in the
(White1, 81)
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
MODEL WINDOW
GUIDE WINDOW
2 of 5
Writing Style:
New Products as "Catalog". 1
New Products as "News". 1
New Products as "Show Window." 1
New Products as "Story". 1
WRITING:
Article Elements:
Dramatic Openings. 1
Endings. 1
Handling People and Quotes. 1
Realistic Details. 1
Summary Openings. 1
The Lead. 1
Organization:
Chronology. 1
Narrative Theme Structure. 1
684
694
NEW PRODUCTS AS "CATALOG"
Some publications devote major space to new products in every issue. Others do so only on occasion (such as once a year in a special issue). But whatever the frequency, certain catalog techniques are followed which should be pointed out. First of all, however, it is necessary to mention that the catalog business is burgeoning. Selling by mail from illustrated catalogs fills a proud and glamorous page in this country's social history, though the graphic design of catalogs has only recently received the
(White1, 152-153)
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
MODEL WINDOW
GUIDE WINDOW
3 of 5
Profile Articles. 1
Structure by Function. 1
Technical Writing:
Describing Machinery. 1
Describing Processes. 1
Describing Theories. 1
Techniques:
A Personal Voice. 1
Carving Out a Theme. 1
Descriptiveness. 1
Handling Numbers. 1
Interviewing. 1
Repetition and Force. 1
The Telling Detail. 1
Transitions. 1
Writing Lean. 1
686
696
PROFILE ARTICLES
For profile articles, I use a slightly altered version, as follows:
I. HISTORY
A. How has my subject's past shaped the nature of him/her/it today?
II. QUALITIES
A. What are the qualities of differentness -- personal, professional or other -- that make my subject
(Blundell, 76-77)

FIG. 54

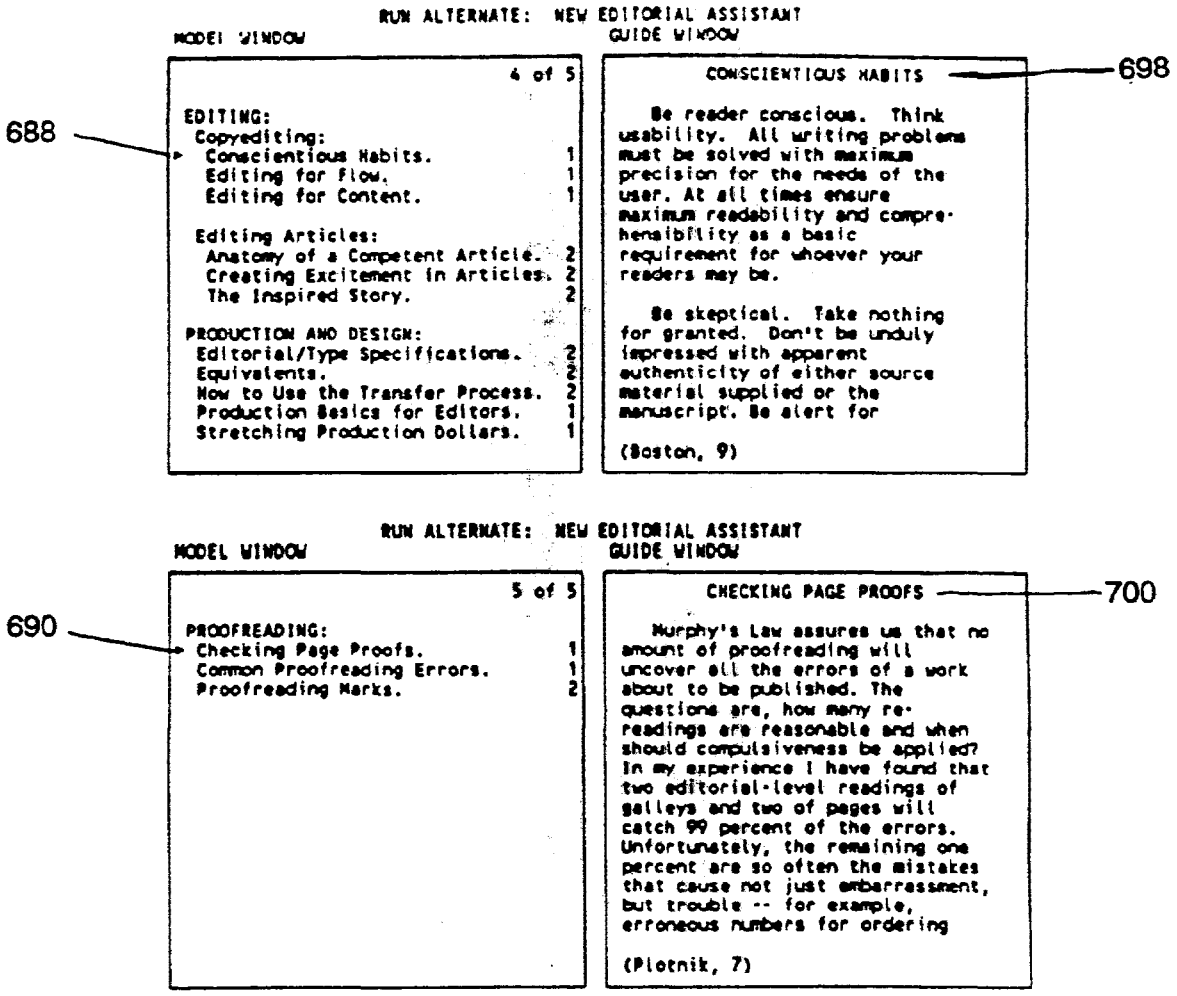

RUN ALTERNATE: NEW EDITORIAL ASSISTANT
MODEL WINDOW
GUIDE WINDOW
4 of 5
EDITING:
Copyediting:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1
Editing Articles:
Anatomy of a Competent Article. 2
Creating Excitement in Articles. 2
The Inspired Story. 2
PRODUCTION AND DESIGN:
Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Process. 2
Production Basics for Editors. 1
Stretching Production Dollars. 1
CONSCIENTIOUS HABITS
Be reader conscious. Think usability. All writing problems must be solved with maximum precision for the needs of the user. At all times ensure maximum readability and comprehensibility as a basic requirement for whoever your readers may be.
Be skeptical. Take nothing for granted. Don't be unduly impressed with apparent authenticity of either source material supplied or the manuscript. Be alert for
(Boston, 9)
688
698
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
MODEL WINDOW
GUIDE WINDOW
5 of 5
PROOFREADING:
Checking Page Proofs. 1
Common Proofreading Errors. 1
Proofreading Marks. 2
CHECKING PAGE PROOFS
Murphy's Law assures us that no amount of proofreading will uncover all the errors of a work about to be published. The questions are, how many re-readings are reasonable and when should compulsiveness be applied? In my experience I have found that two editorial-level readings of galleys and two of pages will catch 99 percent of the errors. Unfortunately, the remaining one percent are so often the mistakes that cause not just embarrassment, but trouble -- for example, erroneous numbers for ordering
(Plotnik, 7)
690
700

FIG. 55

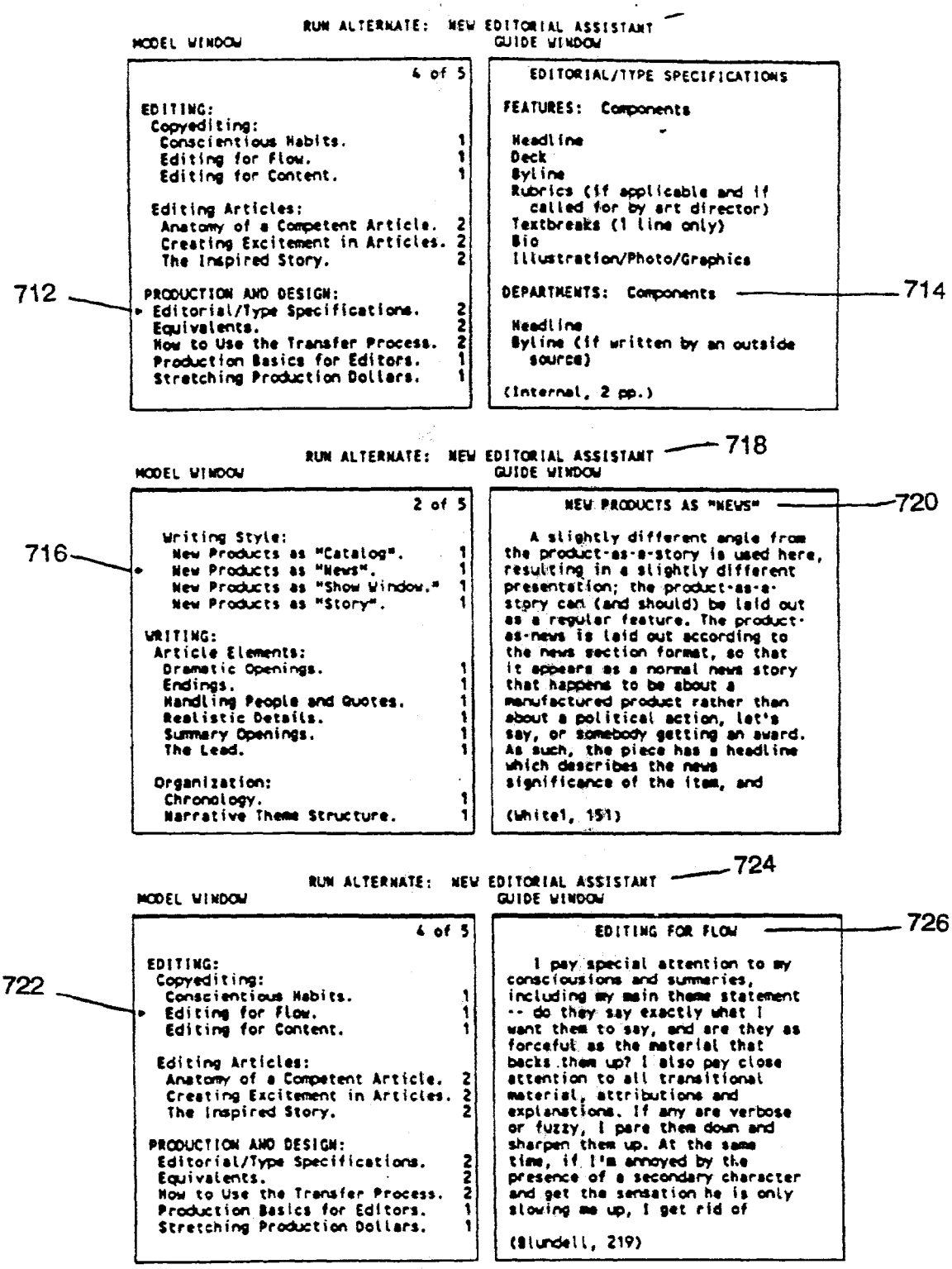

RUN ALTERNATE: NEW EDITORIAL ASSISTANT
MODEL WINDOW
GUIDE WINDOW
4 of 5
EDITING:
Copyediting:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1
Editing Articles:
Anatomy of a Competent Article. 2
Creating Excitement in Articles. 2
The Inspired Story. 2
PRODUCTION AND DESIGN:
Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Process. 2
Production Basics for Editors. 1
Stretching Production Dollars. 1
712
EDITORIAL/TYPE SPECIFICATIONS
FEATURES: Components
Headline
Deck
Byline
Rubrics (if applicable and if called for by art director)
Textbreaks (1 line only)
Bio
Illustration/Photo/Graphics
DEPARTMENTS: Components
714
Headline
Byline (if written by an outside source)
(Internal, 2 pp.)
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
718
MODEL WINDOW
GUIDE WINDOW
2 of 5
Writing Style:
New Products as "Catalog". 1
New Products as "News". 1
New Products as "Show Window." 1
New Products as "Story". 1
716
WRITING:
Article Elements:
Dramatic Openings. 1
Endings. 1
Handling People and Quotes. 1
Realistic Details. 1
Summary Openings. 1
The Lead. 1
Organization:
Chronology. 1
Narrative Theme Structure. 1
NEW PRODUCTS AS "NEWS"
720
A slightly different angle from the product-as-a-story is used here, resulting in a slightly different presentation; the product-as-a-story can (and should) be laid out as a regular feature. The product-as-news is laid out according to the news section format, so that it appears as a normal news story that happens to be about a manufactured product rather than about a political action, let's say, or somebody getting an award. As such, the piece has a headline which describes the news significance of the item, and
(White1, 151)
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
724
MODEL WINDOW
GUIDE WINDOW
4 of 5
EDITING:
Copyediting:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1
Editing Articles:
Anatomy of a Competent Article. 2
Creating Excitement in Articles. 2
The Inspired Story. 2
PRODUCTION AND DESIGN:
Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Process. 2
Production Basics for Editors. 1
Stretching Production Dollars. 1
722
EDITING FOR FLOW
726
I pay special attention to my conclusions and summaries, including my main theme statement -- do they say exactly what I want them to say, and are they as forceful as the material that backs them up? I also pay close attention to all transitional material, attributions and explanations. If any are verbose or fuzzy, I pare them down and sharpen them up. At the same time, if I'm annoyed by the presence of a secondary character and get the sensation he is only slowing me up, I get rid of
(Blundell, 219)

FIG. 56

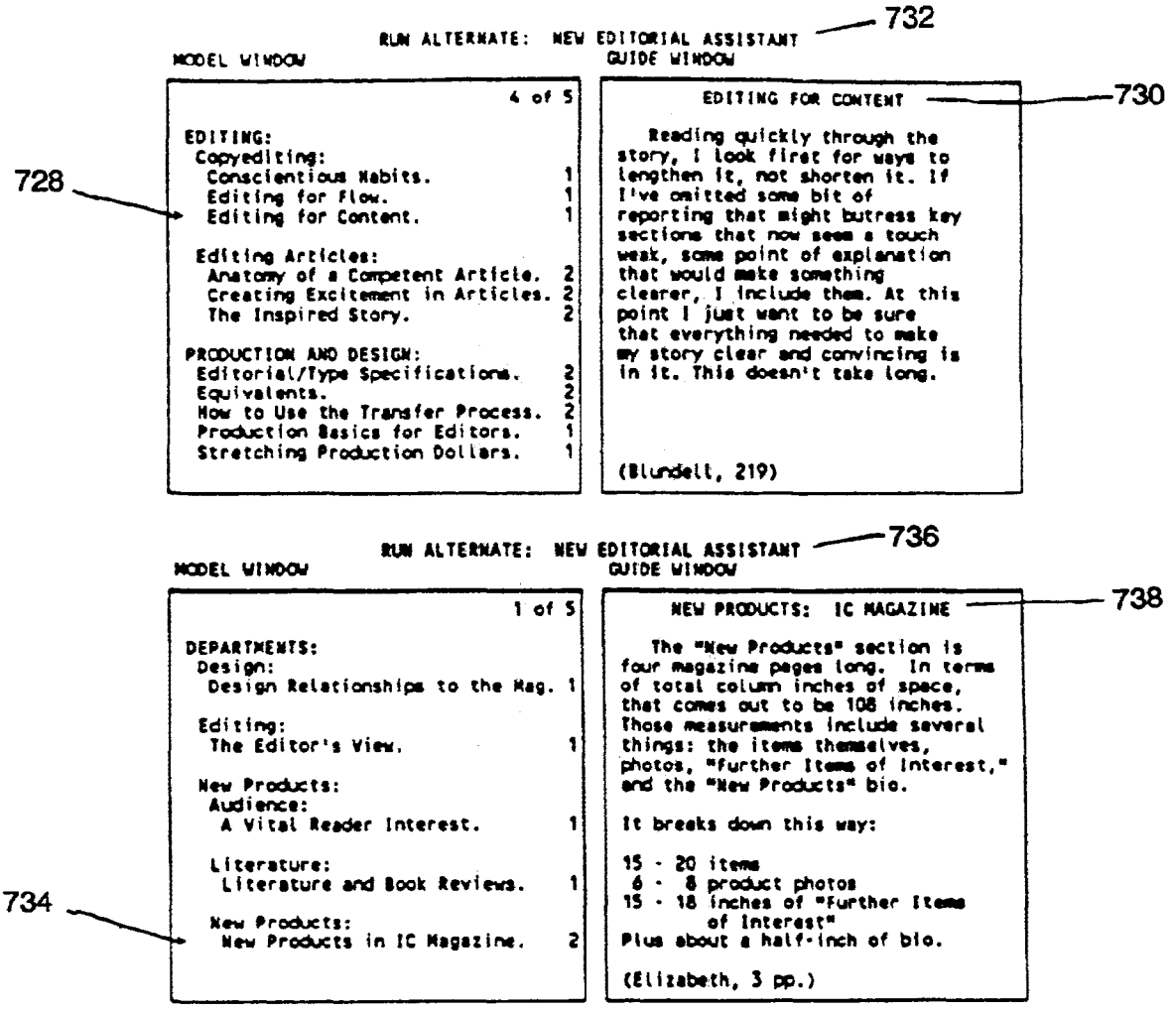

RUN ALTERNATE: NEW EDITORIAL ASSISTANT
732
MODEL WINDOW
GUIDE WINDOW
4 of 5
EDITING:
Copyediting:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1
Editing Articles:
Anatomy of a Competent Article. 2
Creating Excitement in Articles. 2
The Inspired Story. 2
PRODUCTION AND DESIGN:
Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Process. 2
Production Basics for Editors. 1
Stretching Production Dollars. 1
728
EDITING FOR CONTENT
730
Reading quickly through the story, I look first for ways to lengthen it, not shorten it. If I've omitted some bit of reporting that might buttress key sections that now seem a touch weak, some point of explanation that would make something clearer, I include them. At this point I just want to be sure that everything needed to make my story clear and convincing is in it. This doesn't take long.
(Blundell, 219)
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
736
MODEL WINDOW
GUIDE WINDOW
1 of 5
DEPARTMENTS:
Design:
Design Relationships to the Mag. 1
Editing:
The Editor's View. 1
New Products:
Audience:
A Vital Reader Interest. 1
Literature:
Literature and Book Reviews. 1
New Products:
New Products in IC Magazine. 2
734
NEW PRODUCTS: IC MAGAZINE
738
The "New Products" section is four magazine pages long. In terms of total column inches of space, that comes out to be 108 inches. Those measurements include several things: the items themselves, photos, "Further Items of Interest," and the "New Products" bio.
It breaks down this way:
15 - 20 items
6 - 8 product photos
15 - 18 inches of "Further Items of Interest"
Plus about a half-inch of bio.
(Elizabeth, 3 pp.)

FIG. 57

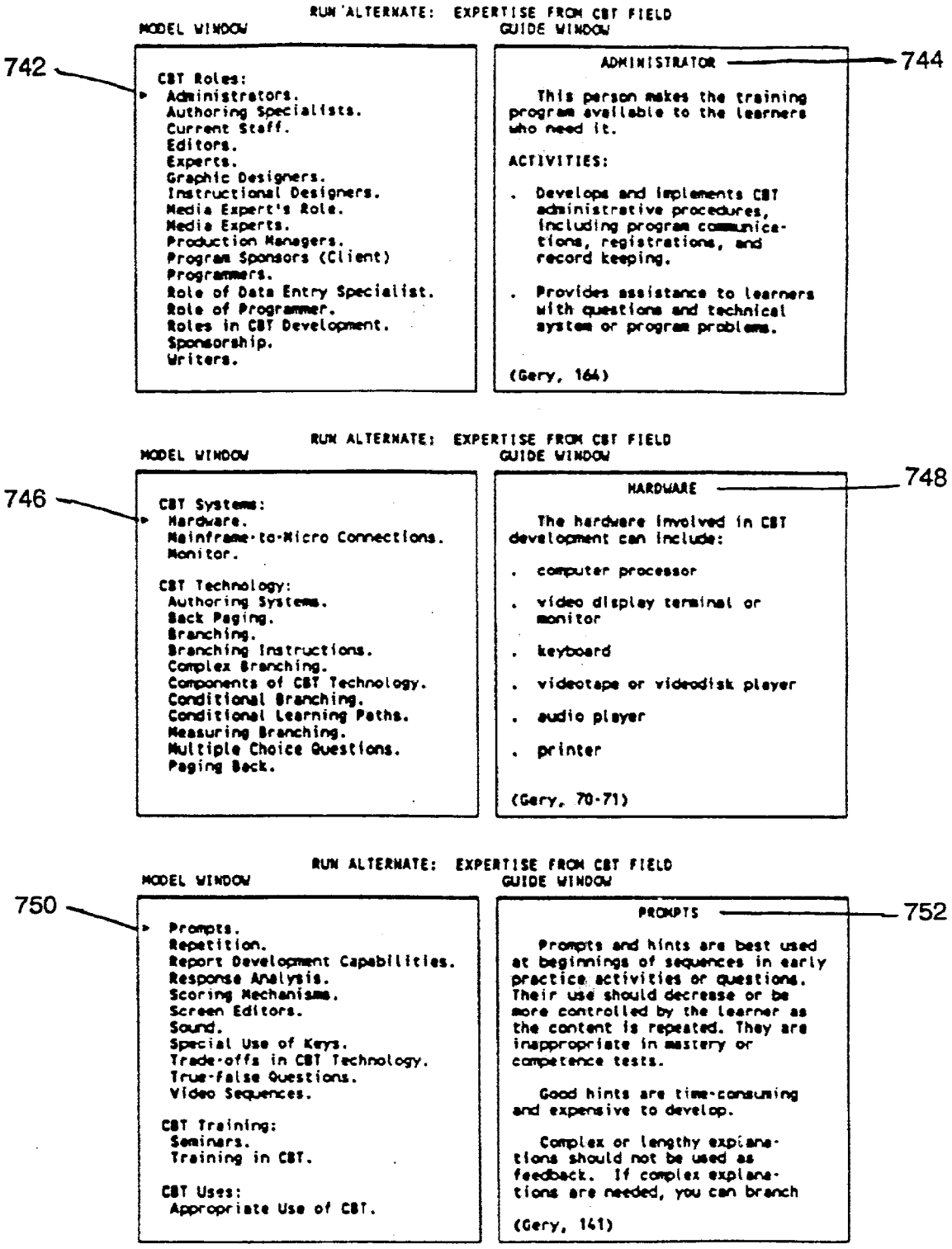

RUN ALTERNATE: EXPERTISE FROM CBT FIELD
MODEL WINDOW
GUIDE WINDOW
742
CBT Roles:
Administrators.
Authoring Specialists.
Current Staff.
Editors.
Experts.
Graphic Designers.
Instructional Designers.
Media Expert's Role.
Media Experts.
Production Managers.
Program Sponsors (Client)
Programmers.
Role of Data Entry Specialist.
Role of Programmer.
Roles in CBT Development.
Sponsorship.
Writers.
ADMINISTRATOR
744
This person makes the training program available to the learners who need it.
ACTIVITIES:
. Develops and implements CBT administrative procedures, including program communications, registrations, and record keeping.
. Provides assistance to learners with questions and technical system or program problems.
(Gery, 164)
RUN ALTERNATE: EXPERTISE FROM CBT FIELD
MODEL WINDOW
GUIDE WINDOW
746
CBT Systems:
Hardware.
Mainframe-to-Micro Connections.
Monitor.
CBT Technology:
Authoring Systems.
Back Paging.
Branching.
Branching Instructions.
Complex Branching.
Components of CBT Technology.
Conditional Branching.
Conditional Learning Paths.
Measuring Branching.
Multiple Choice Questions.
Paging Back.
HARDWARE
748
The hardware involved in CBT development can include:
. computer processor
. video display terminal or monitor
. keyboard
. videotape or videodisk player
. audio player
. printer
(Gery, 70-71)
RUN ALTERNATE: EXPERTISE FROM CBT FIELD
MODEL WINDOW
GUIDE WINDOW
750
Prompts.
Repetition.
Report Development Capabilities.
Response Analysis.
Scoring Mechanisms.
Screen Editors.
Sound.
Special Use of Keys.
Trade-offs in CBT Technology.
True-False Questions.
Video Sequences.
CBT Training:
Seminars.
Training in CBT.
CBT Uses:
Appropriate Use of CBT.
PROMPTS
752
Prompts and hints are best used at beginnings of sequences in early practice activities or questions. Their use should decrease or be more controlled by the learner as the content is repeated. They are inappropriate in mastery or competence tests.
Good hints are time-consuming and expensive to develop.
Complex or lengthy explanations should not be used as feedback. If complex explanations are needed, you can branch
(Gery, 141)

FIG. 58

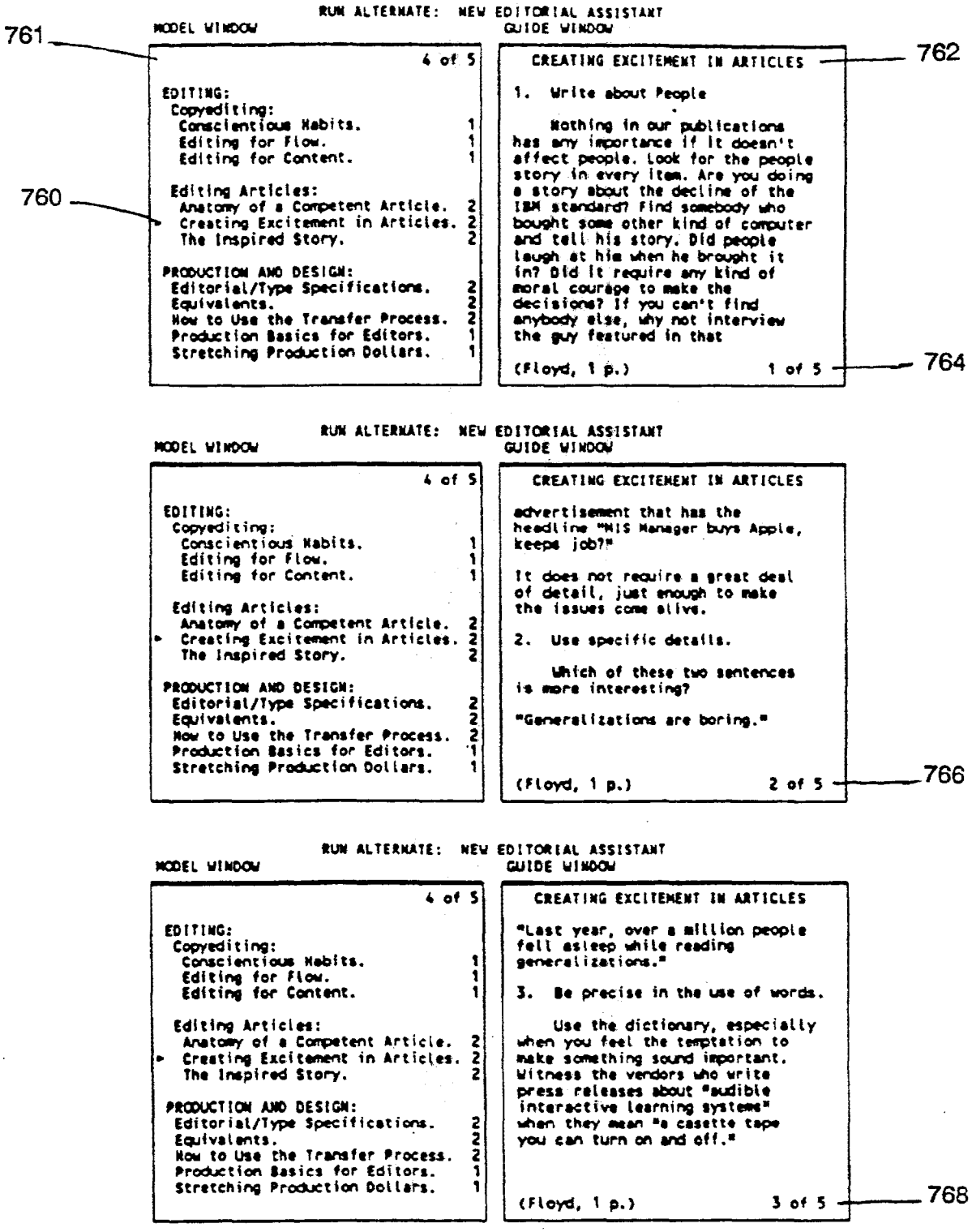

RUN ALTERNATE: NEW EDITORIAL ASSISTANT
MODEL WINDOW
GUIDE WINDOW
761
762
760
764
766
768
4 of 5
EDITING:
Copyediting:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1
Editing Articles:
Anatomy of a Competent Article. 2
Creating Excitement in Articles. 2
The Inspired Story. 2
PRODUCTION AND DESIGN:
Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Process. 2
Production Basics for Editors. 1
Stretching Production Dollars. 1
CREATING EXCITEMENT IN ARTICLES
1. Write about People
Nothing in our publications has any importance if it doesn't affect people. Look for the people story in every item. Are you doing a story about the decline of the IBM standard? Find somebody who bought some other kind of computer and tell his story. Did people laugh at him when he brought it in? Did it require any kind of moral courage to make the decisions? If you can't find anybody else, why not interview the guy featured in that
(Floyd, 1 p.) 1 of 5
advertisement that has the headline "MIS Manager buys Apple, keeps job?"
It does not require a great deal of detail, just enough to make the issues come alive.
2. Use specific details.
Which of these two sentences is more interesting?
"Generalizations are boring."
(Floyd, 1 p.) 2 of 5
"Last year, over a million people fell asleep while reading generalizations."
3. Be precise in the use of words.
Use the dictionary, especially when you feel the temptation to make something sound important. Witness the vendors who write press releases about "audible interactive learning systems" when they mean "a cassette tape you can turn on and off."
(Floyd, 1 p.) 3 of 5

FIG. 59

RUN ALTERNATE: NEW EDITORIAL ASSISTANT

MODEL WINDOW

4 of 5

EDITING:
Copyediting:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1

Editing Articles:
Anatomy of a Competent Article. 2
▸ Creating Excitement in Articles. 2
The Inspired Story. 2

PRODUCTION AND DESIGN:
Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Process. 2
Production Basics for Editors. 1
Stretching Production Dollars. 1

GUIDE WINDOW

CREATING EXCITEMENT IN ARTICLES

4. Use the connotations of words.

Let's say you are writing a story about computer viruses and you discover these things are remarkably short as programs go. Try something like this for a description: "The program consists of five lines, hardly enough coding to fill a blasting cap."

5. Be simple, be clear.

Go for the Anglo-Saxon word first. Winston Churchill did,

(Floyd, 1 p.) 4 of 5

770

RUN ALTERNATE: NEW EDITORIAL ASSISTANT

MODEL WINDOW

4 of 5

EDITING:
Copyediting:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1

Editing Articles:
Anatomy of a Competent Article. 2
▸ Creating Excitement in Articles. 2
The Inspired Story. 2

PRODUCTION AND DESIGN:
Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Process. 2
Production Basics for Editors. 1
Stretching Production Dollars. 1

GUIDE WINDOW

CREATING EXCITEMENT IN ARTICLES

and he left us some of the most memorable phrases in English. "I have nothing to offer but blood, toil, tears, and sweat."

or: "This was their finest hour."

or: "Never in the field of human conflict was so mucked owed by so many to so few."

or: "The soft underbelly of the Axis."

(Floyd, 1 p.) 5 of 5

772

FIG. 60

RUN ALTERNATE: NEW EDITORIAL ASSISTANT

ZOOMED GUIDE WINDOW

782

780

CREATING EXCITEMENT IN ARTICLES

1. Write about people.

Nothing in our publications has any importance if it doesn't affect people. Look for the people story in every item. Are you doing a story about the decline of the IBM standard? Find somebody who bought some other kind of computer and tell his story. Did people laugh at him when he brought it in? Did it require any kind of moral courage to make the decisions? If you can't anybody else, why not interview the guy featured in that advertisement that has the headline "MIS Manager buys Apple, keeps job"?

It does not require a great deal of detail, just enough to make the issues come alive.

(Floyd, 1 p.) 1 of 4

786

RUN ALTERNATE: NEW EDITORIAL ASSISTANT

ZOOMED GUIDE WINDOW

CREATING EXCITEMENT IN ARTICLES

2. Use specific details.

Which of these two sentences is more interesting?

"Generalizations are boring."

"Last year, over a million people fell asleep while reading generalizations."

3. Be precise in the use of words.

Use the dictionary, especially when you feel the temptation to make something sound important. Witness the vendors who write press releases about "Audible interactive learning systems" when they mean "a cassette tape you can turn on and off."

(Floyd, 1 p.) 2 of 4

788

RUN ALTERNATE: NEW EDITORIAL ASSISTANT

ZOOMED GUIDE WINDOW

CREATING EXCITEMENT IN ARTICLES

4. Use the connotations of words.

Let's say you are writing a story about computer viruses and you discover these things are remarkably short as programs go. Try something like this for a description: "The program consists of five lines, hardly enough coding to fill a blasting cap."

5. Be simple, be clear.

Go for the Anglo-Saxon word first. Winston Churchill did, and he left us some of the most memorable phrases in English. "I have nothing to offer but blood, toil, tears, and sweat."

(Floyd, 1 p.) 3 of 4

FIG. 61

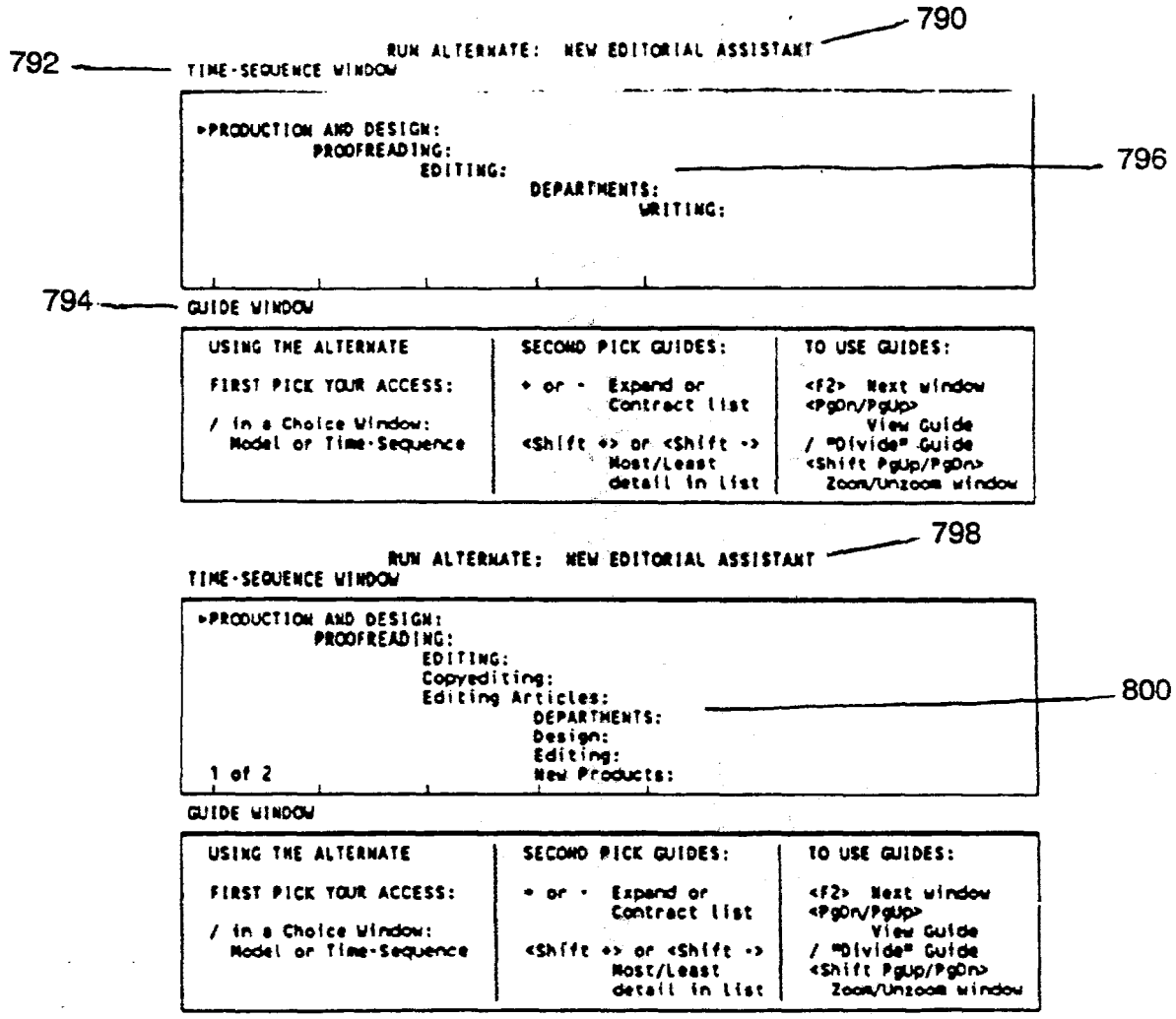

790
792
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
TIME-SEQUENCE WINDOW
▸PRODUCTION AND DESIGN:
PRODUCTION:
EDITING:
DEPARTMENTS:
WRITING:
796
794
GUIDE WINDOW
USING THE ALTERNATE
FIRST PICK YOUR ACCESS:
/ in a Choice Window:
Model or Time-Sequence
SECOND PICK GUIDES:
+ or - Expand or Contract list
<Shift +> or <Shift ->
Most/Least detail in list
TO USE GUIDES:
<F2> Next window
<PgDn/PgUp>
View Guide
/ "Divide" Guide
<Shift PgUp/PgDn>
Zoom/Unzoom window
798
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
TIME-SEQUENCE WINDOW
▸PRODUCTION AND DESIGN:
PRODUCTION:
EDITING:
Copyediting:
Editing Articles:
DEPARTMENTS:
Design:
Editing:
1 of 2
New Products:
800
GUIDE WINDOW
USING THE ALTERNATE
FIRST PICK YOUR ACCESS:
/ in a Choice Window:
Model or Time-Sequence
SECOND PICK GUIDES:
+ or - Expand or Contract list
<Shift +> or <Shift ->
Most/Least detail in list
TO USE GUIDES:
<F2> Next window
<PgDn/PgUp>
View Guide
/ "Divide" Guide
<Shift PgUp/PgDn>
Zoom/Unzoom window

FIG. 62

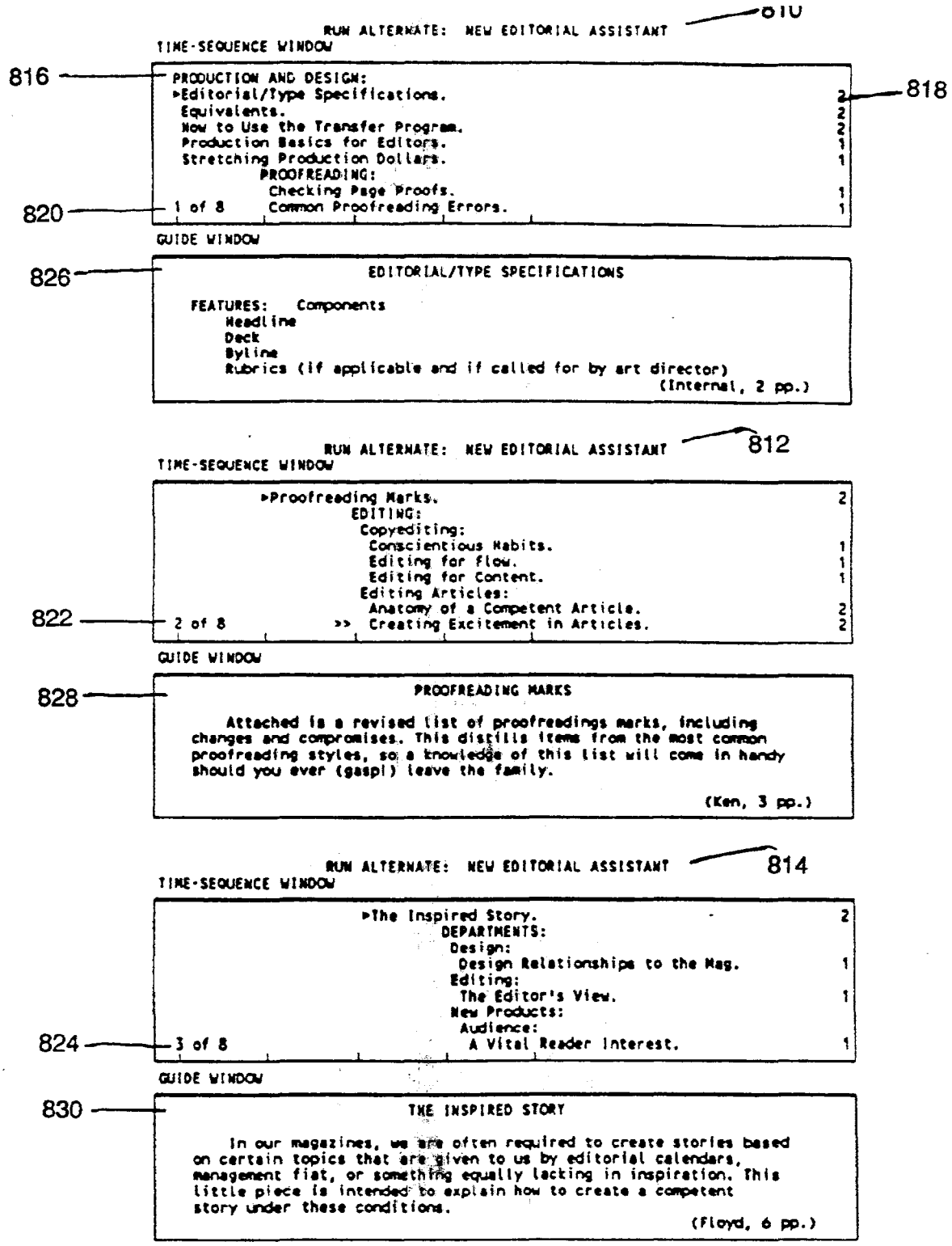

810
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
TIME-SEQUENCE WINDOW
816
PRODUCTION AND DESIGN:
▸Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Program. 2
Production Basics for Editors. 1
Stretching Production Dollars. 1
PROOFREADING:
Checking Page Proofs. 1
820
1 of 8
Common Proofreading Errors. 1
818
GUIDE WINDOW
826
EDITORIAL/TYPE SPECIFICATIONS
FEATURES: Components
Headline
Deck
Byline
Rubrics (if applicable and if called for by art director)
(Internal, 2 pp.)
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
812
TIME-SEQUENCE WINDOW
▸Proofreading Marks. 2
EDITING:
Copyediting:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1
Editing Articles:
822
2 of 8
>> Anatomy of a Competent Article. 2
Creating Excitement in Articles. 2
GUIDE WINDOW
828
PROOFREADING MARKS
Attached is a revised list of proofreadings marks, including changes and compromises. This distills items from the most common proofreading styles, so a knowledge of this list will come in handy should you ever (gasp!) leave the family.
(Ken, 3 pp.)
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
814
TIME-SEQUENCE WINDOW
▸The Inspired Story. 2
DEPARTMENTS:
Design:
Design Relationships to the Mag. 1
Editing:
The Editor's View. 1
New Products:
Audience:
824
3 of 8
A Vital Reader Interest. 1
GUIDE WINDOW
830
THE INSPIRED STORY
In our magazines, we are often required to create stories based on certain topics that are given to us by editorial calendars, management fiat, or something equally lacking in inspiration. This little piece is intended to explain how to create a competent story under these conditions.
(Floyd, 6 pp.)

FIG. 63

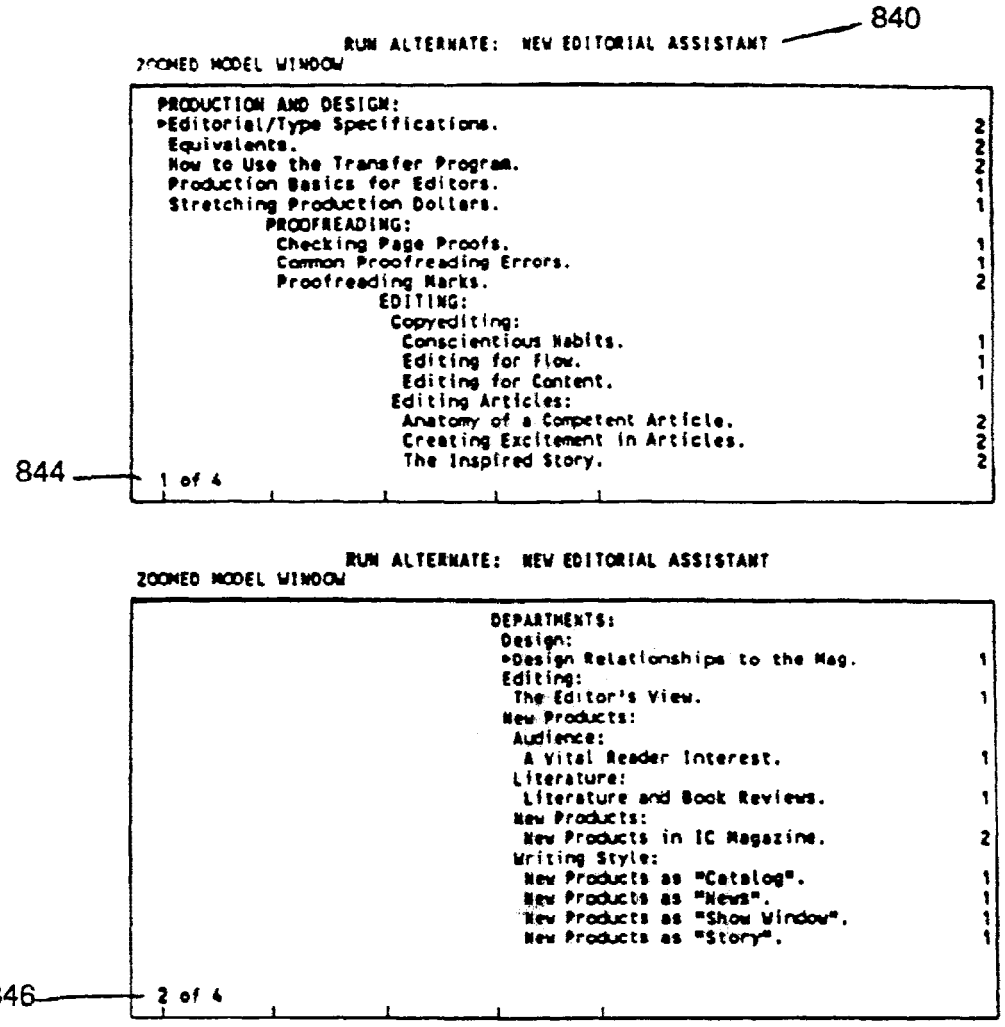

840
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
ZOOMED MODEL WINDOW
PRODUCTION AND DESIGN:
•Editorial/Type Specifications. 2
Equivalents. 2
How to Use the Transfer Program. 2
Production Basics for Editors. 1
Stretching Production Dollars. 1
PROOFREADING:
Checking Page Proofs. 1
Common Proofreading Errors. 1
Proofreading Marks. 2
EDITING:
Copyediting:
Conscientious Habits. 1
Editing for Flow. 1
Editing for Content. 1
Editing Articles:
Anatomy of a Competent Article. 2
Creating Excitement in Articles. 2
The Inspired Story. 2
844
1 of 4
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
ZOOMED MODEL WINDOW
DEPARTMENTS:
Design:
•Design Relationships to the Mag. 1
Editing:
The Editor's View. 1
New Products:
Audience:
A Vital Reader Interest. 1
Literature:
Literature and Book Reviews. 1
New Products:
New Products in IC Magazine. 2
Writing Style:
New Products as "Catalog". 1
New Products as "News". 1
New Products as "Show Window". 1
New Products as "Story". 1
846
2 of 4

FIG. 64

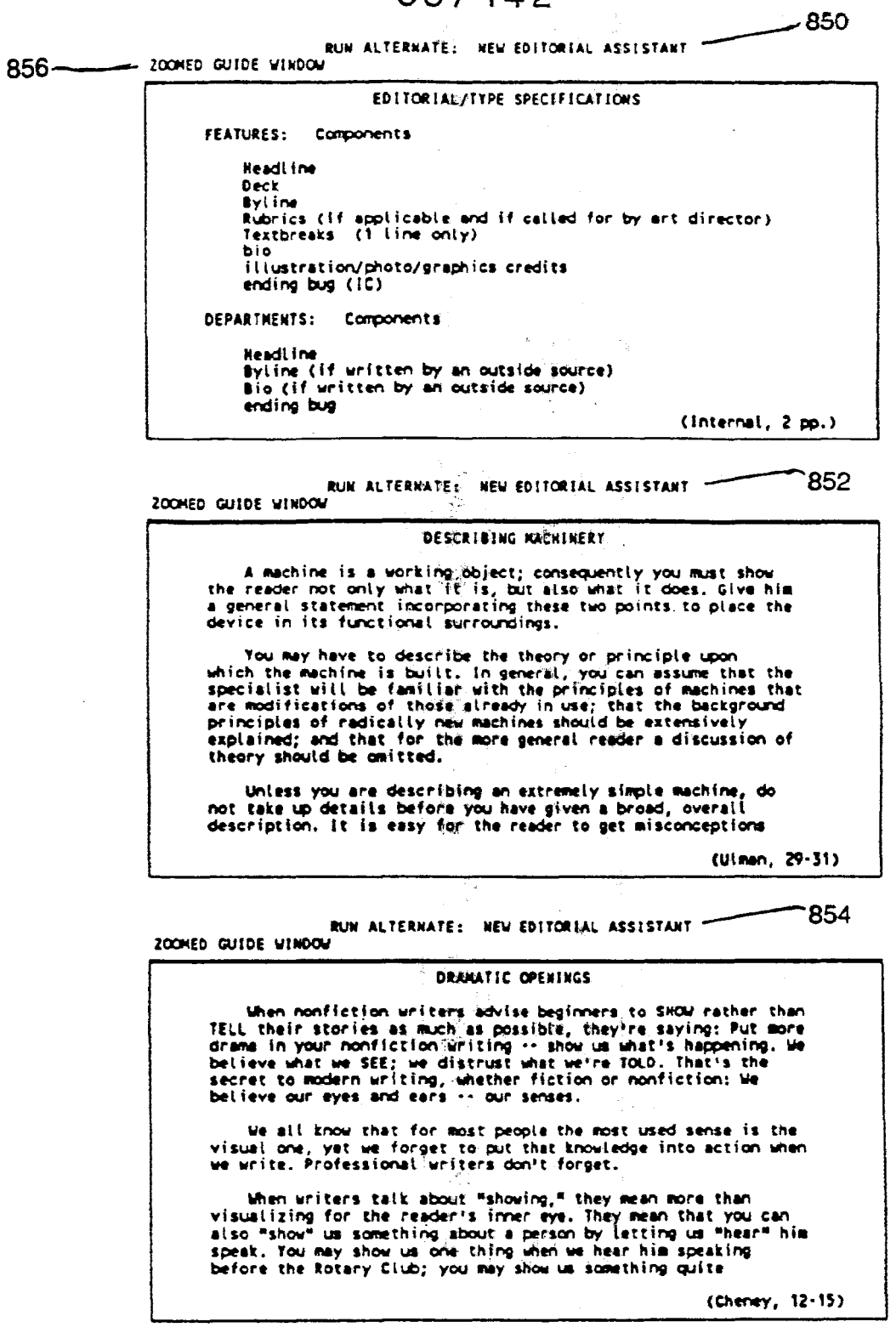

RUN ALTERNATE: NEW EDITORIAL ASSISTANT
850
856
ZOOMED GUIDE WINDOW
EDITORIAL/TYPE SPECIFICATIONS
FEATURES: Components
Headline
Deck
Byline
Rubrics (if applicable and if called for by art director)
Textbreaks (1 line only)
bio
illustration/photo/graphics credits
ending bug (IC)
DEPARTMENTS: Components
Headline
Byline (if written by an outside source)
Bio (if written by an outside source)
ending bug
(Internal, 2 pp.)
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
852
ZOOMED GUIDE WINDOW
DESCRIBING MACHINERY
A machine is a working object; consequently you must show the reader not only what it is, but also what it does. Give him a general statement incorporating these two points to place the device in its functional surroundings.
You may have to describe the theory or principle upon which the machine is built. In general, you can assume that the specialist will be familiar with the principles of machines that are modifications of those already in use; that the background principles of radically new machines should be extensively explained; and that for the more general reader a discussion of theory should be omitted.
Unless you are describing an extremely simple machine, do not take up details before you have given a broad, overall description. It is easy for the reader to get misconceptions
(Ulman, 29-31)
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
854
ZOOMED GUIDE WINDOW
DRAMATIC OPENINGS
When nonfiction writers advise beginners to SHOW rather than TELL their stories as much as possible, they're saying: Put more drama in your nonfiction writing -- show us what's happening. We believe what we SEE; we distrust what we're TOLD. That's the secret to modern writing, whether fiction or nonfiction: We believe our eyes and ears -- our senses.
We all know that for most people the most used sense is the visual one, yet we forget to put that knowledge into action when we write. Professional writers don't forget.
When writers talk about "showing," they mean more than visualizing for the reader's inner eye. They mean that you can also "show" us something about a person by letting us "hear" him speak. You may show us one thing when we hear him speaking before the Rotary Club; you may show us something quite
(Cheney, 12-15)

FIG. 65

WO 91/12583 PCT/US91/00807

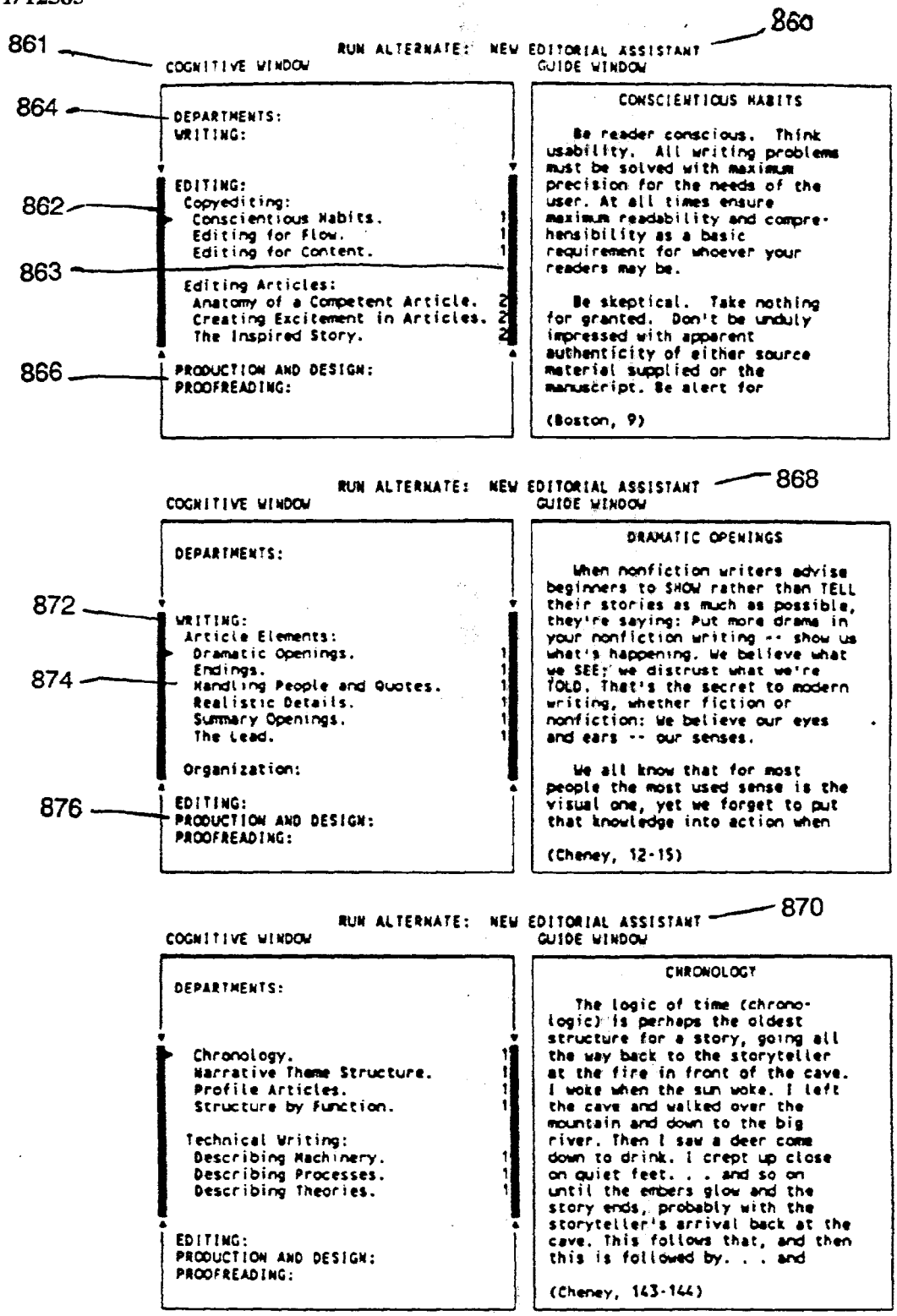


FIG. 66

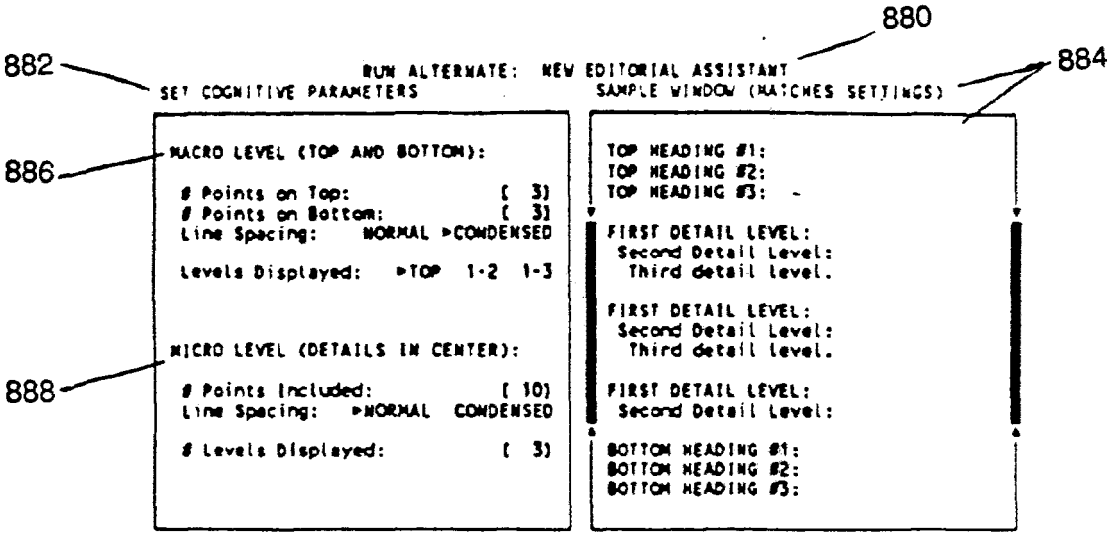

880
882
884
886
888
RUN ALTERNATE: NEW EDITORIAL ASSISTANT
SET COGNITIVE PARAMETERS
SAMPLE WINDOW (MATCHES SETTINGS)
MACRO LEVEL (TOP AND BOTTOM):
Points on Top: [3]
Points on Bottom: [3]
Line Spacing: NORMAL >CONDENSED
Levels Displayed: >TOP 1-2 1-3
MICRO LEVEL (DETAILS IN CENTER):
Points Included: [10]
Line Spacing: >NORMAL CONDENSED
Levels Displayed: [3]
TOP HEADING #1:
TOP HEADING #2:
TOP HEADING #3:
FIRST DETAIL LEVEL:
Second Detail Level:
Third detail level.
FIRST DETAIL LEVEL:
Second Detail Level:
Third detail level.
FIRST DETAIL LEVEL:
Second Detail Level:
BOTTOM HEADING #1:
BOTTOM HEADING #2:
BOTTOM HEADING #3:

FIG. 67

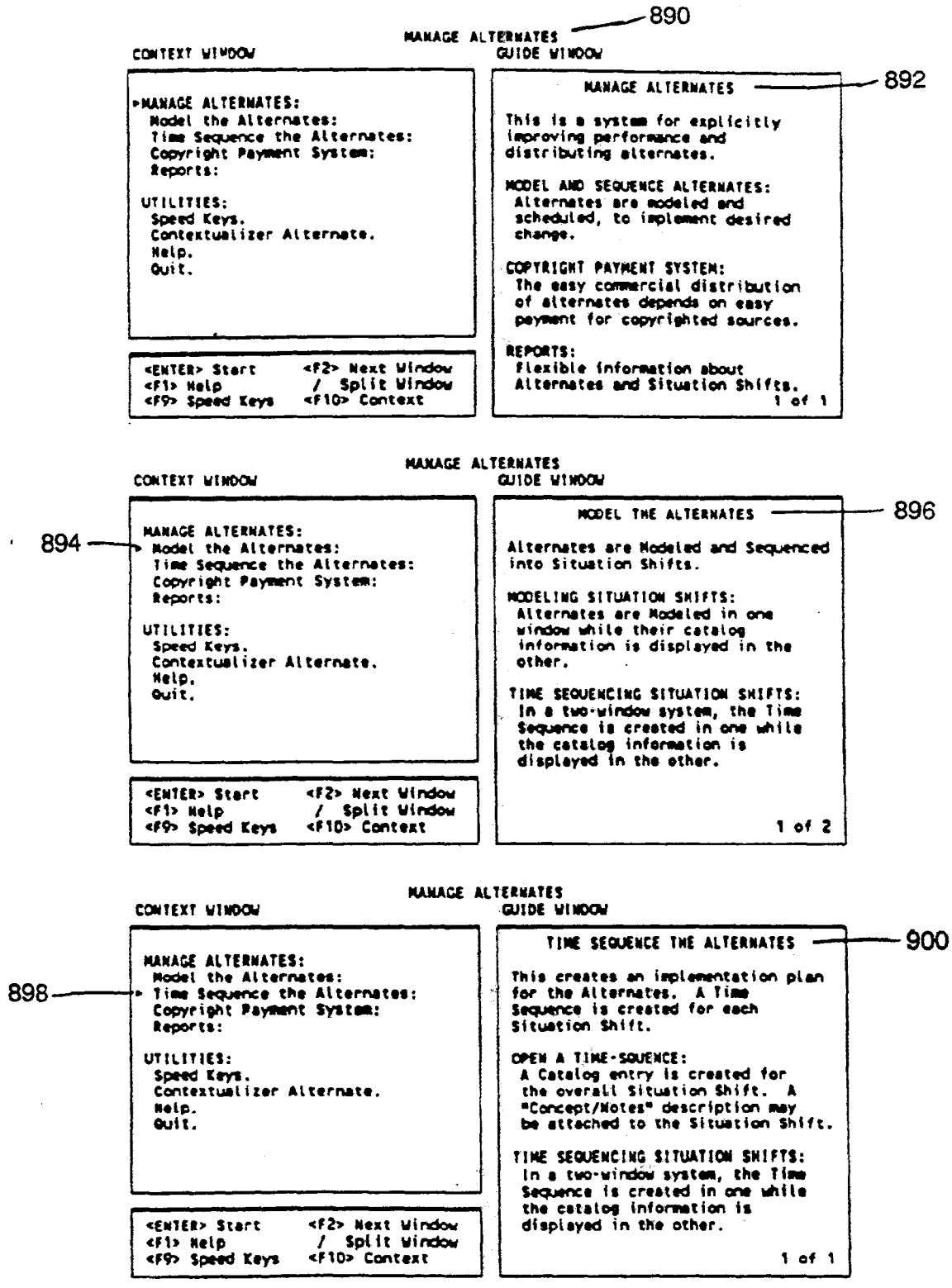

890
MANAGE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
MANAGE ALTERNATES:
Model the Alternates:
Time Sequence the Alternates:
Copyright Payment System:
Reports:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Quit.
<ENTER> Start
<F2> Next Window
<F1> Help
/ Split Window
<F9> Speed Keys
<F10> Context
MANAGE ALTERNATES
892
This is a system for explicitly improving performance and distributing alternates.
MODEL AND SEQUENCE ALTERNATES:
Alternates are modeled and scheduled, to implement desired change.
COPYRIGHT PAYMENT SYSTEM:
The easy commercial distribution of alternates depends on easy payment for copyrighted sources.
REPORTS:
Flexible information about Alternates and Situation Shifts.
1 of 1
MANAGE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
894
MANAGE ALTERNATES:
Model the Alternates:
Time Sequence the Alternates:
Copyright Payment System:
Reports:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Quit.
<ENTER> Start
<F2> Next Window
<F1> Help
/ Split Window
<F9> Speed Keys
<F10> Context
MODEL THE ALTERNATES
896
Alternates are Modeled and Sequenced into Situation Shifts.
MODELING SITUATION SHIFTS:
Alternates are Modeled in one window while their catalog information is displayed in the other.
TIME SEQUENCING SITUATION SHIFTS:
In a two-window system, the Time Sequence is created in one while the catalog information is displayed in the other.
1 of 2
MANAGE ALTERNATES
CONTEXT WINDOW
GUIDE WINDOW
898
MANAGE ALTERNATES:
Model the Alternates:
Time Sequence the Alternates:
Copyright Payment System:
Reports:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Quit.
<ENTER> Start
<F2> Next Window
<F1> Help
/ Split Window
<F9> Speed Keys
<F10> Context
TIME SEQUENCE THE ALTERNATES
900
This creates an implementation plan for the Alternates. A Time Sequence is created for each Situation Shift.
OPEN A TIME-SQUENCE:
A Catalog entry is created for the overall Situation Shift. A "Concept/Notes" description may be attached to the Situation Shift.
TIME SEQUENCING SITUATION SHIFTS:
In a two-window system, the Time Sequence is created in one while the catalog information is displayed in the other.
1 of 1

FIG. 68

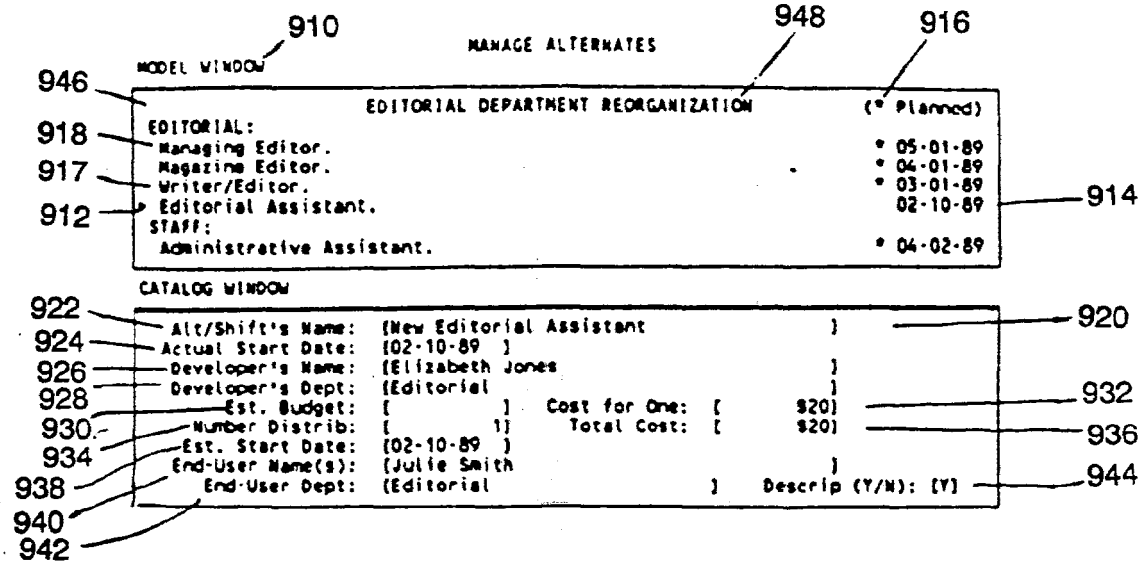

910
948
916
MANAGE ALTERNATES
MODEL WINDOW
946
EDITORIAL DEPARTMENT REORGANIZATION
(* Planned)
EDITORIAL:
Managing Editor.
Magazine Editor.
Writer/Editor.
Editorial Assistant.
STAFF:
Administrative Assistant.
* 05-01-89
* 04-01-89
* 03-01-89
02-10-89
* 04-02-89
914
CATALOG WINDOW
Alt/Shift's Name: [New Editorial Assistant]
Actual Start Date: [02-10-89]
Developer's Name: [Elizabeth Jones]
Developer's Dept: [Editorial]
Est. Budget: [ ] Cost for One: [$20]
Number Distrib: [1] Total Cost: [$20]
Est. Start Date: [02-10-89]
End-User Name(s): [Julie Smith]
End-User Dept: [Editorial] Descrip (Y/N): [Y]
920
932
936
944
922
924
926
928
930
934
938
940
942

FIG. 69

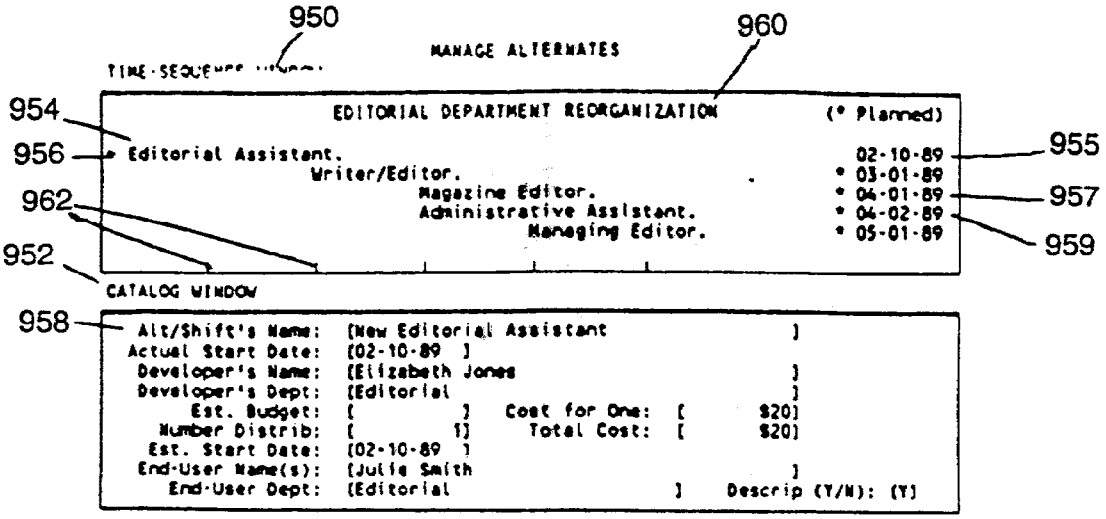

950
960
MANAGE ALTERNATES
TIME-SEQUENCE WINDOW
954
956
962
952
958
955
957
959
EDITORIAL DEPARTMENT REORGANIZATION
(* Planned)
Editorial Assistant.
Writer/Editor.
Magazine Editor.
Administrative Assistant.
Managing Editor.
02-10-89
* 03-01-89
* 04-01-89
* 04-02-89
* 05-01-89
CATALOG WINDOW
Alt/Shift's Name: [New Editorial Assistant]
Actual Start Date: [02-10-89]
Developer's Name: [Elizabeth Jones]
Developer's Dept: [Editorial]
Est. Budget: [ ] Cost for One: [$20]
Number Distrib: [1] Total Cost: [$20]
Est. Start Date: [02-10-89]
End-User Name(s): [Julie Smith]
End-User Dept: [Editorial] Descrip (Y/N): [Y]

FIG. 70

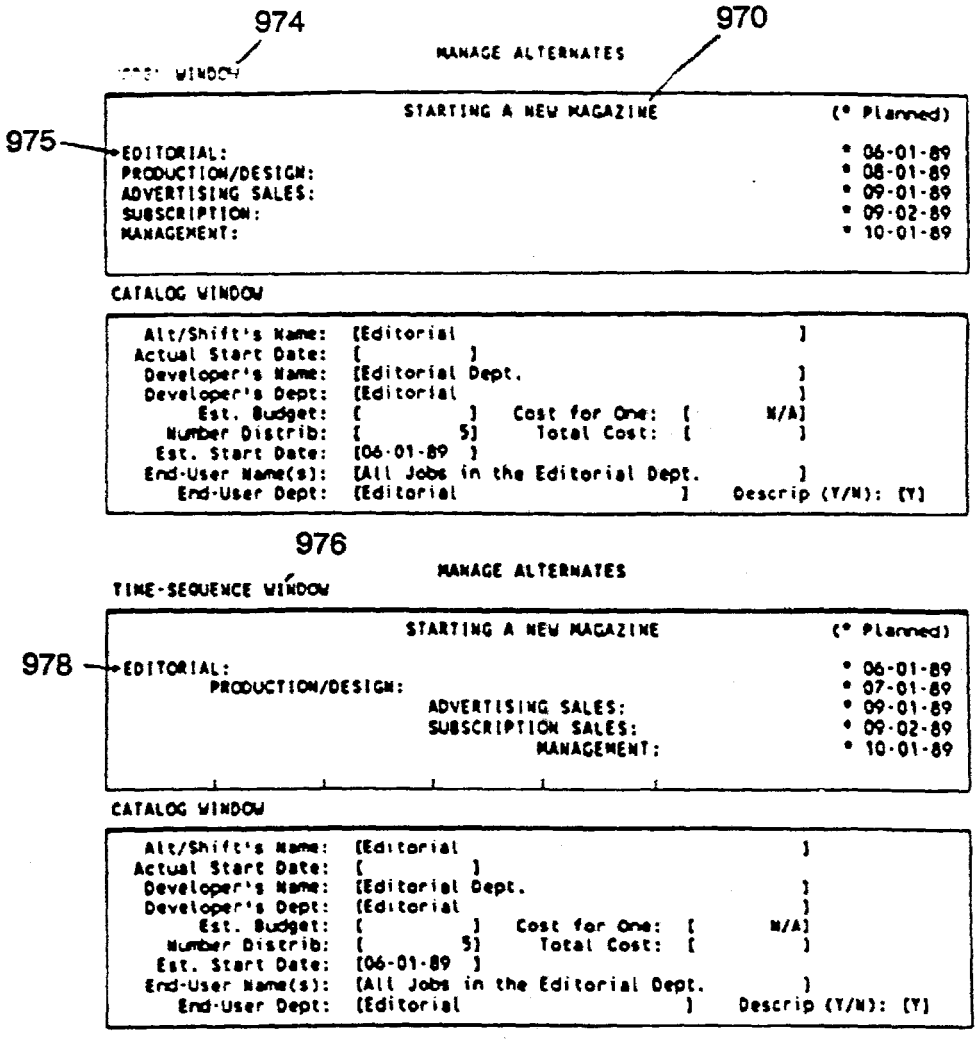

974
970
MANAGE ALTERNATES
STARTING A NEW MAGAZINE
(* Planned)
975
EDITORIAL: * 06-01-89
PRODUCTION/DESIGN: * 08-01-89
ADVERTISING SALES: * 09-01-89
SUBSCRIPTION: * 09-02-89
MANAGEMENT: * 10-01-89
CATALOG WINDOW
Alt/Shift's Name: [Editorial]
Actual Start Date: [ ]
Developer's Name: [Editorial Dept.]
Developer's Dept: [Editorial]
Est. Budget: [ ] Cost for One: [N/A]
Number Distrib: [5] Total Cost: [ ]
Est. Start Date: [06-01-89]
End-User Name(s): [All Jobs in the Editorial Dept.]
End-User Dept: [Editorial] Descrip (Y/N): [Y]
976
MANAGE ALTERNATES
TIME-SEQUENCE WINDOW
STARTING A NEW MAGAZINE
(* Planned)
978
EDITORIAL: * 06-01-89
PRODUCTION/DESIGN: * 07-01-89
ADVERTISING SALES: * 09-01-89
SUBSCRIPTION SALES: * 09-02-89
MANAGEMENT: * 10-01-89
CATALOG WINDOW
Alt/Shift's Name: [Editorial]
Actual Start Date: [ ]
Developer's Name: [Editorial Dept.]
Developer's Dept: [Editorial]
Est. Budget: [ ] Cost for One: [N/A]
Number Distrib: [5] Total Cost: [ ]
Est. Start Date: [06-01-89]
End-User Name(s): [All Jobs in the Editorial Dept.]
End-User Dept: [Editorial] Descrip (Y/N): [Y]

FIG. 71

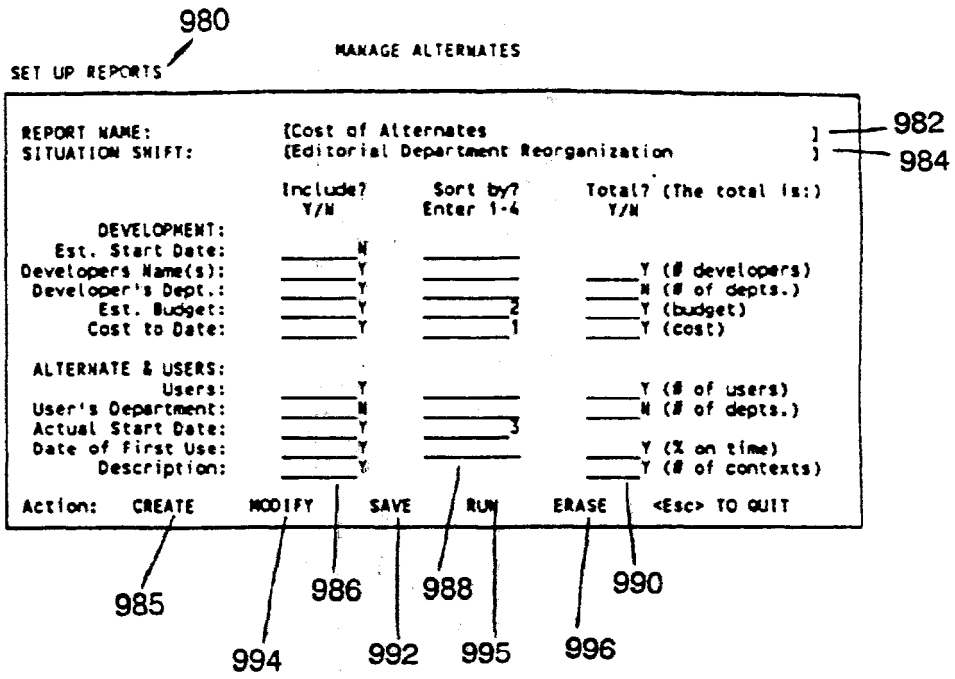

980
SET UP REPORTS
MANAGE ALTERNATES
REPORT NAME: {Cost of Alternates }
SITUATION SHIFT: {Editorial Department Reorganization }
982
984
Include? Y/N
Sort by? Enter 1-4
Total? (The total is:) Y/N
DEVELOPMENT:
Est. Start Date: N
Developers Name(s): Y
Developer's Dept.: Y
Est. Budget: Y 2 Y (budget)
Cost to Date: Y 1 Y (cost)
Y (# developers)
N (# of depts.)
ALTERNATE & USERS:
Users: Y Y (# of users)
User's Department: N N (# of depts.)
Actual Start Date: Y 3
Date of First Use: Y Y (% on time)
Description: Y (# of contexts)
Action: CREATE MODIFY SAVE RUN ERASE <Esc> TO QUIT
985
994
986
992
988
995
996
990

FIG. 72

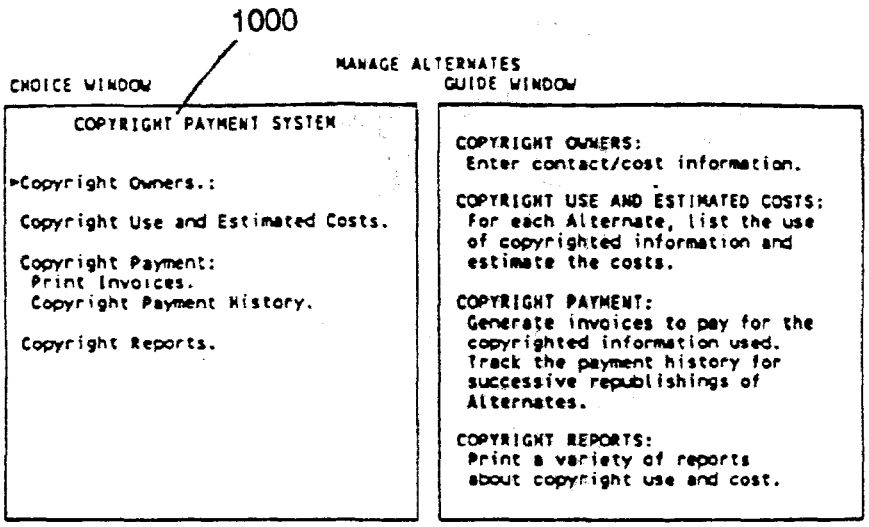

1000
MANAGE ALTERNATES
CHOICE WINDOW
GUIDE WINDOW
COPYRIGHT PAYMENT SYSTEM
>Copyright Owners.:
Copyright Use and Estimated Costs.
Copyright Payment:
Print Invoices.
Copyright Payment History.
Copyright Reports.
COPYRIGHT OWNERS:
Enter contact/cost information.
COPYRIGHT USE AND ESTIMATED COSTS:
For each Alternate, list the use of copyrighted information and estimate the costs.
COPYRIGHT PAYMENT:
Generate invoices to pay for the copyrighted information used. Track the payment history for successive republishings of Alternates.
COPYRIGHT REPORTS:
Print a variety of reports about copyright use and cost.

FIG. 73

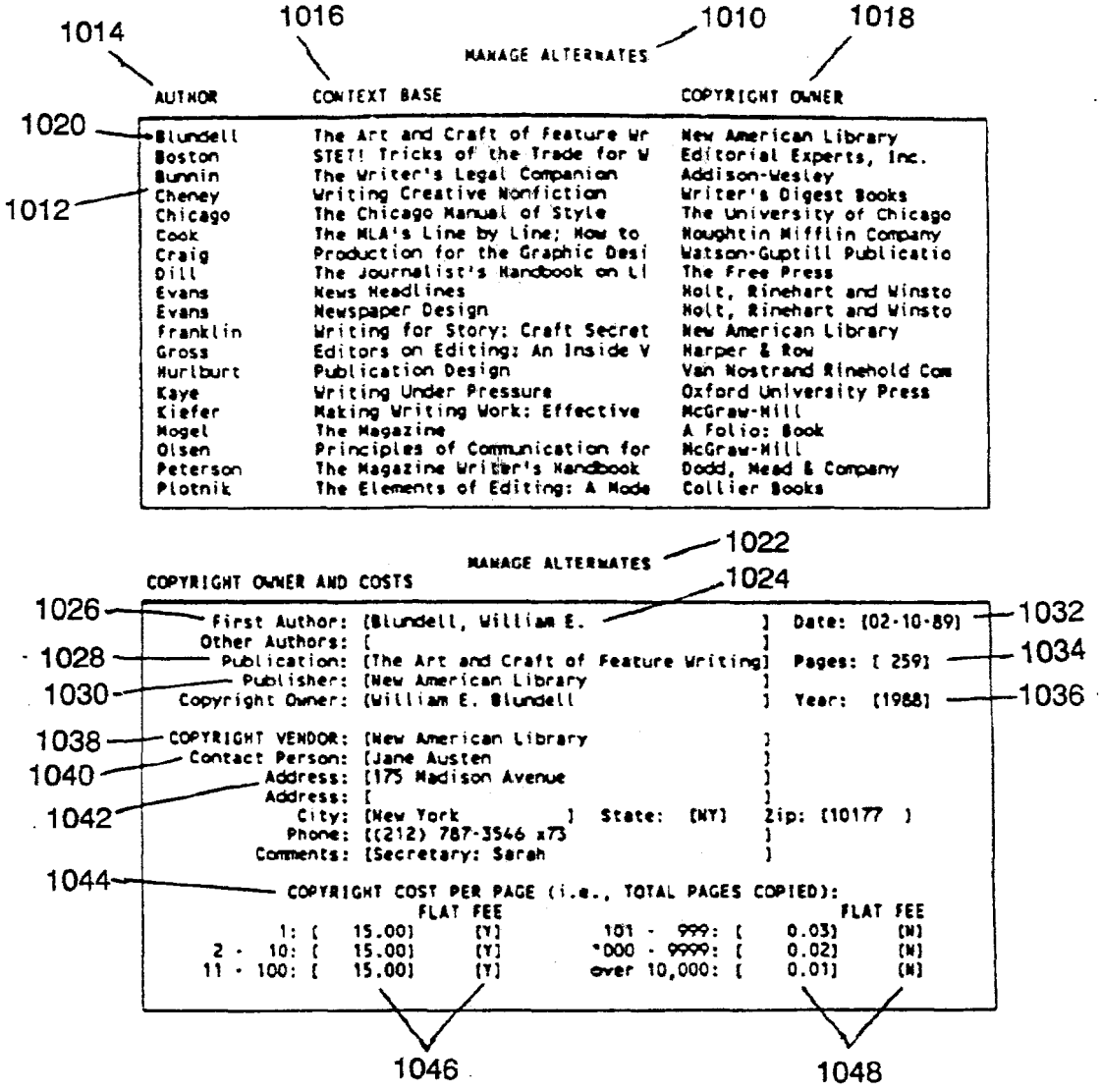

1014
1016
1010
1018
MANAGE ALTERNATES
AUTHOR
CONTEXT BASE
COPYRIGHT OWNER
1020
1012
Blundell The Art and Craft of Feature Wr New American Library
Boston STET! Tricks of the Trade for W Editorial Experts, Inc.
Bunnin The Writer's Legal Companion Addison-Wesley
Cheney Writing Creative Nonfiction Writer's Digest Books
Chicago The Chicago Manual of Style The University of Chicago
Cook The MLA's Line by Line; How to Houghtin Mifflin Company
Craig Production for the Graphic Desi Watson-Guptill Publicatio
Dill The Journalist's Handbook on Li The Free Press
Evans News Headlines Holt, Rinehart and Winsto
Evans Newspaper Design Holt, Rinehart and Winsto
Franklin Writing for Story: Craft Secret New American Library
Gross Editors on Editing: An Inside V Harper & Row
Hurlburt Publication Design Van Nostrand Rinehold Com
Kaye Writing Under Pressure Oxford University Press
Kiefer Making Writing Work: Effective McGraw-Hill
Nogel The Magazine A Folio: Book
Olsen Principles of Communication for McGraw-Hill
Peterson The Magazine Writer's Handbook Dodd, Mead & Company
Plotnik The Elements of Editing: A Mode Collier Books
1022
MANAGE ALTERNATES
COPYRIGHT OWNER AND COSTS
1024
1026
First Author: [Blundell, William E.] Date: [02-10-89] 1032
Other Authors: [ ]
1028 Publication: [The Art and Craft of Feature Writing] Pages: [259] 1034
1030 Publisher: [New American Library]
Copyright Owner: [William E. Blundell] Year: [1988] 1036
1038 COPYRIGHT VENDOR: [New American Library]
1040 Contact Person: [Jane Austen]
Address: [175 Madison Avenue]
1042 Address: [ ]
City: [New York] State: [NY] Zip: [10177]
Phone: [(212) 787-3546 x73]
Comments: [Secretary: Sarah]
1044 COPYRIGHT COST PER PAGE (i.e., TOTAL PAGES COPIED):
FLAT FEE FLAT FEE
1: [15.00] [Y] 101 - 999: [0.03] [N]
2 - 10: [15.00] [Y] 1000 - 9999: [0.02] [N]
11 - 100: [15.00] [Y] over 10,000: [0.01] [N]
1046
1048

FIG. 74

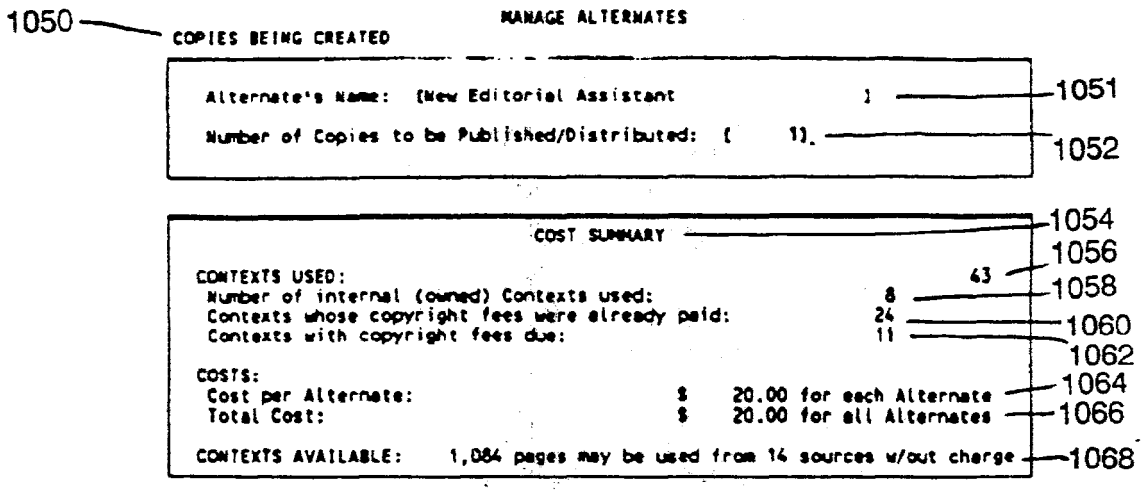

1050
COPIES BEING CREATED
MANAGE ALTERNATES
Alternate's Name: (New Editorial Assistant)
1051
Number of Copies to be Published/Distributed: (1).
1052
COST SUMMARY
1054
CONTEXTS USED:
43
1056
Number of internal (owned) Contexts used:
8
1058
Contexts whose copyright fees were already paid:
24
1060
Contexts with copyright fees due:
11
1062
COSTS:
Cost per Alternate: $ 20.00 for each Alternate
1064
Total Cost: $ 20.00 for all Alternates
1066
CONTEXTS AVAILABLE: 1,084 pages may be used from 14 sources w/out charge
1068

FIG. 75

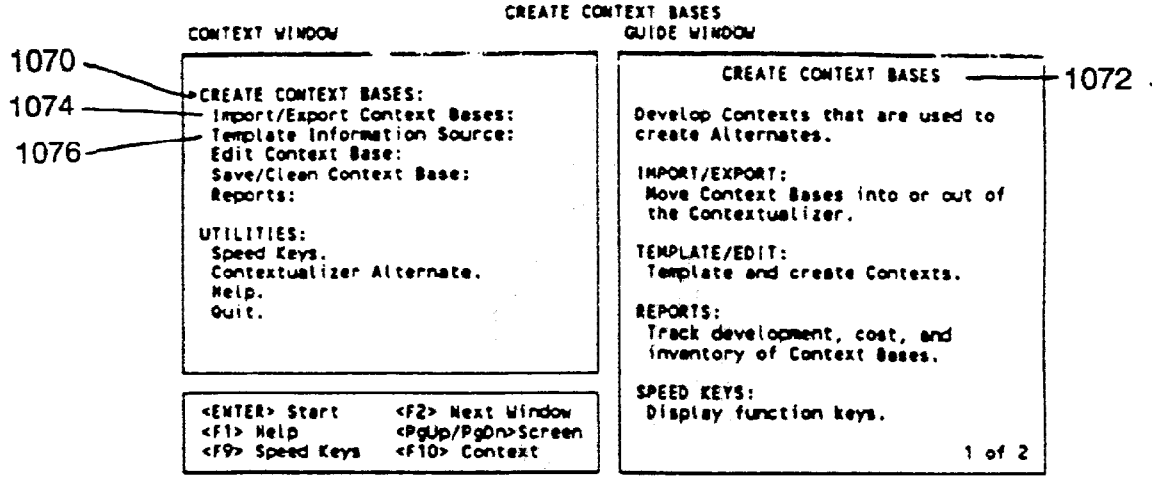

CREATE CONTEXT BASES
CONTEXT WINDOW
GUIDE WINDOW
1070
1074
1076
1072
CREATE CONTEXT BASES:
Import/Export Context Bases:
Template Information Source:
Edit Context Base:
Save/Clean Context Base:
Reports:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Quit.
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Context
CREATE CONTEXT BASES
Develop Contexts that are used to create Alternates.
IMPORT/EXPORT:
Move Context Bases into or out of the Contextualizer.
TEMPLATE/EDIT:
Template and create Contexts.
REPORTS:
Track development, cost, and inventory of Context Bases.
SPEED KEYS:
Display function keys.
1 of 2

FIG. 76

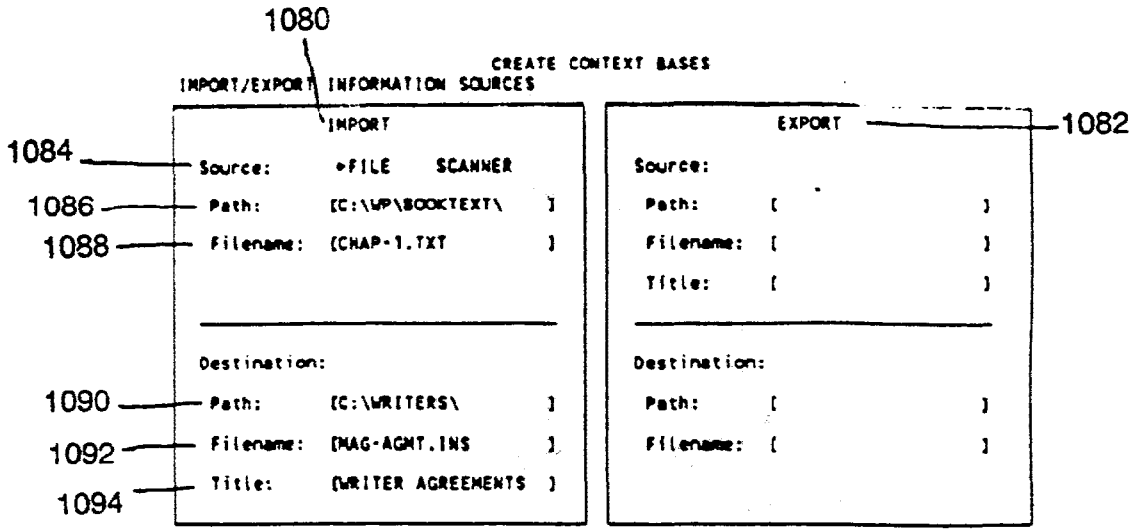

1080
CREATE CONTEXT BASES
IMPORT/EXPORT INFORMATION SOURCES
IMPORT
EXPORT
1082
1084
Source: •FILE SCANNER
1086
Path: [C:\WP\BOOKTEXT\ ]
1088
Filename: [CHAP-1.TXT]
Destination:
1090
Path: [C:\WRITERS\ ]
1092
Filename: [MAG-AGMT.INS]
1094
Title: [WRITER AGREEMENTS]
Source:
Path: [ ]
Filename: [ ]
Title: [ ]
Destination:
Path: [ ]
Filename: [ ]

FIG. 77

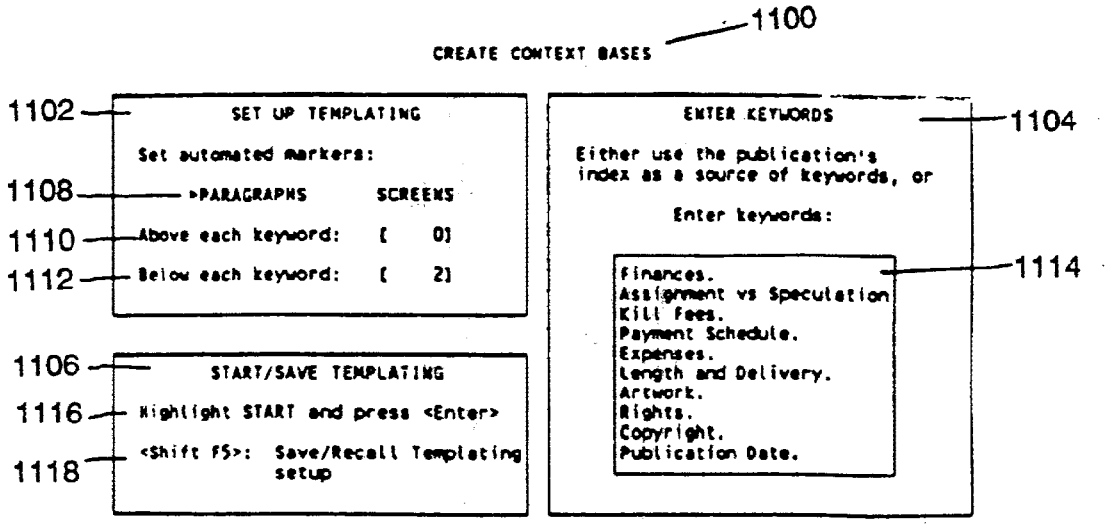

1100
CREATE CONTEXT BASES
1102
SET UP TEMPLATING
Set automated markers:
1108
>PARAGRAPHS SCREENS
1110
Above each keyword: [0]
1112
Below each keyword: [2]
1106
START/SAVE TEMPLATING
1116
Highlight START and press <Enter>
1118
<Shift F5>: Save/Recall Templating setup
ENTER KEYWORDS
1104
Either use the publication's index as a source of keywords, or
Enter keywords:
1114
Finances.
Assignment vs Speculation
Kill Fees.
Payment Schedule.
Expenses.
Length and Delivery.
Artwork.
Rights.
Copyright.
Publication Date.

FIG. 78

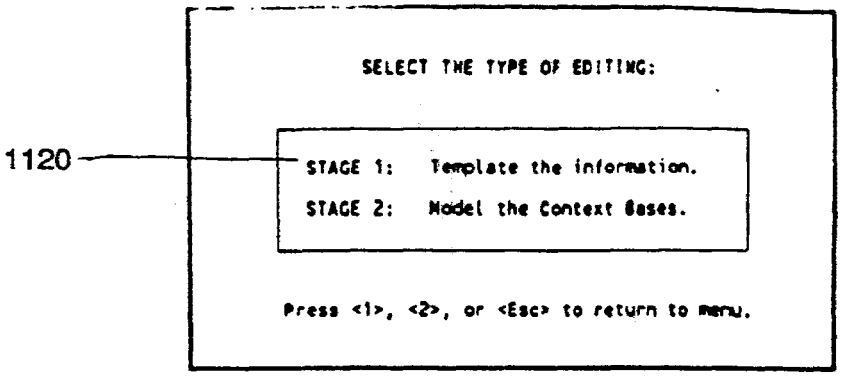

SELECT THE TYPE OF EDITING:
1120
STAGE 1: Template the information.
STAGE 2: Model the Context Bases.
Press <1>, <2>, or <Esc> to return to menu.

FIG. 79

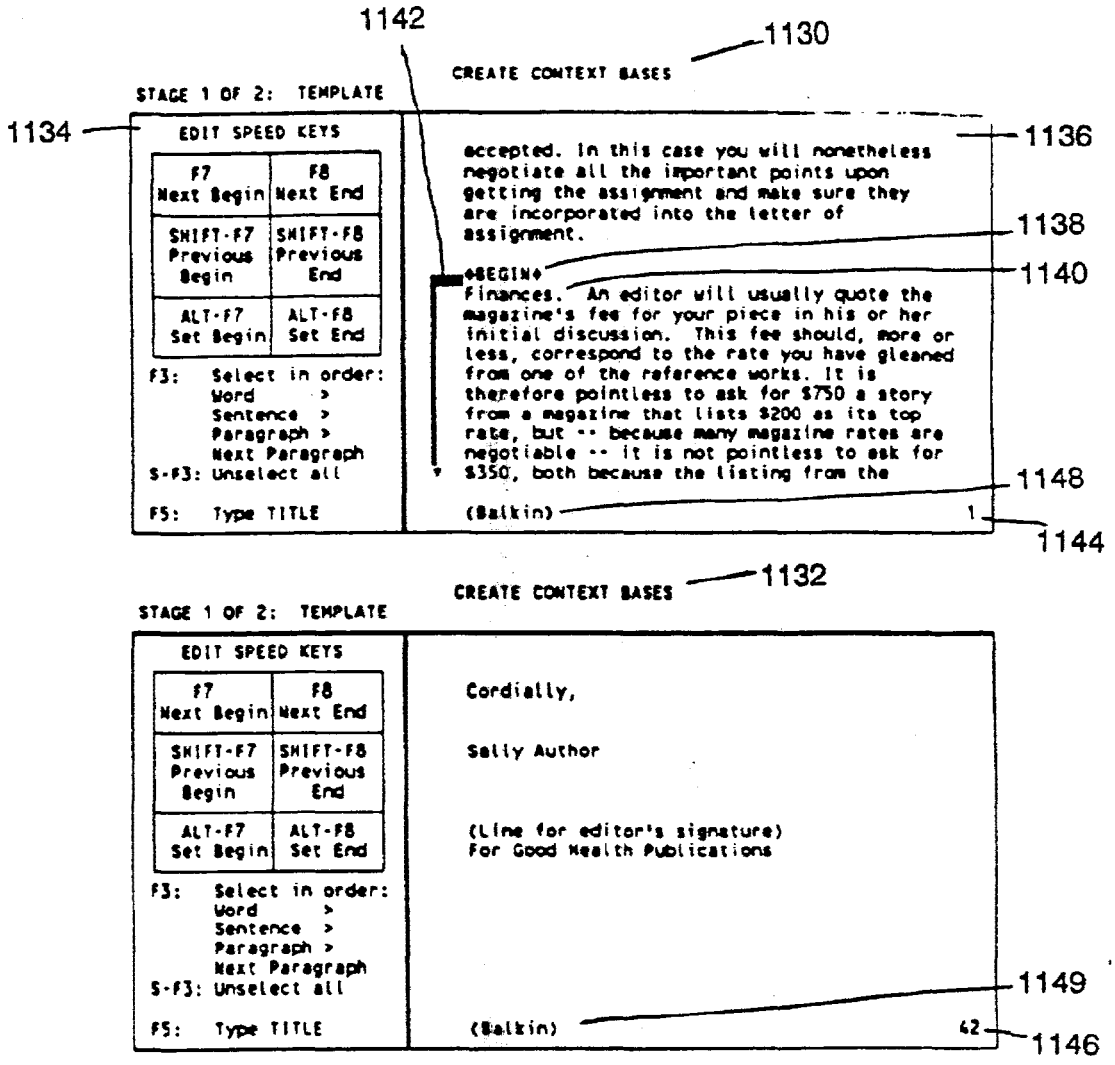

1142
1130
CREATE CONTEXT BASES
STAGE 1 OF 2: TEMPLATE
1134
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
accepted. In this case you will nonetheless negotiate all the important points upon getting the assignment and make sure they are incorporated into the letter of assignment.
1136
1138
♦BEGIN♦
1140
Finances. An editor will usually quote the magazine's fee for your piece in his or her initial discussion. This fee should, more or less, correspond to the rate you have gleaned from one of the reference works. It is therefore pointless to ask for $750 a story from a magazine that lists $200 as its top rate, but -- because many magazine rates are negotiable -- it is not pointless to ask for $350, both because the listing from the
1148
(Balkin) 1
1144
CREATE CONTEXT BASES
1132
STAGE 1 OF 2: TEMPLATE
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
Cordially,
Sally Author
(Line for editor's signature)
For Good Health Publications
1149
(Balkin) 42
1146

FIG. 80

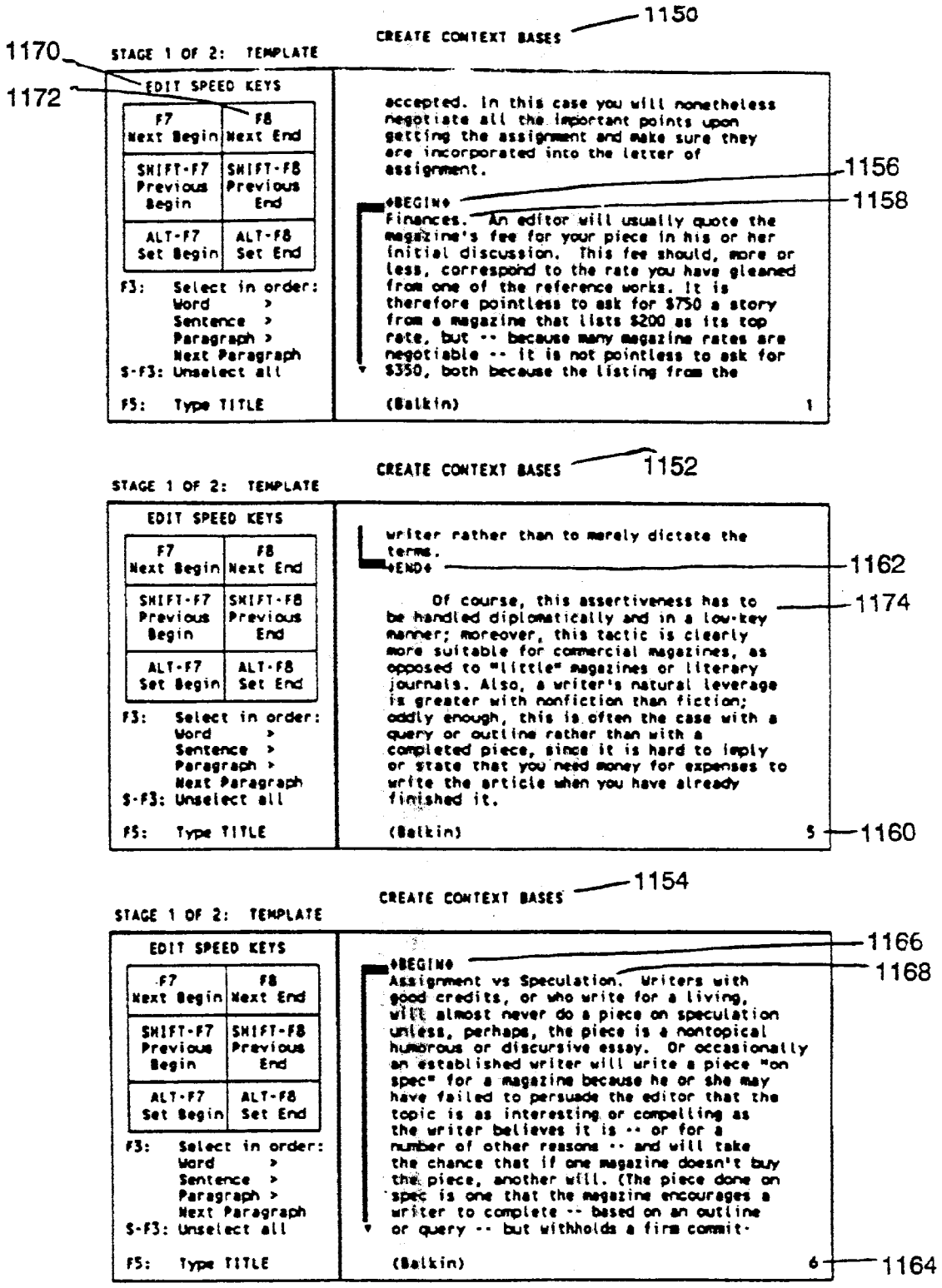

1150
CREATE CONTEXT BASES
1170
STAGE 1 OF 2: TEMPLATE
1172
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
accepted. In this case you will nonetheless negotiate all the important points upon getting the assignment and make sure they are incorporated into the letter of assignment.
1156
♦BEGIN♦
1158
Finances. An editor will usually quote the magazine's fee for your piece in his or her initial discussion. This fee should, more or less, correspond to the rate you have gleaned from one of the reference works. It is therefore pointless to ask for $750 a story from a magazine that lists $200 as its top rate, but -- because many magazine rates are negotiable -- it is not pointless to ask for $350, both because the listing from the
(Balkin) 1
1152
CREATE CONTEXT BASES
STAGE 1 OF 2: TEMPLATE
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
writer rather than to merely dictate the terms.
♦END♦
1162
Of course, this assertiveness has to be handled diplomatically and in a low-key manner; moreover, this tactic is clearly more suitable for commercial magazines, as opposed to "little" magazines or literary journals. Also, a writer's natural leverage is greater with nonfiction than fiction; oddly enough, this is often the case with a query or outline rather than with a completed piece, since it is hard to imply or state that you need money for expenses to write the article when you have already finished it.
1174
(Balkin) 5
1160
1154
CREATE CONTEXT BASES
STAGE 1 OF 2: TEMPLATE
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
1166
♦BEGIN♦
1168
Assignment vs Speculation. Writers with good credits, or who write for a living, will almost never do a piece on speculation unless, perhaps, the piece is a nontopical humorous or discursive essay. Or occasionally an established writer will write a piece "on spec" for a magazine because he or she may have failed to persuade the editor that the topic is as interesting or compelling as the writer believes it is -- or for a number of other reasons -- and will take the chance that if one magazine doesn't buy the piece, another will. (The piece done on spec is one that the magazine encourages a writer to complete -- based on an outline or query -- but withholds a firm commit-
(Balkin) 6
1164

FIG. 81

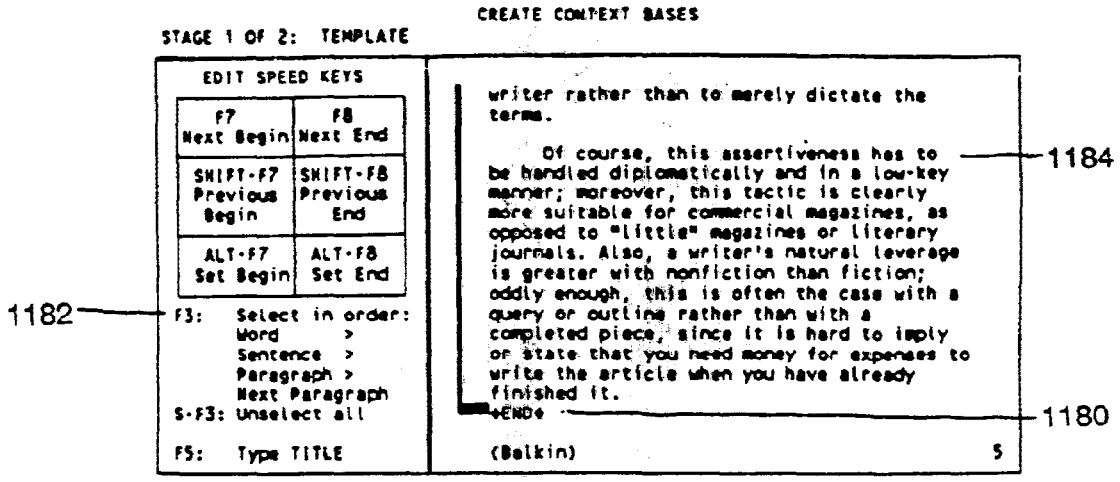

CREATE CONTEXT BASES
STAGE 1 OF 2: TEMPLATE
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
1182
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
writer rather than to merely dictate the terms.
Of course, this assertiveness has to be handled diplomatically and in a low-key manner; moreover, this tactic is clearly more suitable for commercial magazines, as opposed to "little" magazines or literary journals. Also, a writer's natural leverage is greater with nonfiction than fiction; oddly enough, this is often the case with a query or outline rather than with a completed piece, since it is hard to imply or state that you need money for expenses to write the article when you have already finished it.
1184
•END•
1180
(Balkin) 5

FIG. 82

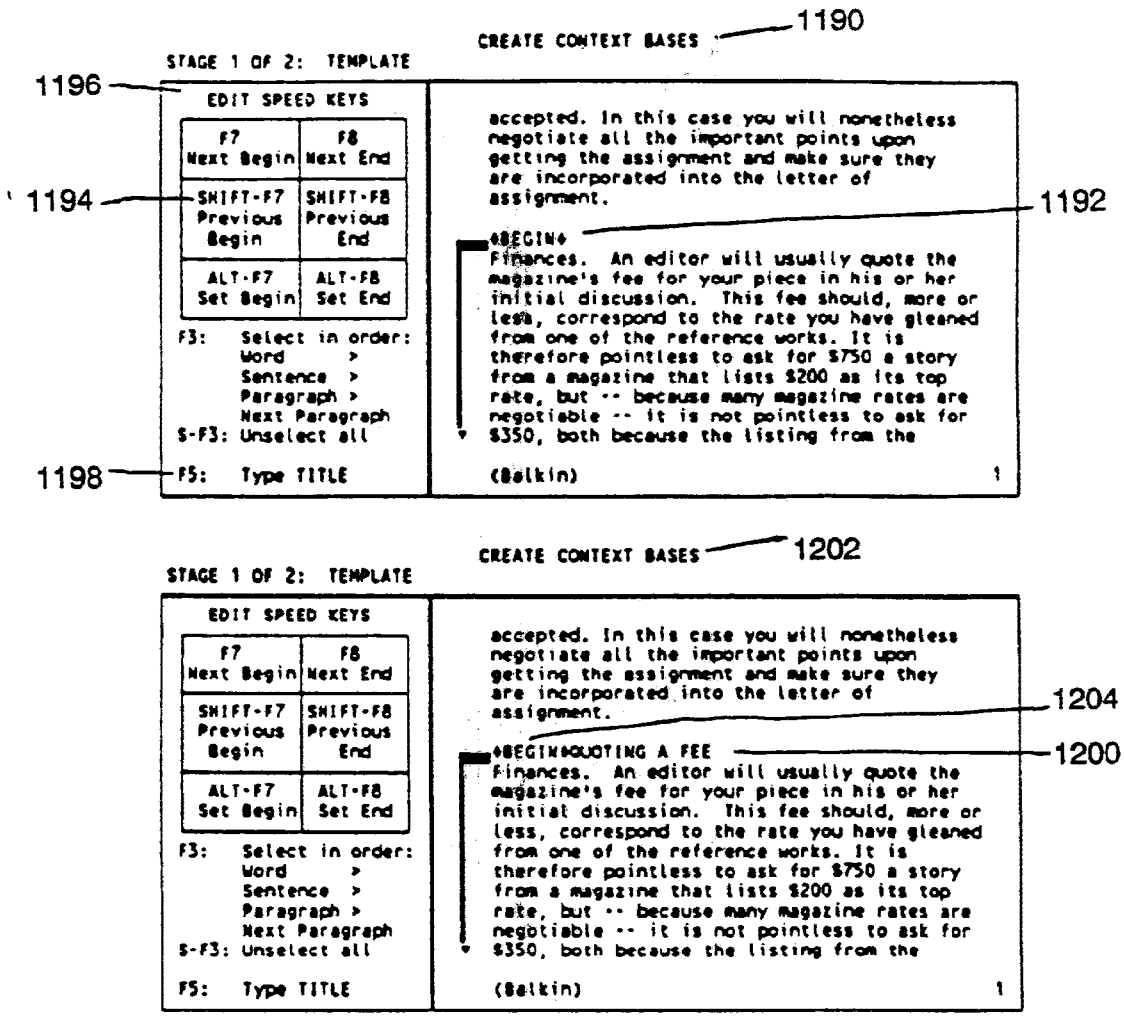

CREATE CONTEXT BASES
1190
STAGE 1 OF 2: TEMPLATE
1196
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
1194
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
1198
F5: Type TITLE
accepted. In this case you will nonetheless negotiate all the important points upon getting the assignment and make sure they are incorporated into the letter of assignment.
1192
♦BEGIN♦
Finances. An editor will usually quote the magazine's fee for your piece in his or her initial discussion. This fee should, more or less, correspond to the rate you have gleaned from one of the reference works. It is therefore pointless to ask for $750 a story from a magazine that lists $200 as its top rate, but -- because many magazine rates are negotiable -- it is not pointless to ask for $350, both because the listing from the
(Balkin)
1
CREATE CONTEXT BASES
1202
STAGE 1 OF 2: TEMPLATE
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
accepted. In this case you will nonetheless negotiate all the important points upon getting the assignment and make sure they are incorporated into the letter of assignment.
1204
♦BEGIN♦QUOTING A FEE
1200
Finances. An editor will usually quote the magazine's fee for your piece in his or her initial discussion. This fee should, more or less, correspond to the rate you have gleaned from one of the reference works. It is therefore pointless to ask for $750 a story from a magazine that lists $200 as its top rate, but -- because many magazine rates are negotiable -- it is not pointless to ask for $350, both because the listing from the
(Balkin)
1

FIG. 83

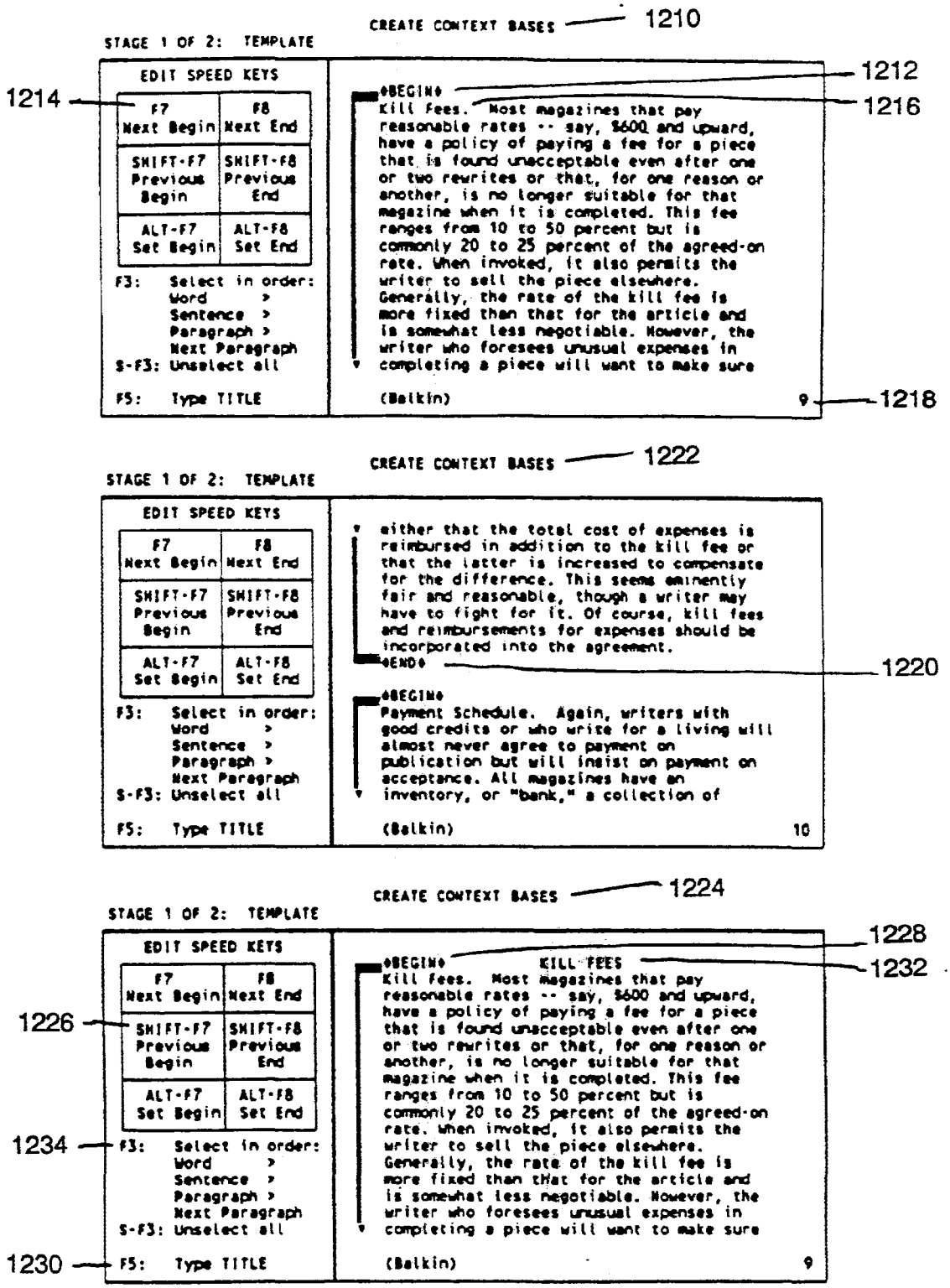

CREATE CONTEXT BASES
1210
STAGE 1 OF 2: TEMPLATE
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
1214
1212
1216
◊BEGIN◊
Kill Fees. Most magazines that pay reasonable rates -- say, $600 and upward, have a policy of paying a fee for a piece that is found unacceptable even after one or two rewrites or that, for one reason or another, is no longer suitable for that magazine when it is completed. This fee ranges from 10 to 50 percent but is commonly 20 to 25 percent of the agreed-on rate. When invoked, it also permits the writer to sell the piece elsewhere. Generally, the rate of the kill fee is more fixed than that for the article and is somewhat less negotiable. However, the writer who foresees unusual expenses in completing a piece will want to make sure
(Balkin) 9
1218
CREATE CONTEXT BASES
1222
STAGE 1 OF 2: TEMPLATE
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
either that the total cost of expenses is reimbursed in addition to the kill fee or that the latter is increased to compensate for the difference. This seems eminently fair and reasonable, though a writer may have to fight for it. Of course, kill fees and reimbursements for expenses should be incorporated into the agreement.
◊END◊
1220
◊BEGIN◊
Payment Schedule. Again, writers with good credits or who write for a living will almost never agree to payment on publication but will insist on payment on acceptance. All magazines have an inventory, or "bank," a collection of
(Balkin) 10
CREATE CONTEXT BASES
1224
STAGE 1 OF 2: TEMPLATE
EDIT SPEED KEYS
F7 Next Begin
F8 Next End
SHIFT-F7 Previous Begin
SHIFT-F8 Previous End
ALT-F7 Set Begin
ALT-F8 Set End
F3: Select in order:
Word >
Sentence >
Paragraph >
Next Paragraph
S-F3: Unselect all
F5: Type TITLE
1226
1234
1230
1228
1232
◊BEGIN◊ KILL FEES
Kill Fees. Most magazines that pay reasonable rates -- say, $600 and upward, have a policy of paying a fee for a piece that is found unacceptable even after one or two rewrites or that, for one reason or another, is no longer suitable for that magazine when it is completed. This fee ranges from 10 to 50 percent but is commonly 20 to 25 percent of the agreed-on rate. When invoked, it also permits the writer to sell the piece elsewhere. Generally, the rate of the kill fee is more fixed than tHat for the article and is somewhat less negotiable. However, the writer who foresees unusual expenses in completing a piece will want to make sure
(Balkin) 9

FIG. 84

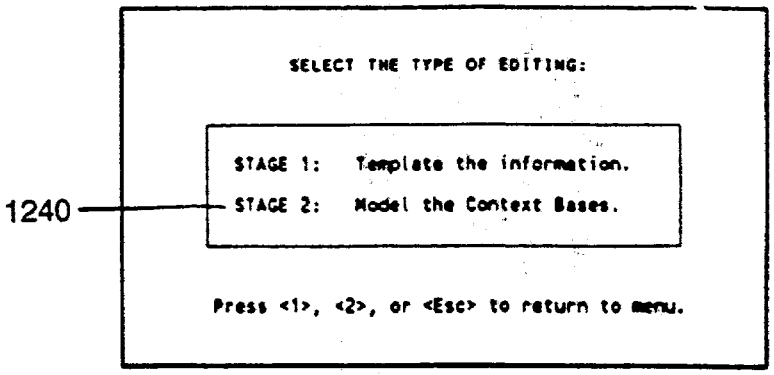

SELECT THE TYPE OF EDITING:
STAGE 1: Template the information.
STAGE 2: Model the Context Bases.
1240
Press <1>, <2>, or <Esc> to return to menu.

FIG. 85

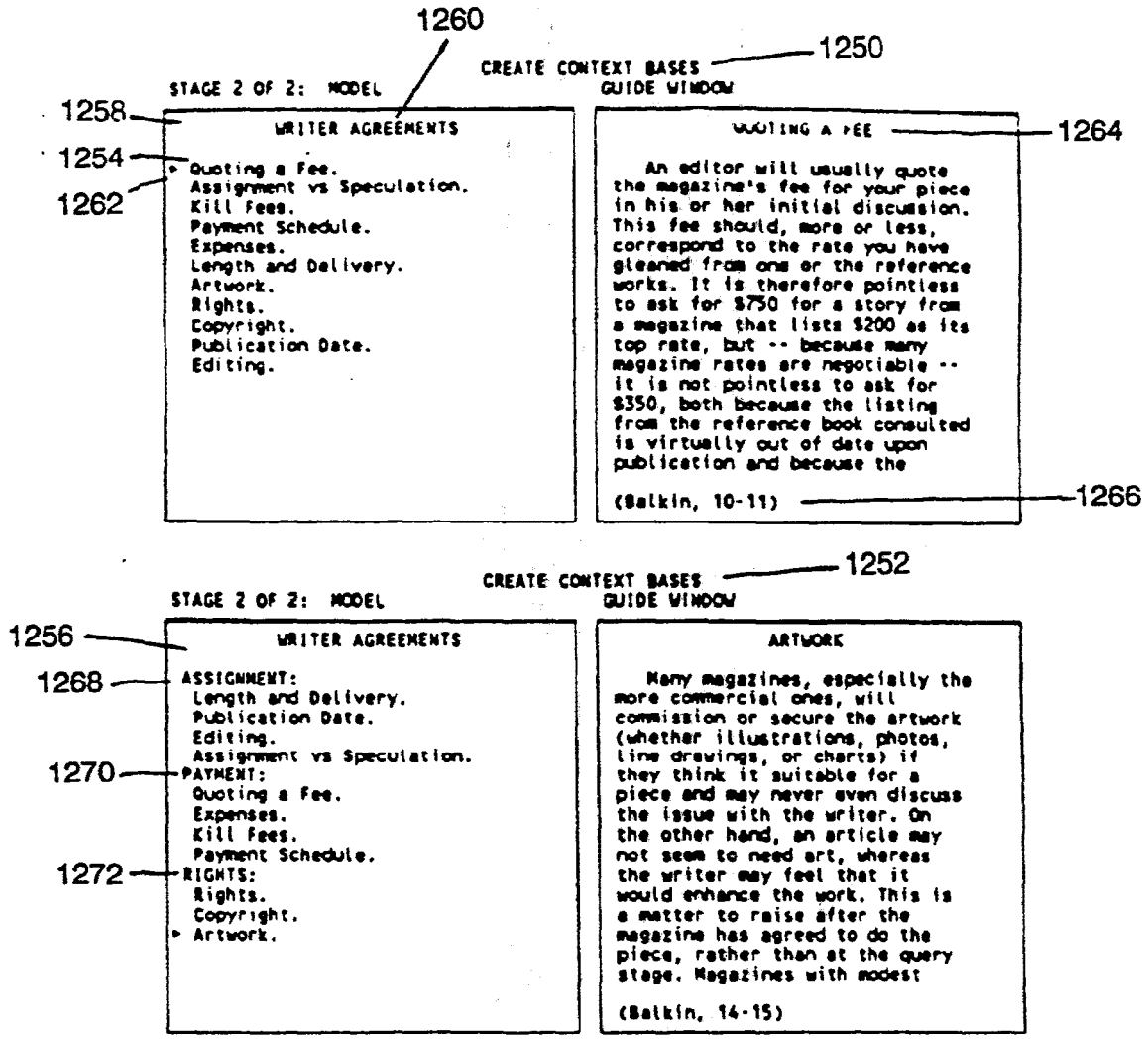
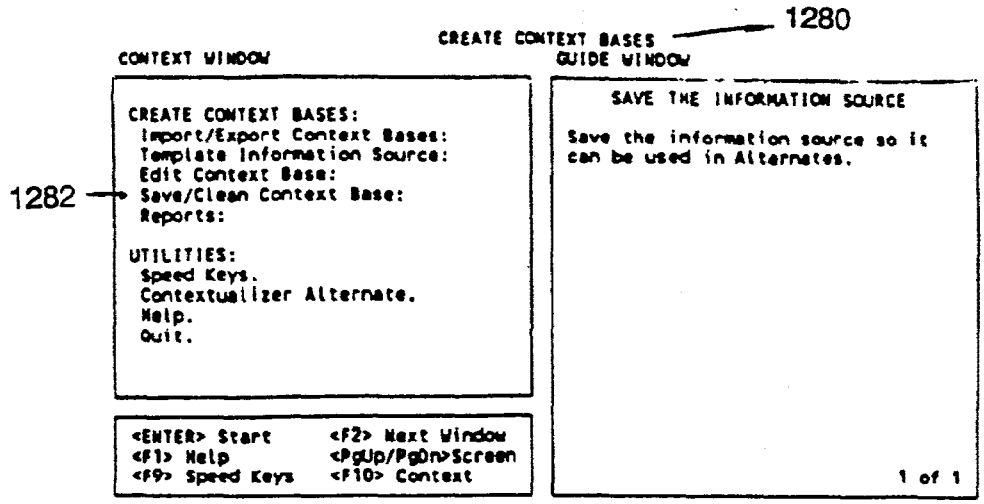
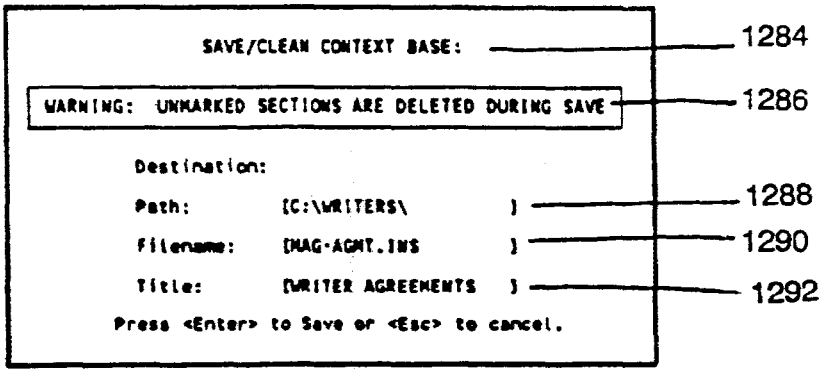

1260
CREATE CONTEXT BASES
1250
STAGE 2 OF 2: MODEL
GUIDE WINDOW
1258
WRITER AGREEMENTS
1254
Quoting a Fee.
1262
Assignment vs Speculation.
Kill Fees.
Payment Schedule.
Expenses.
Length and Delivery.
Artwork.
Rights.
Copyright.
Publication Date.
Editing.
QUOTING A FEE
1264
An editor will usually quote the magazine's fee for your piece in his or her initial discussion. This fee should, more or less, correspond to the rate you have gleaned from one or the reference works. It is therefore pointless to ask for $750 for a story from a magazine that lists $200 as its top rate, but -- because many magazine rates are negotiable -- it is not pointless to ask for $350, both because the listing from the reference book consulted is virtually out of date upon publication and because the
(Balkin, 10-11)
1266
CREATE CONTEXT BASES
1252
STAGE 2 OF 2: MODEL
GUIDE WINDOW
1256
WRITER AGREEMENTS
1268
ASSIGNMENT:
Length and Delivery.
Publication Date.
Editing.
Assignment vs Speculation.
1270
PAYMENT:
Quoting a Fee.
Expenses.
Kill Fees.
Payment Schedule.
1272
RIGHTS:
Rights.
Copyright.
Artwork.
ARTWORK
Many magazines, especially the more commercial ones, will commission or secure the artwork (whether illustrations, photos, line drawings, or charts) if they think it suitable for a piece and may never even discuss the issue with the writer. On the other hand, an article may not seem to need art, whereas the writer may feel that it would enhance the work. This is a matter to raise after the magazine has agreed to do the piece, rather than at the query stage. Magazines with modest
(Balkin, 14-15)

FIG. 86


CREATE CONTEXT BASES
1280
CONTEXT WINDOW
GUIDE WINDOW
CREATE CONTEXT BASES:
Import/Export Context Bases:
Template Information Source:
Edit Context Base:
1282
Save/Clean Context Base:
Reports:
UTILITIES:
Speed Keys.
Contextualizer Alternate.
Help.
Quit.
SAVE THE INFORMATION SOURCE
Save the information source so it can be used in Alternates.
<ENTER> Start
<F1> Help
<F9> Speed Keys
<F2> Next Window
<PgUp/PgDn>Screen
<F10> Context
1 of 1


SAVE/CLEAN CONTEXT BASE:
1284
WARNING: UNMARKED SECTIONS ARE DELETED DURING SAVE
1286
Destination:
Path: [C:\WRITERS\ ]
1288
Filename: [MAG-AGNT.INS]
1290
Title: [WRITER AGREEMENTS]
1292
Press <Enter> to Save or <Esc> to cancel.

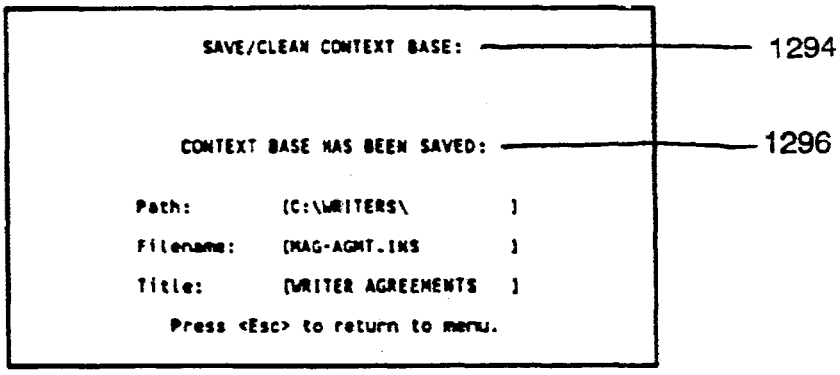

SAVE/CLEAN CONTEXT BASE:
1294
CONTEXT BASE HAS BEEN SAVED:
1296
Path: [C:\WRITERS\ ]
Filename: [MAG-AGNT.INS]
Title: [WRITER AGREEMENTS]
Press <Esc> to return to menu.

FIG. 87

FIG. 88

Context	Information Source
Traditional Customer Service Department (CSD) Improvements:	
Select a new CSD system:	
Current tracking system (too much numbers and "good news?"):	
Internal numerical reports and graphs.	Internal computer file
Internal descriptive reports.	Internal computer file
Possible new tracking systems:	
Alternative #1.	Management systems
Alternative #2.	Quantitative and qualitative evaluation
Delegate a new system to CSD manager:	
Select new system with current manager:	
Consensus approach (preferred).	Personnel management
Negotiation approach (backup).	Negotiation strategies
Confrontation approach (contingency).	Negotiation strategies
CSD manager implements new system:	
Design clear and simple forms.	Business forms design
Train employees in new system.	Training methods
Administer/collect data, evaluate, improve.	
Analysis:	
Key statistics and graphs.	Business statistics
Compare with current reports.	Quantitative and qualitative evaluation
Compare with customer expectations.	Internal marketing department
Compare with other customer service:	
Customer service in the industry.	Trade magazine reports
Customer service in other industries.	Trade magazine reports
Forming Conclusions/Recommendations:	
Draft of conclusions/recommendations.	To be explored
Review and reach consensus.	
Final report or memo.	

Context	Information Source
A voice for the customer throughout the company?:	
Rapidly Improving Corporate Responsiveness:	
Examples of Japanese companies:	
Company #1.	Trade magazine reports
Company #2.	Management systems
An example American company.	Trade magazine reports
Cost of prevention vs cost of problems:	
Costs of problems in our company:	
An analysis from last year.	Internal computer file
Cost of our customer service department.	Internal computer file
Cost of this program.	To be explored
External model of potential savings.	Management systems
"Customer Alternates" for cooperative redirection:	
Customer input in manufacturing.	To be explored
Customer input in distribution.	To be explored
Customer input in product design.	To be explored
Marketing, support and training.	To be explored
Potential business advantages.	To be explored
Possible operating procedures.	Management systems
Possible implementation procedures.	Customer input online manual
Is a nine-month transformation possible?:	
An example nine-month plan.	Management systems

FIG. 89

WO 91/12583 PCT/US91/00807

FIG. 90

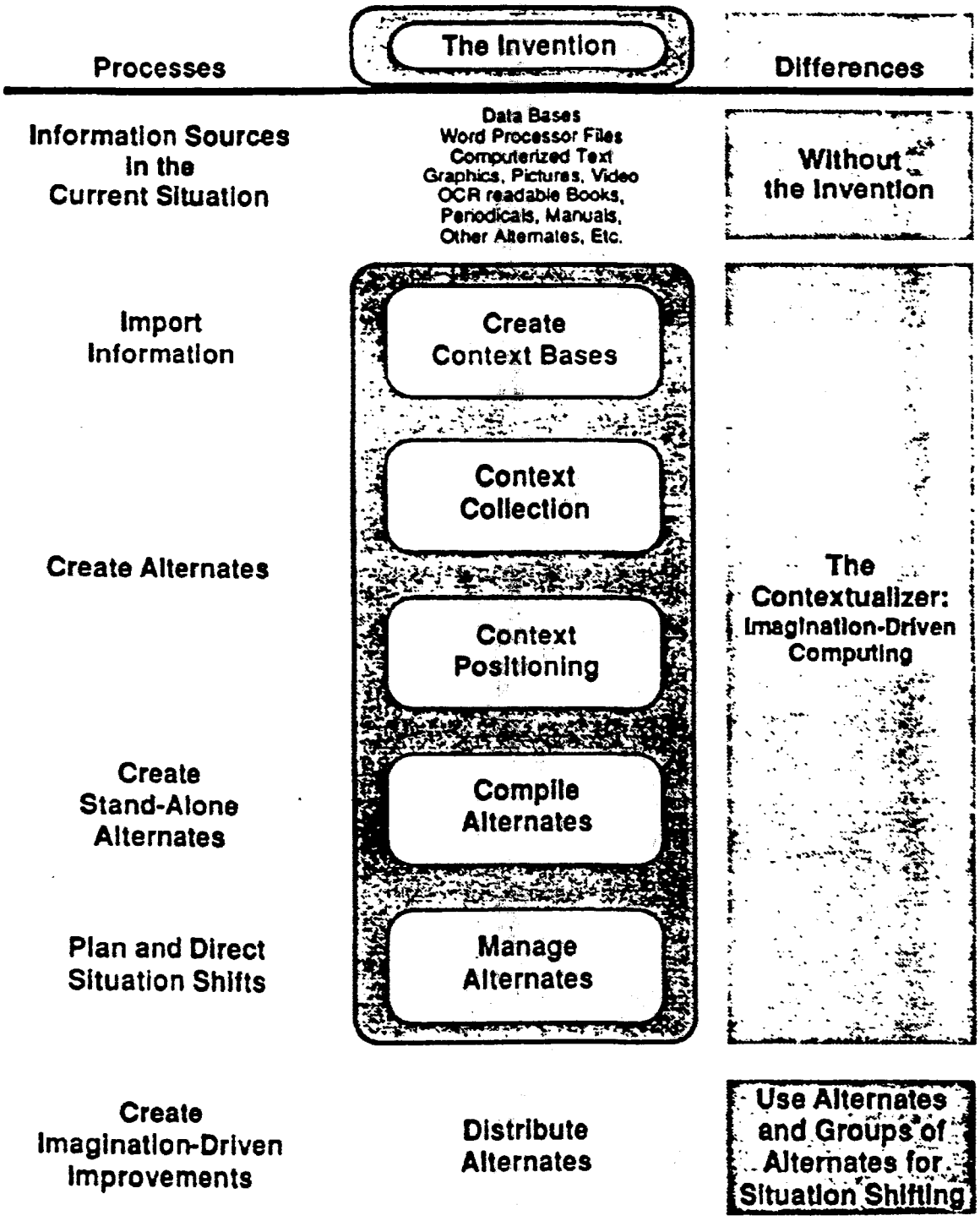
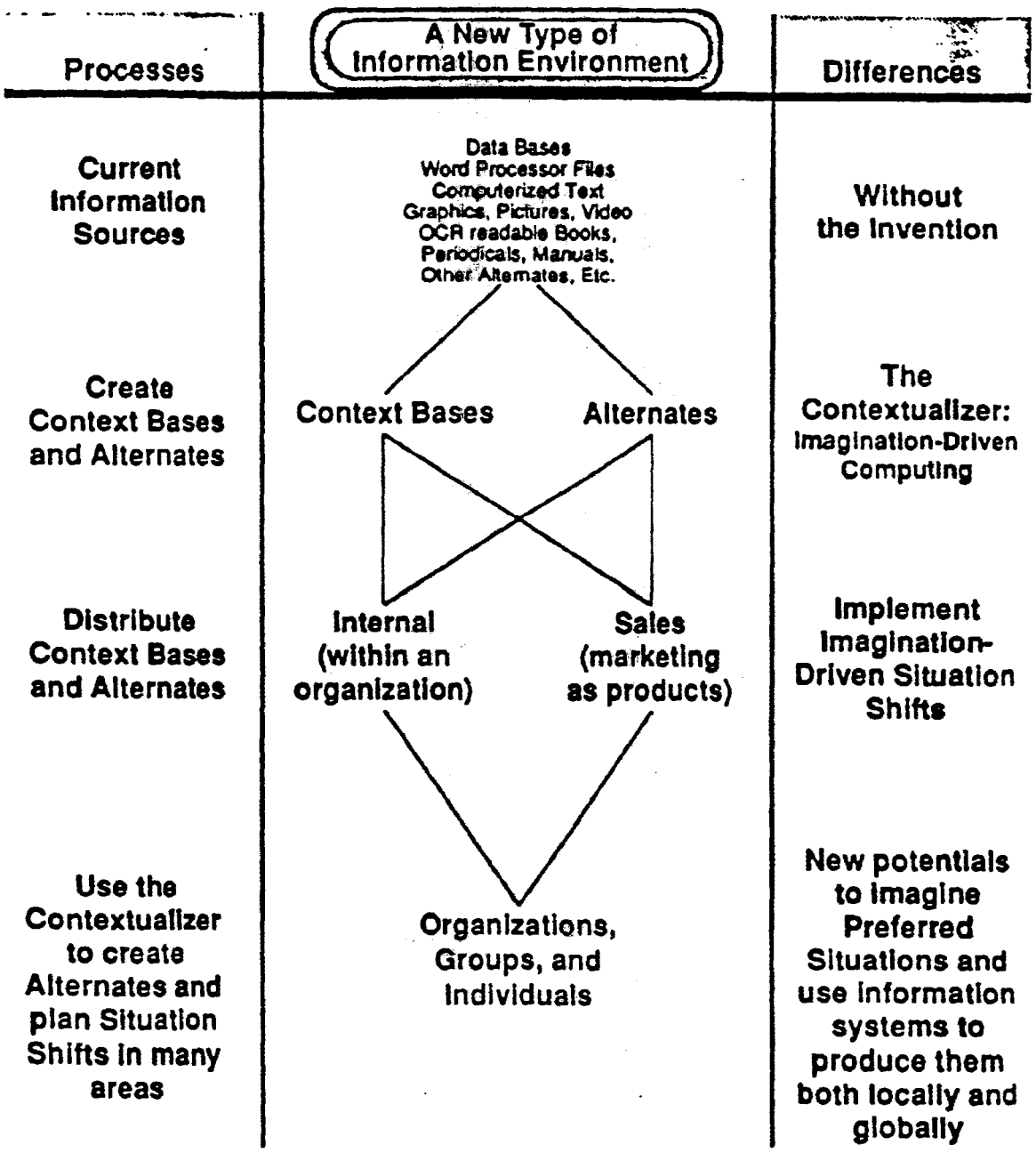


FIG. 91


Processes
A New Type of Information Environment
Differences
Current Information Sources
Data Bases
Word Processor Files
Computerized Text
Graphics, Pictures, Video
OCR readable Books,
Periodicals, Manuals,
Other Alternates, Etc.
Without the Invention
Create Context Bases and Alternates
Context Bases
Alternates
The Contextualizer: Imagination-Driven Computing
Distribute Context Bases and Alternates
Internal (within an organization)
Sales (marketing as products)
Implement Imagination-Driven Situation Shifts
Use the Contextualizer to create Alternates and plan Situation Shifts in many areas
Organizations, Groups, and Individuals
New potentials to imagine Preferred Situations and use information systems to produce them both locally and globally

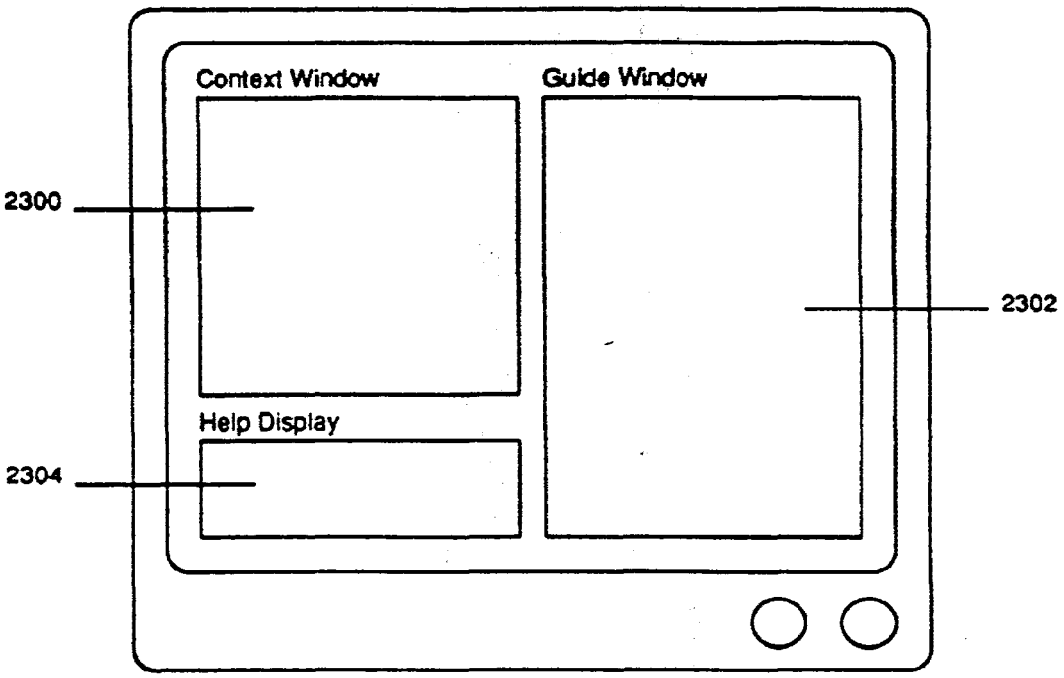


FIG. 92

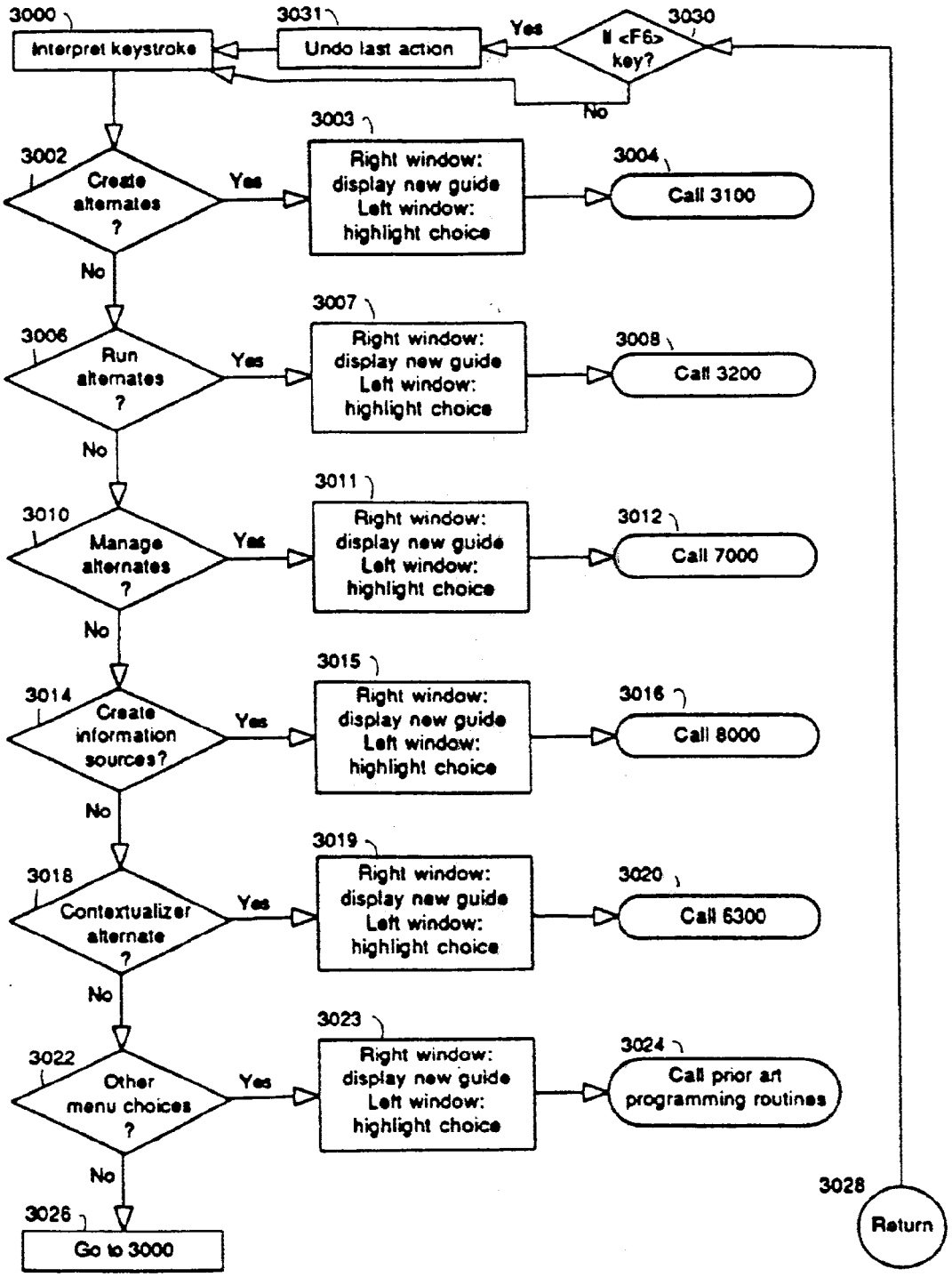

3000
Interpret keystroke
3031
Undo last action
Yes
If <F6> key?
3030
No
3002
Create alternates ?
Yes
3003
Right window: display new guide Left window: highlight choice
3004
Call 3100
No
3006
Run alternates ?
Yes
3007
Right window: display new guide Left window: highlight choice
3008
Call 3200
No
3010
Manage alternates ?
Yes
3011
Right window: display new guide Left window: highlight choice
3012
Call 7000
No
3014
Create information sources?
Yes
3015
Right window: display new guide Left window: highlight choice
3016
Call 8000
No
3018
Contextualizer alternate ?
Yes
3019
Right window: display new guide Left window: highlight choice
3020
Call 6300
No
3022
Other menu choices ?
Yes
3023
Right window: display new guide Left window: highlight choice
3024
Call prior art programming routines
No
3026
Go to 3000
3028
Return

FIG. 93

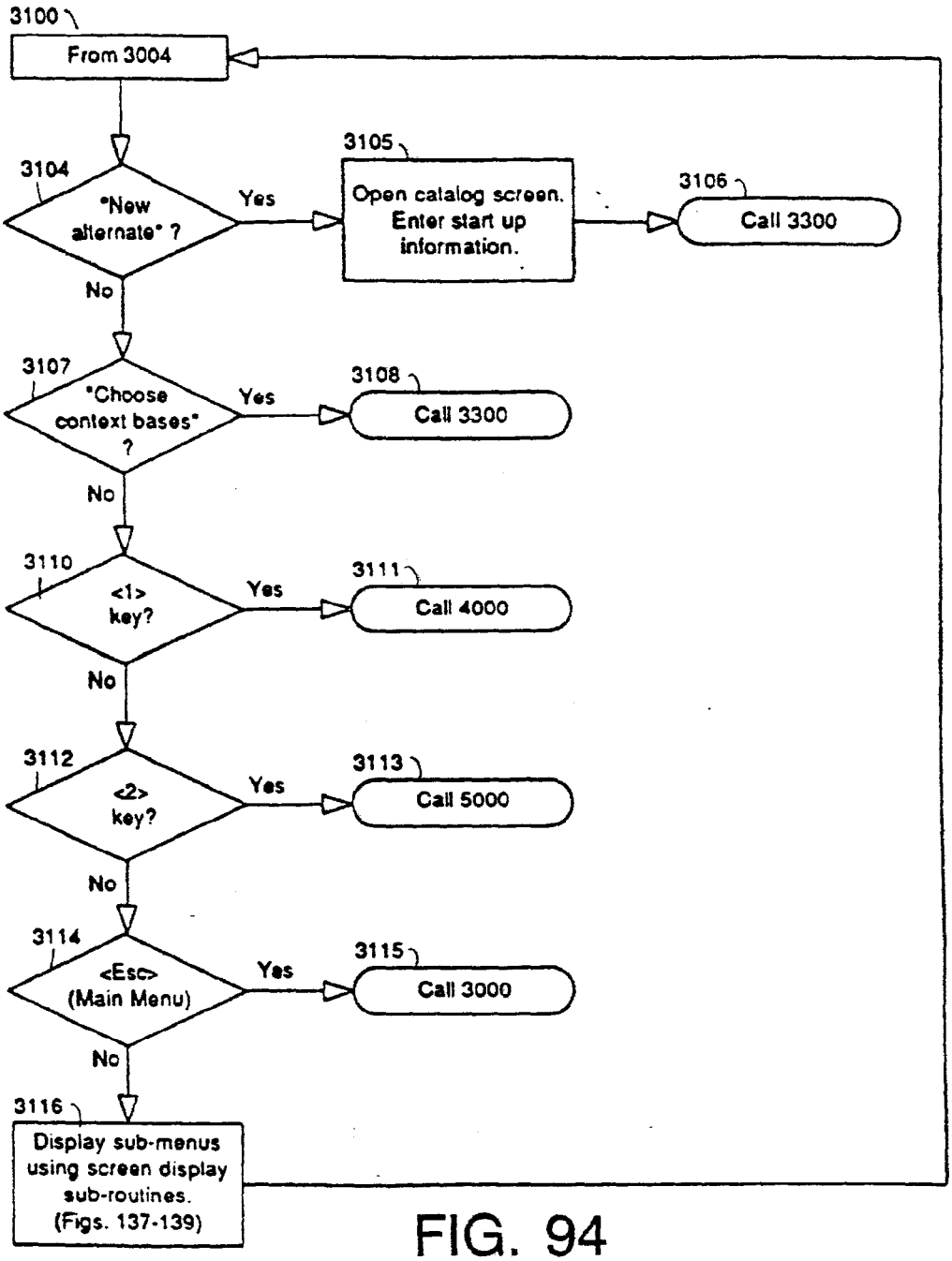

3100
From 3004
3104
"New alternate" ?
Yes
3105
Open catalog screen. Enter start up information.
3106
Call 3300
No
3107
"Choose context bases" ?
Yes
3108
Call 3300
No
3110
<1> key?
Yes
3111
Call 4000
No
3112
<2> key?
Yes
3113
Call 5000
No
3114
<Esc> (Main Menu)
Yes
3115
Call 3000
No
3116
Display sub-menus using screen display sub-routines. (Figs. 137-139)

FIG. 94

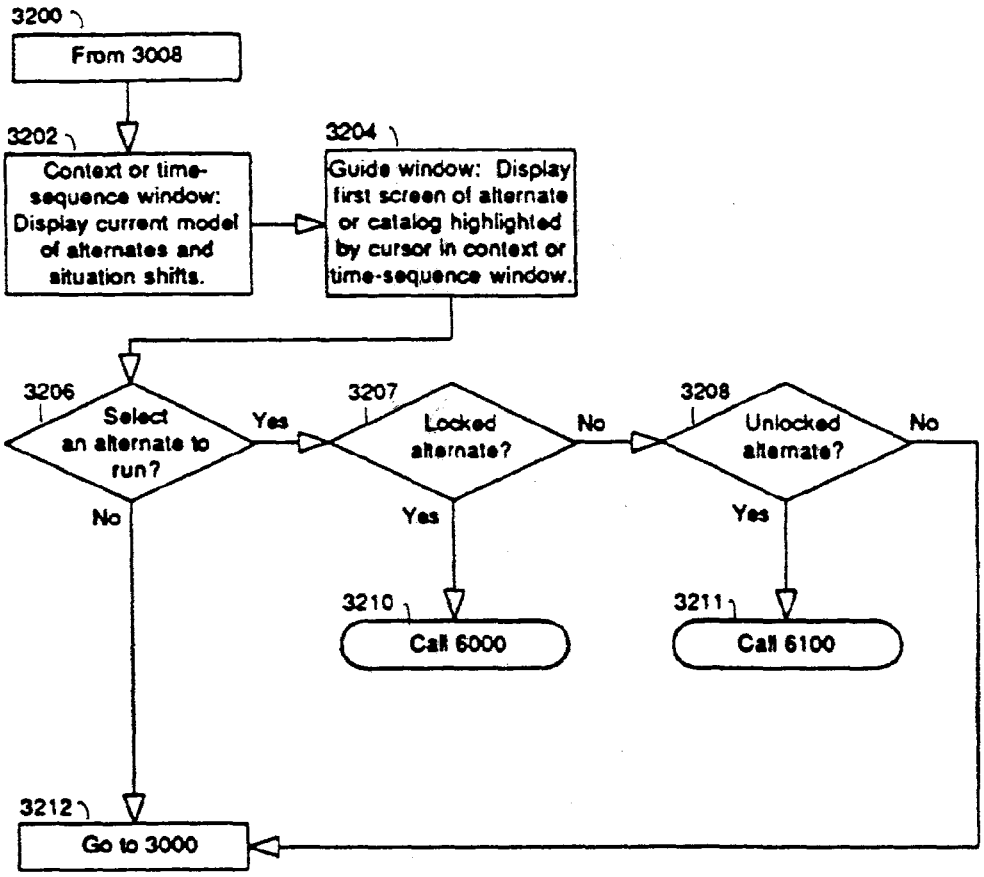

3200
From 3008
3202
Context or time-sequence window: Display current model of alternates and situation shifts.
3204
Guide window: Display first screen of alternate or catalog highlighted by cursor in context or time-sequence window.
3206
Select an alternate to run?
Yes
No
3207
Locked alternate?
No
Yes
3208
Unlocked alternate?
No
Yes
3210
Call 6000
3211
Call 6100
3212
Go to 3000

FIG. 95

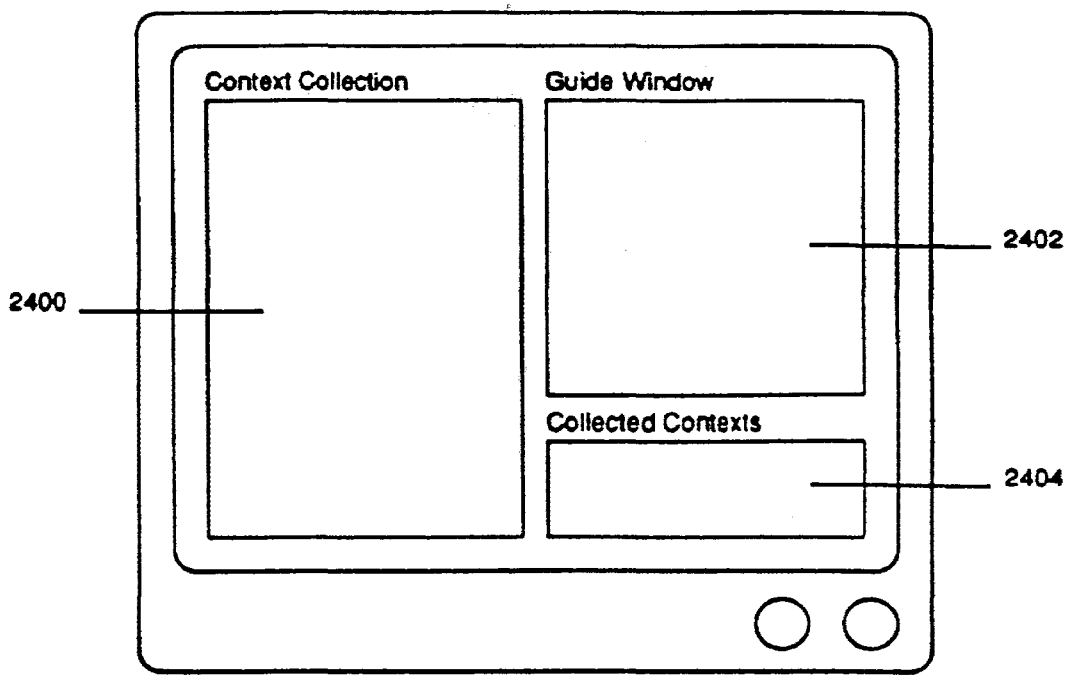

Context Collection
Guide Window
2400
2402
Collected Contexts
2404

FIG. 96

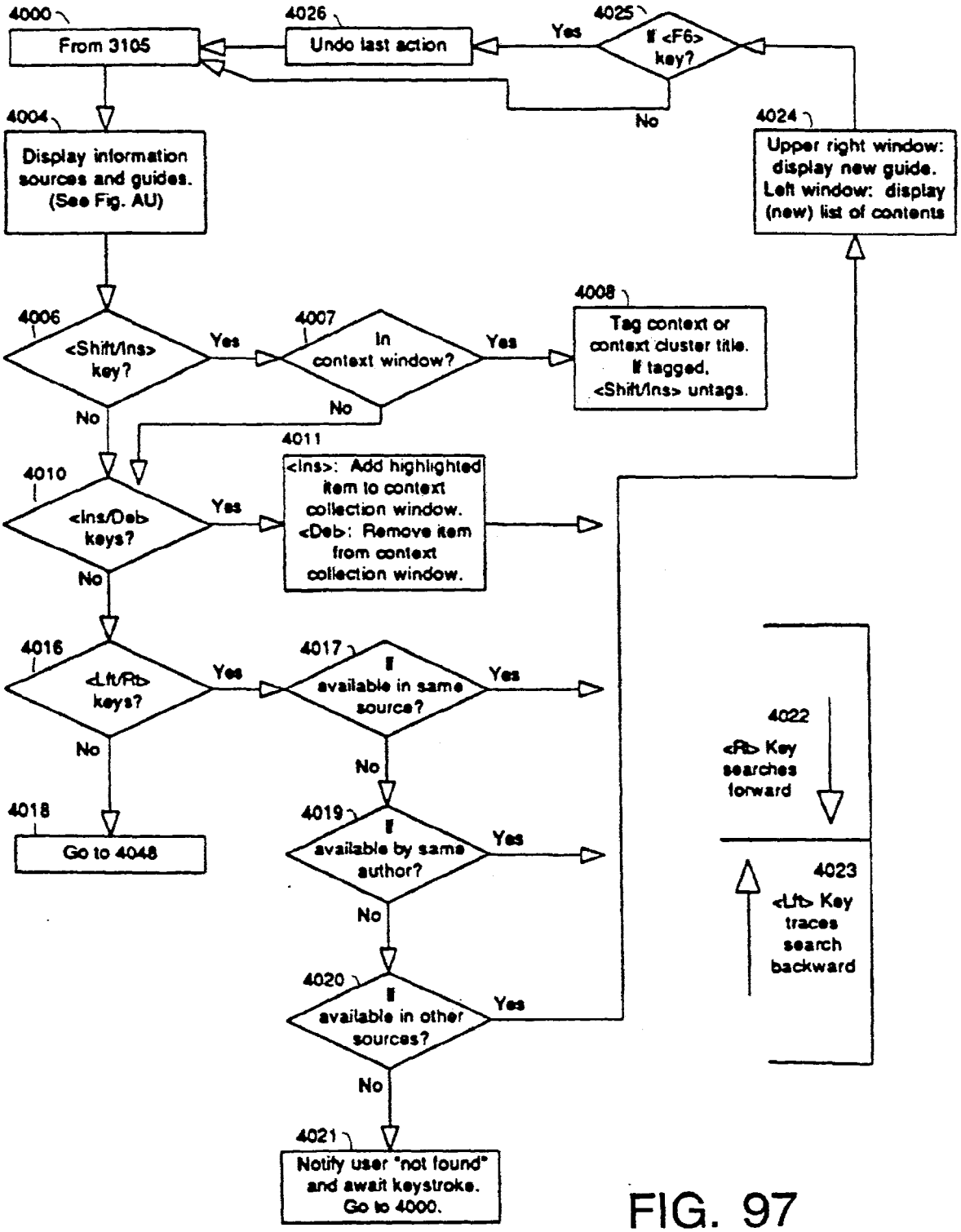

4000
From 3105
4026
Undo last action
4025
If <F6> key?
Yes
No
4004
Display information sources and guides. (See Fig. AU)
4024
Upper right window: display new guide. Left window: display (new) list of contents
4006
<Shift/Ins> key?
Yes
4007
In context window?
Yes
No
4008
Tag context or context cluster title. If tagged, <Shift/Ins> untags.
No
4011
<Ins>: Add highlighted item to context collection window. <Deb>: Remove item from context collection window.
4010
<Ins/Deb> keys?
Yes
No
4016
<Lft/Rt> keys?
Yes
No
4017
If available in same source?
Yes
No
4022
<Rt> Key searches forward
4023
<Lft> Key traces search backward
4018
Go to 4048
4019
If available by same author?
Yes
No
4020
If available in other sources?
Yes
No
4021
Notify user "not found" and await keystroke. Go to 4000.

FIG. 97

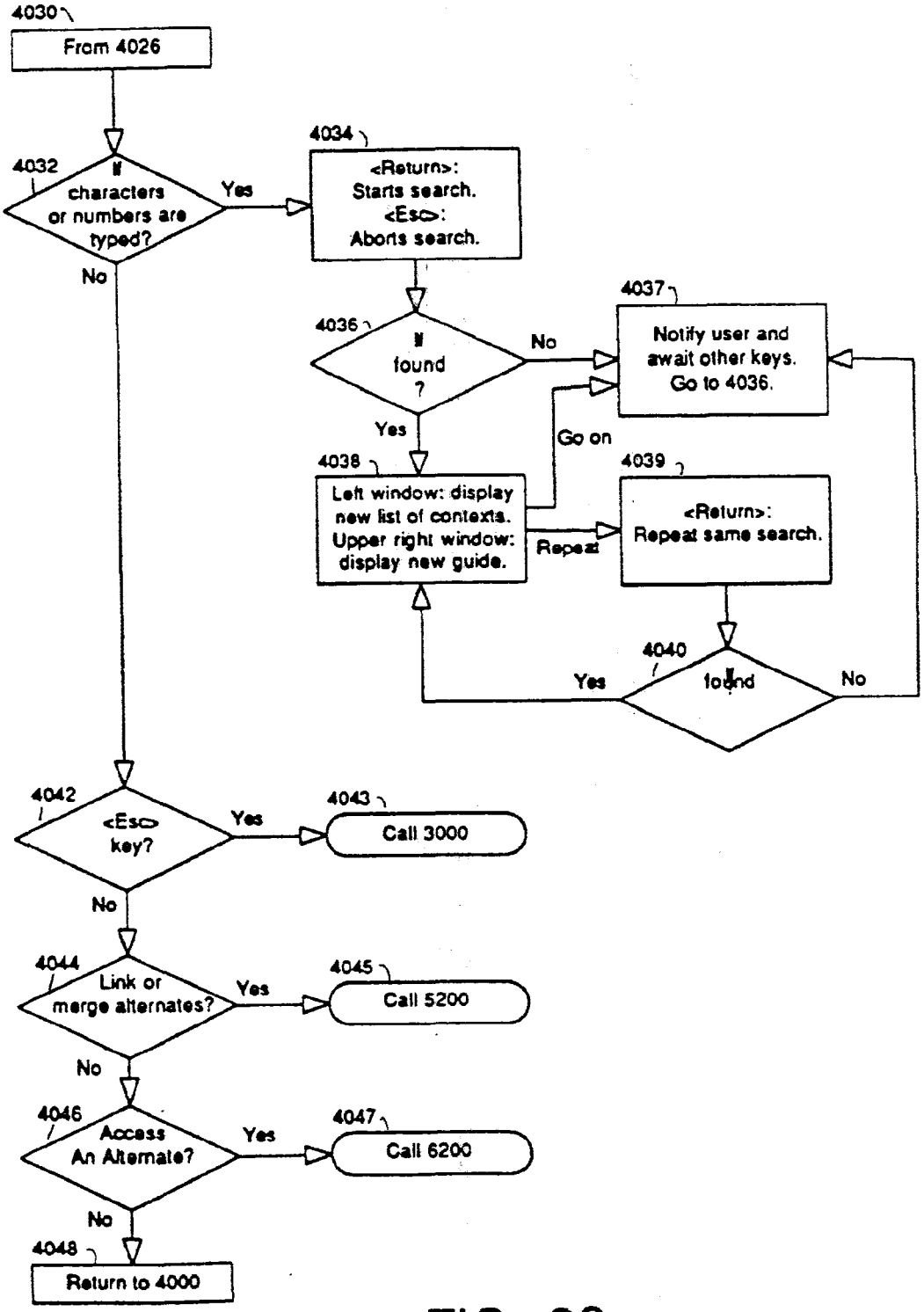

4030
From 4026
4032
If characters or numbers are typed?
Yes
No
4034
<Return>: Starts search. <Esc>: Aborts search.
4036
If found ?
No
Yes
4037
Notify user and await other keys. Go to 4036.
Go on
4038
Left window: display new list of contexts. Upper right window: display new guide.
Repeat
4039
<Return>: Repeat same search.
4040
If found
Yes
No
4042
<Esc> key?
Yes
No
4043
Call 3000
4044
Link or merge alternates?
Yes
No
4045
Call 5200
4046
Access An Alternate?
Yes
No
4047
Call 6200
4048
Return to 4000

FIG. 98

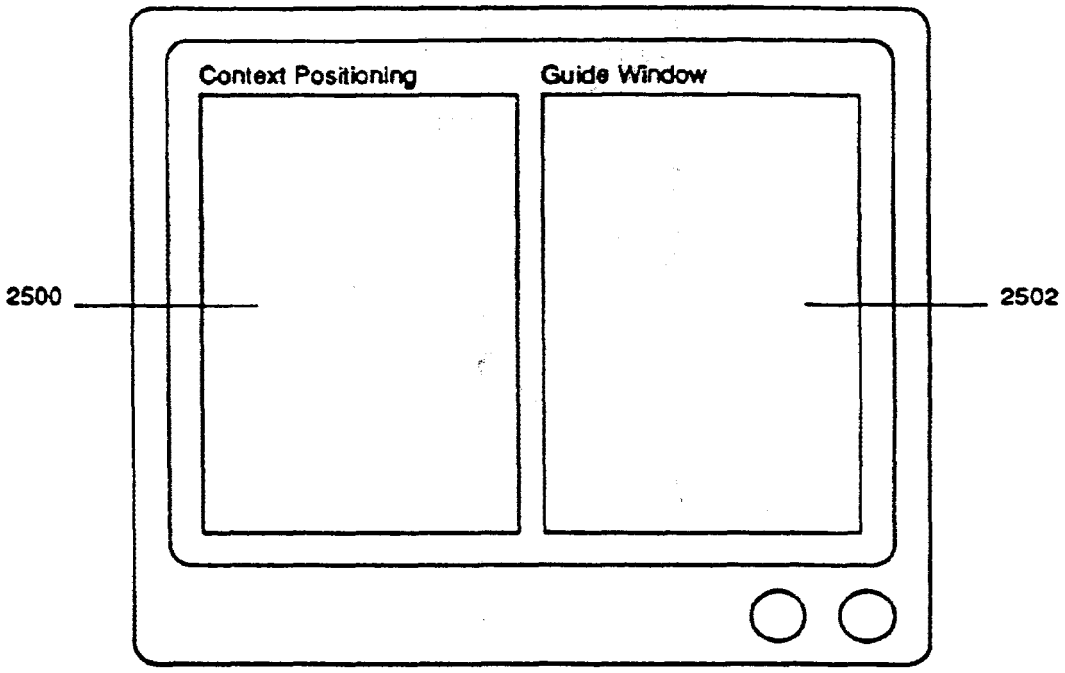


FIG. 99

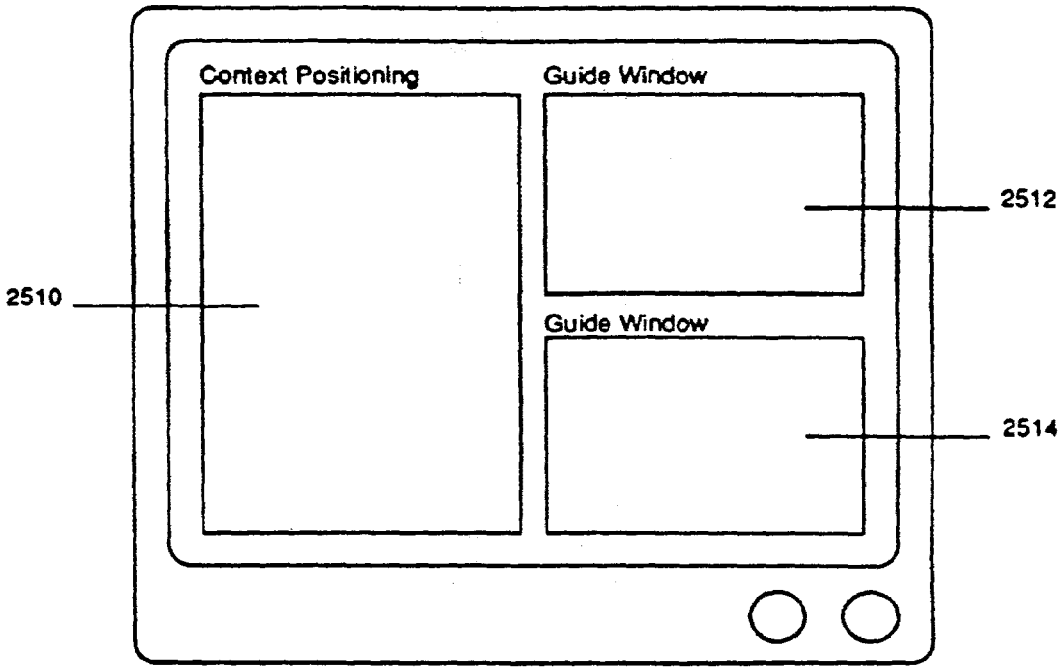

Context Positioning
Guide Window
2512
2510
Guide Window
2514

FIG. 100

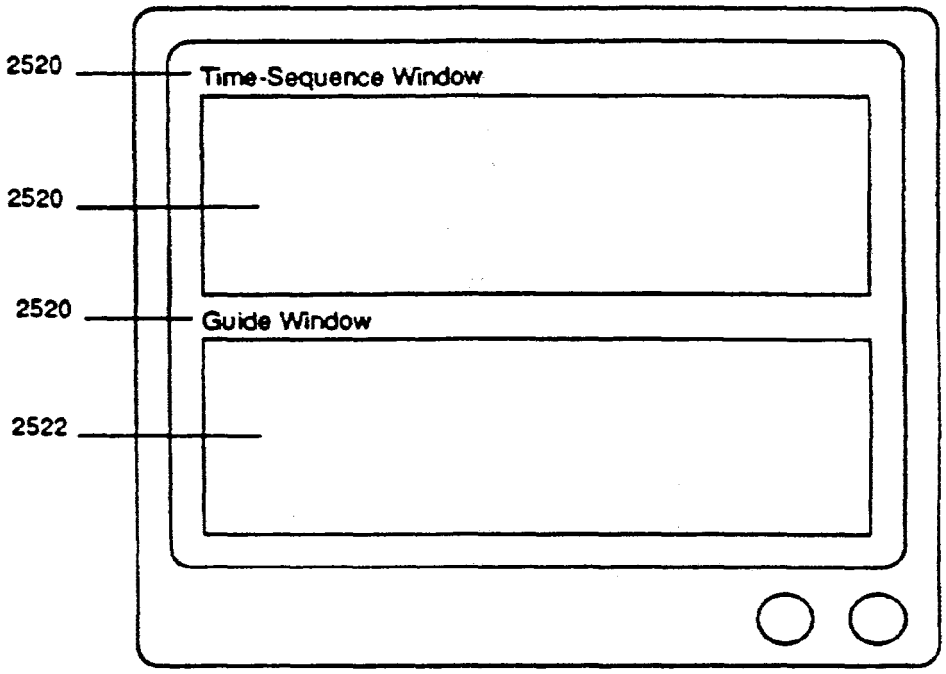


FIG. 101

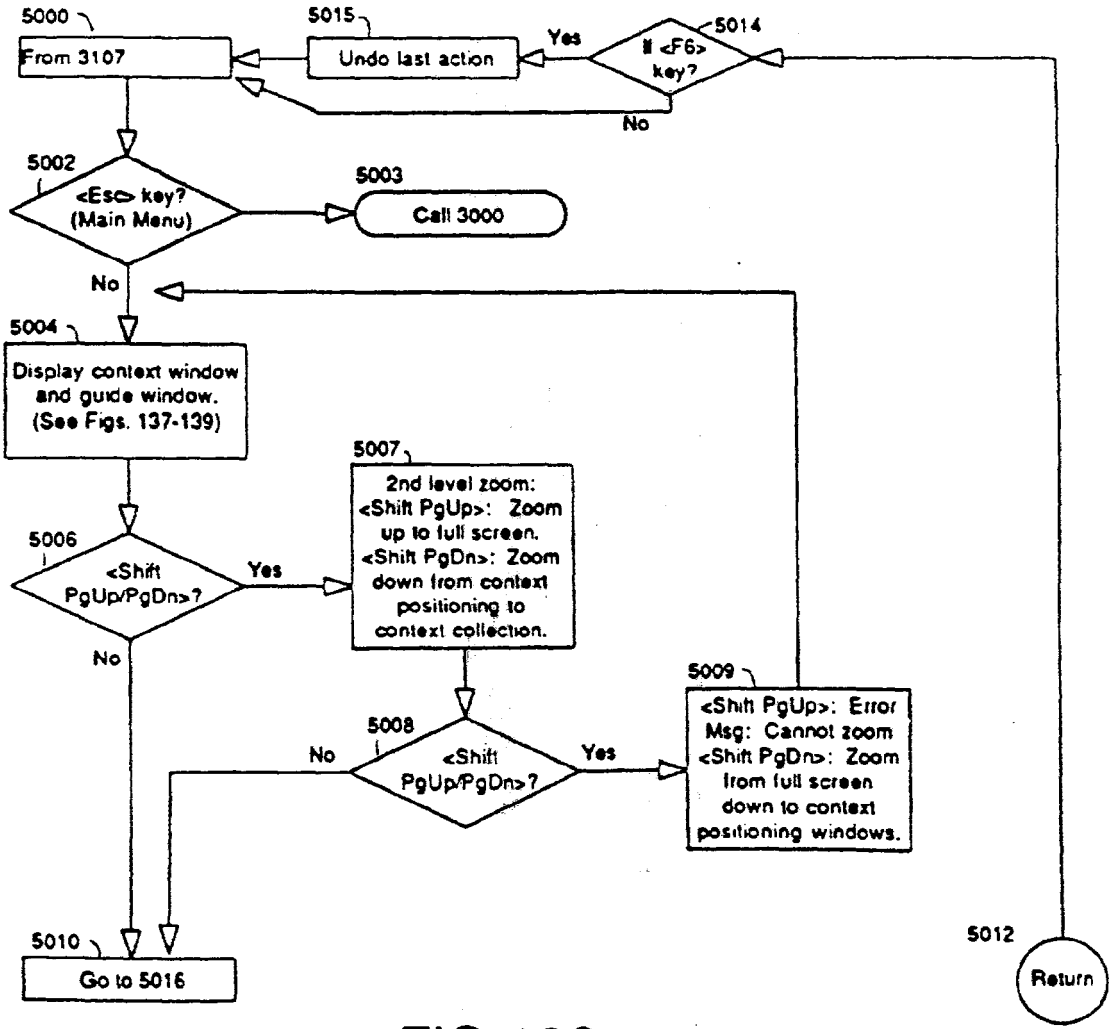

5000
From 3107
5015
Undo last action
Yes
5014
If <F6> key?
No
5002
<Esc> key? (Main Menu)
5003
Call 3000
No
5004
Display context window and guide window. (See Figs. 137-139)
5007
2nd level zoom: <Shift PgUp>: Zoom up to full screen. <Shift PgDn>: Zoom down from context positioning to context collection.
5006
<Shift PgUp/PgDn>?
Yes
No
5009
<Shift PgUp>: Error Msg: Cannot zoom <Shift PgDn>: Zoom from full screen down to context positioning windows.
5008
<Shift PgUp/PgDn>?
No
Yes
5010
Go to 5016
5012
Return

FIG.102

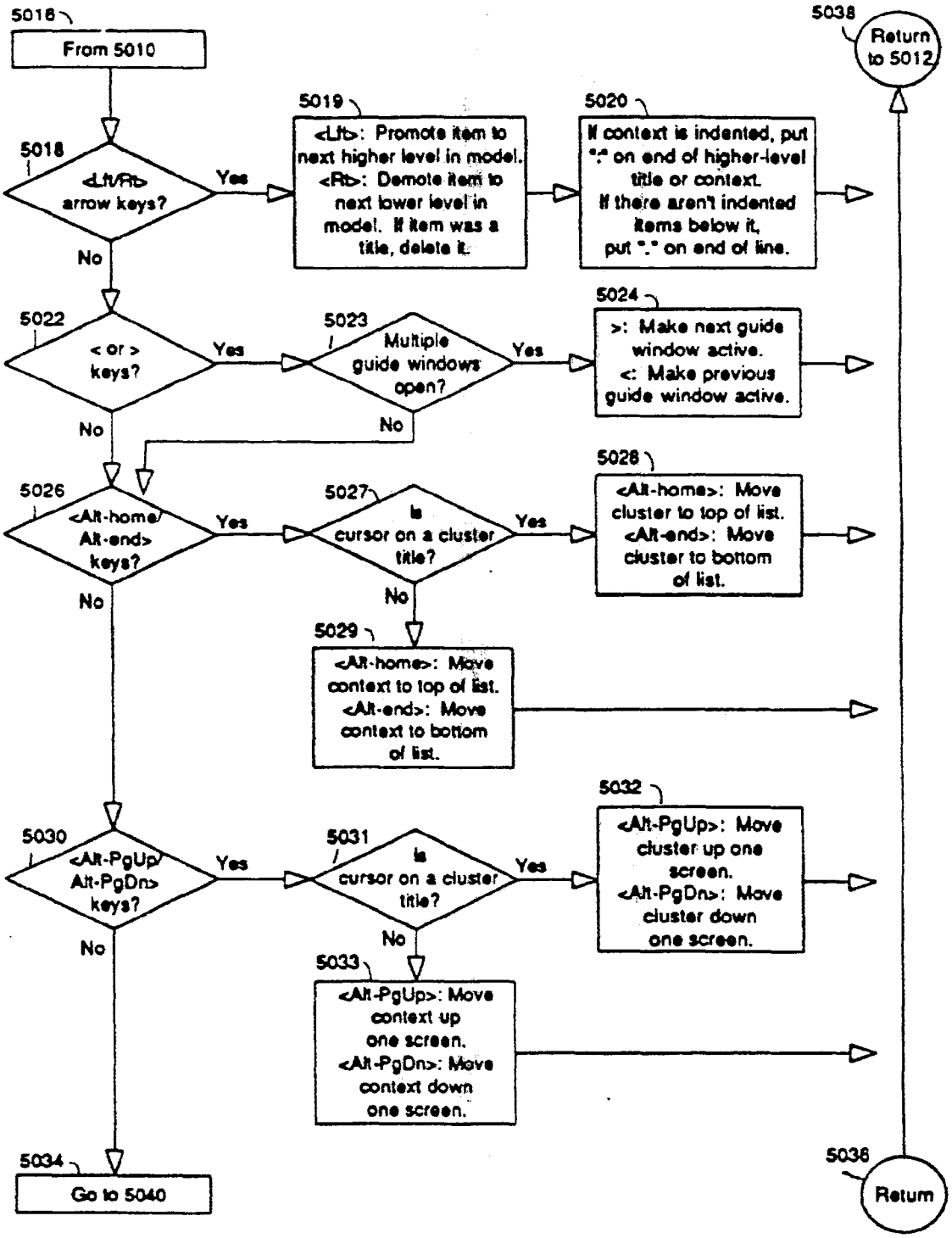

5016
From 5010
5018
<Lft/Rt> arrow keys?
Yes
No
5019
<Lft>: Promote item to next higher level in model.
<Rt>: Demote item to next lower level in model. If item was a title, delete it.
5020
If context is indented, put ":" on end of higher-level title or context.
If there aren't indented items below it, put "." on end of line.
5038
Return to 5012
5022
< or > keys?
Yes
No
5023
Multiple guide windows open?
Yes
No
5024
>: Make next guide window active.
<: Make previous guide window active.
5026
<Alt-home/ Alt-end> keys?
Yes
No
5027
Is cursor on a cluster title?
Yes
No
5028
<Alt-home>: Move cluster to top of list.
<Alt-end>: Move cluster to bottom of list.
5029
<Alt-home>: Move context to top of list.
<Alt-end>: Move context to bottom of list.
5030
<Alt-PgUp/ Alt-PgDn> keys?
Yes
No
5031
Is cursor on a cluster title?
Yes
No
5032
<Alt-PgUp>: Move cluster up one screen.
<Alt-PgDn>: Move cluster down one screen.
5033
<Alt-PgUp>: Move context up one screen.
<Alt-PgDn>: Move context down one screen.
5034
Go to 5040
5036
Return

FIG. 103

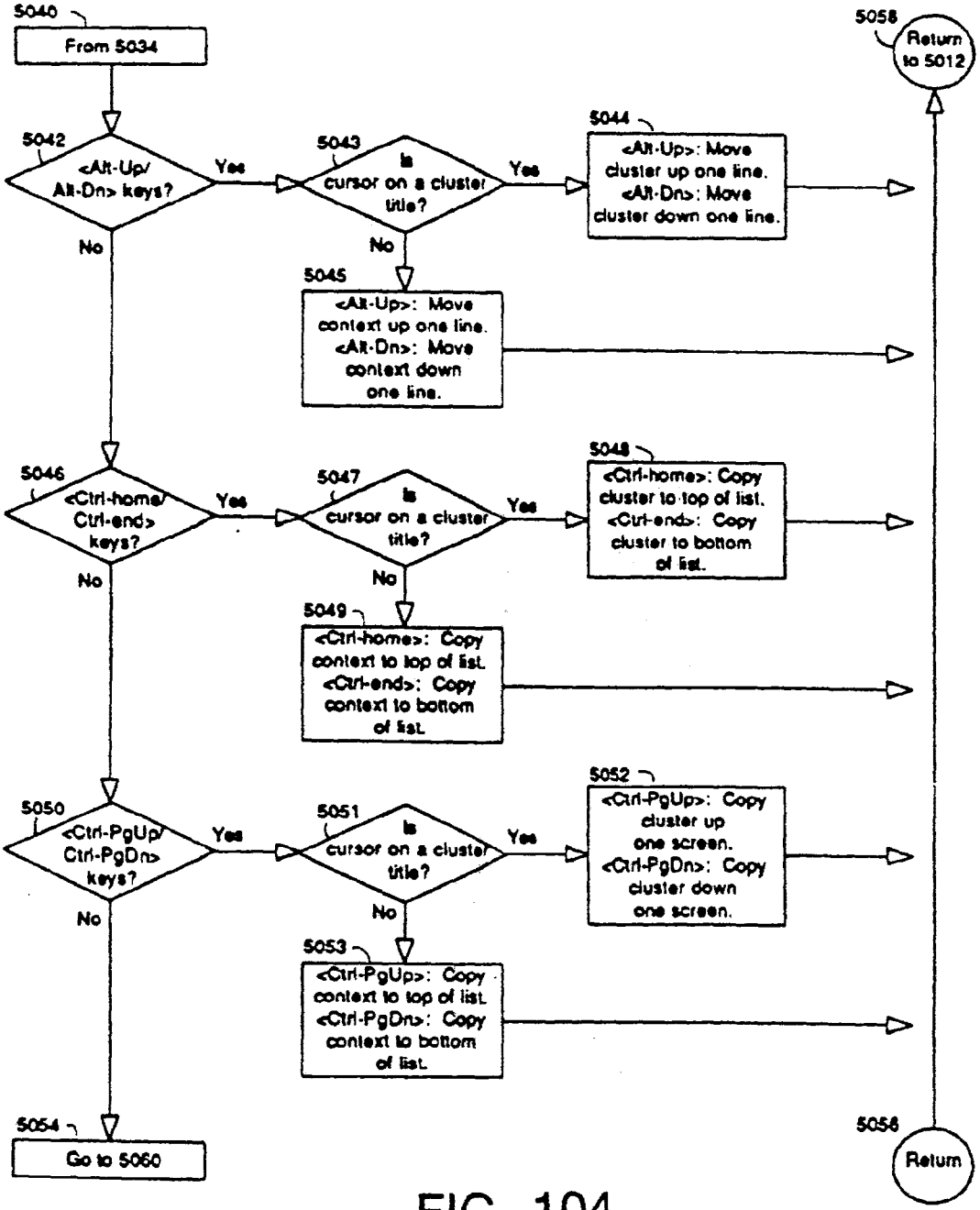
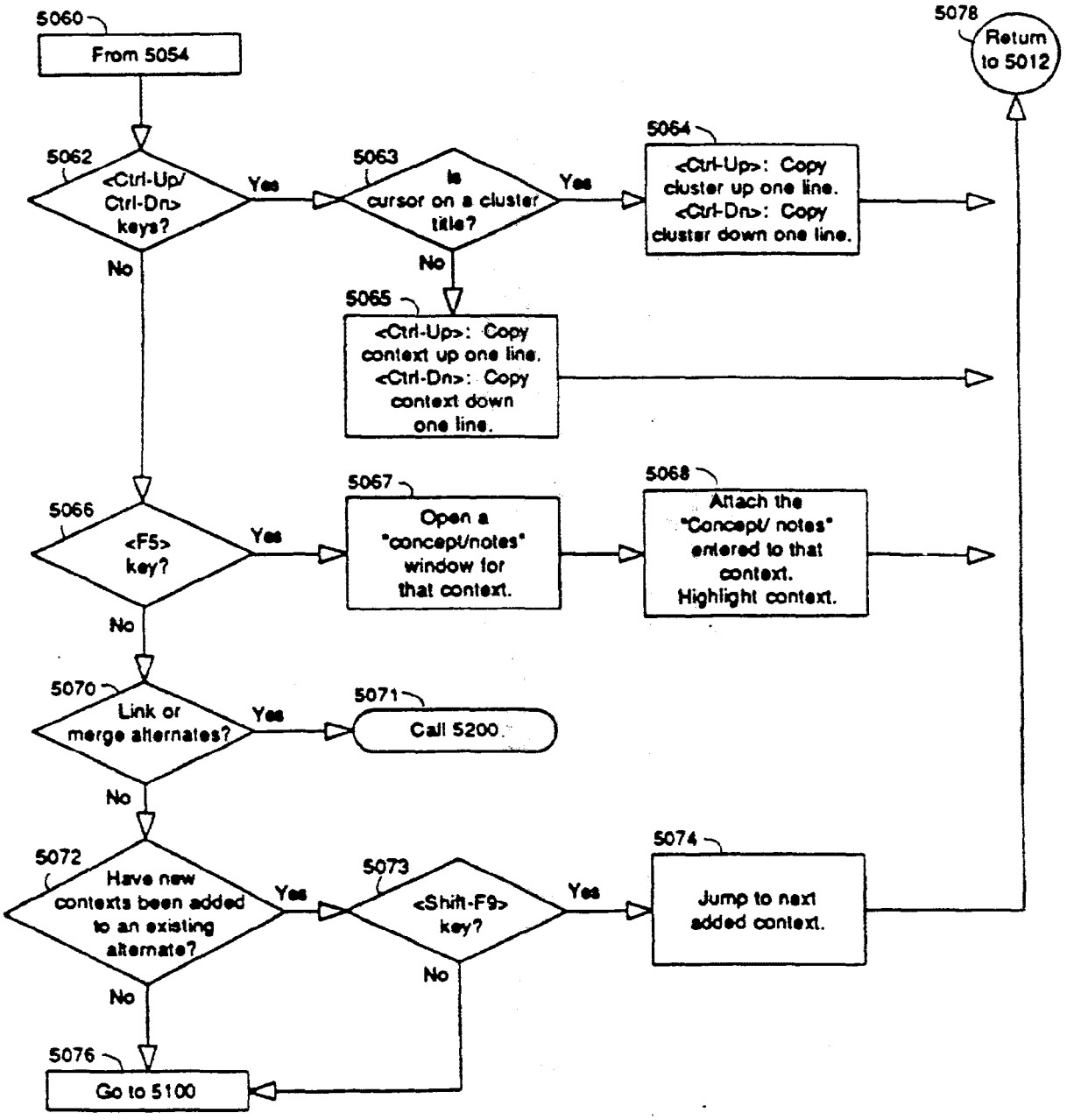

5040
From 5034
5042
<Alt-Up/ Alt-Dn> keys?
Yes
No
5043
Is cursor on a cluster title?
Yes
No
5044
<Alt-Up>: Move cluster up one line. <Alt-Dn>: Move cluster down one line.
5045
<Alt-Up>: Move context up one line. <Alt-Dn>: Move context down one line.
5046
<Ctrl-home/ Ctrl-end> keys?
Yes
No
5047
Is cursor on a cluster title?
Yes
No
5048
<Ctrl-home>: Copy cluster to top of list. <Ctrl-end>: Copy cluster to bottom of list.
5049
<Ctrl-home>: Copy context to top of list. <Ctrl-end>: Copy context to bottom of list.
5050
<Ctrl-PgUp/ Ctrl-PgDn> keys?
Yes
No
5051
Is cursor on a cluster title?
Yes
No
5052
<Ctrl-PgUp>: Copy cluster up one screen. <Ctrl-PgDn>: Copy cluster down one screen.
5053
<Ctrl-PgUp>: Copy context to top of list. <Ctrl-PgDn>: Copy context to bottom of list.
5054
Go to 5060
5058
Return to 5012
5056
Return

FIG. 104

FIG. 105


5060
From 5054
5062
<Ctrl-Up/ Ctrl-Dn> keys?
Yes
5063
Is cursor on a cluster title?
Yes
5064
<Ctrl-Up>: Copy cluster up one line. <Ctrl-Dn>: Copy cluster down one line.
No
5065
<Ctrl-Up>: Copy context up one line. <Ctrl-Dn>: Copy context down one line.
5066
<F5> key?
Yes
5067
Open a "concept/notes" window for that context.
5068
Attach the "Concept/ notes" entered to that context. Highlight context.
No
5070
Link or merge alternates?
Yes
5071
Call 5200.
No
5072
Have new contexts been added to an existing alternate?
Yes
5073
<Shift-F9> key?
Yes
5074
Jump to next added context.
No
No
5076
Go to 5100
5078
Return to 5012

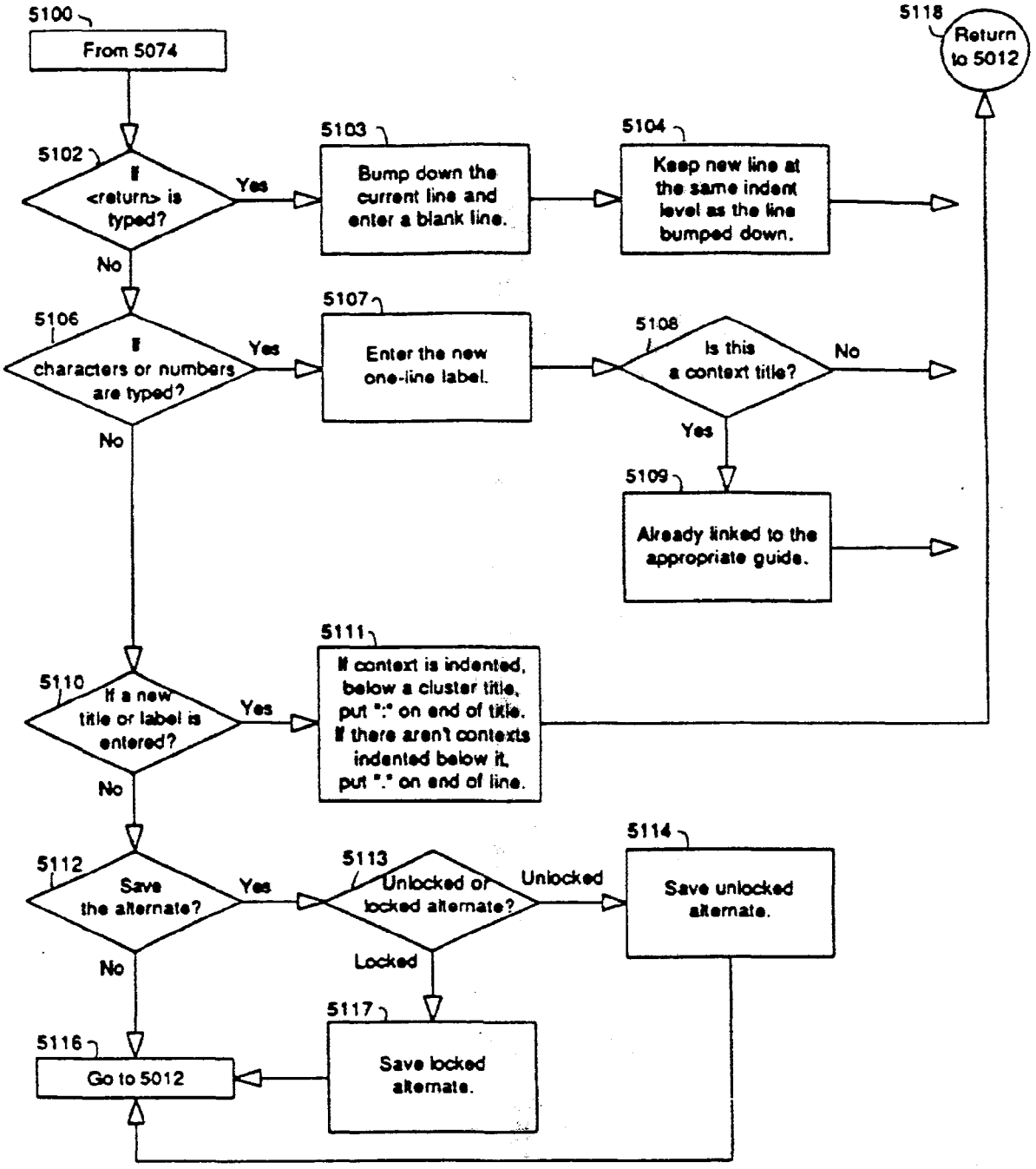

5100
From 5074
5102
If <return> is typed?
Yes
5103
Bump down the current line and enter a blank line.
5104
Keep new line at the same indent level as the line bumped down.
5118
Return to 5012
No
5106
If characters or numbers are typed?
Yes
5107
Enter the new one-line label.
5108
Is this a context title?
No
Yes
5109
Already linked to the appropriate guide.
No
5110
If a new title or label is entered?
Yes
5111
If context is indented, below a cluster title, put ":" on end of title. If there aren't contexts indented below it, put "." on end of line.
No
5112
Save the alternate?
Yes
5113
Unlocked or locked alternate?
Unlocked
5114
Save unlocked alternate.
No
Locked
5117
Save locked alternate.
5116
Go to 5012

FIG. 106

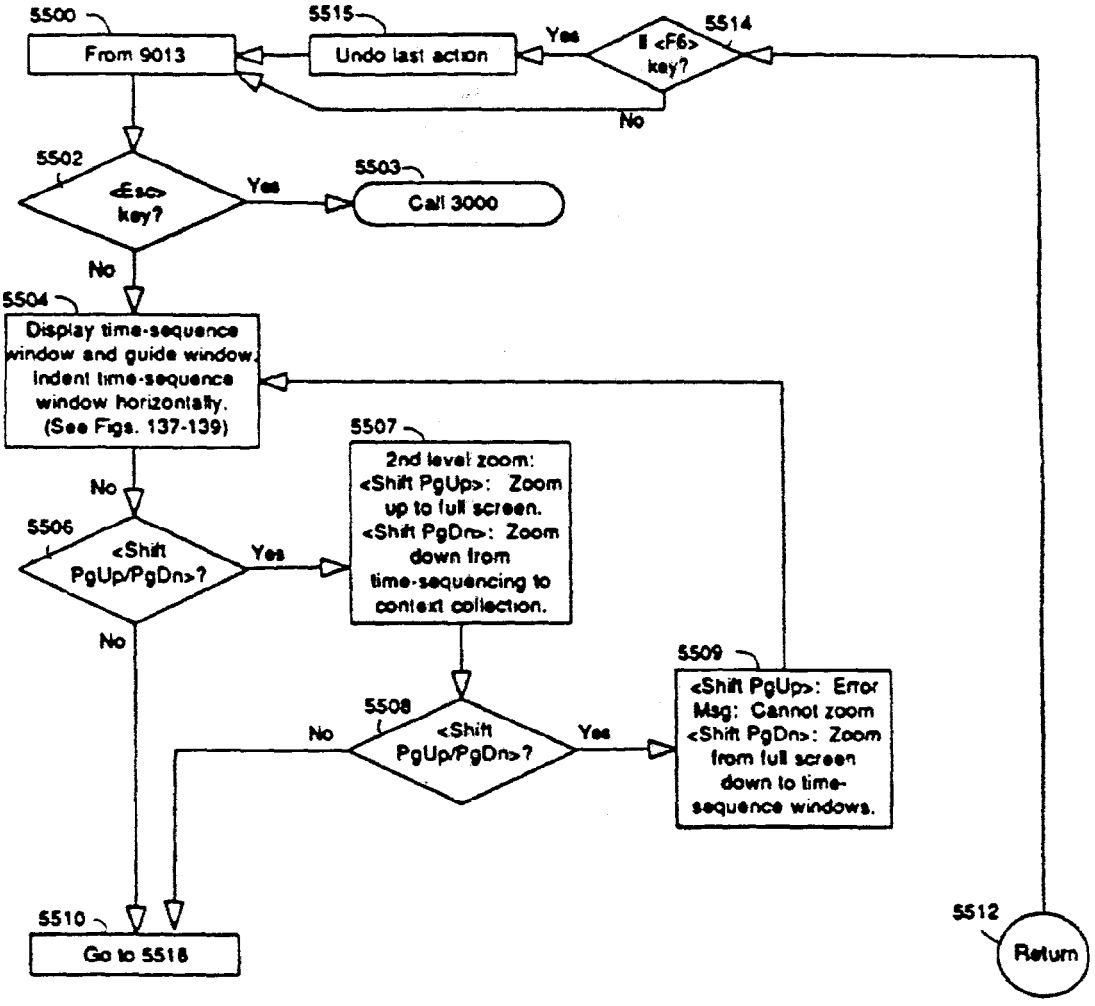

5500
From 9013
5515
Undo last action
Yes
If <F6> key?
5514
No
5502
<Esc> key?
Yes
5503
Call 3000
No
5504
Display time-sequence window and guide window. Indent time-sequence window horizontally. (See Figs. 137-139)
5507
2nd level zoom: <Shift PgUp>: Zoom up to full screen. <Shift PgDn>: Zoom down from time-sequencing to context collection.
No
5506
<Shift PgUp/PgDn>?
Yes
No
5508
<Shift PgUp/PgDn>?
No
Yes
5509
<Shift PgUp>: Error Msg: Cannot zoom <Shift PgDn>: Zoom from full screen down to time-sequence windows.
5510
Go to 5518
5512
Return

FIG. 107

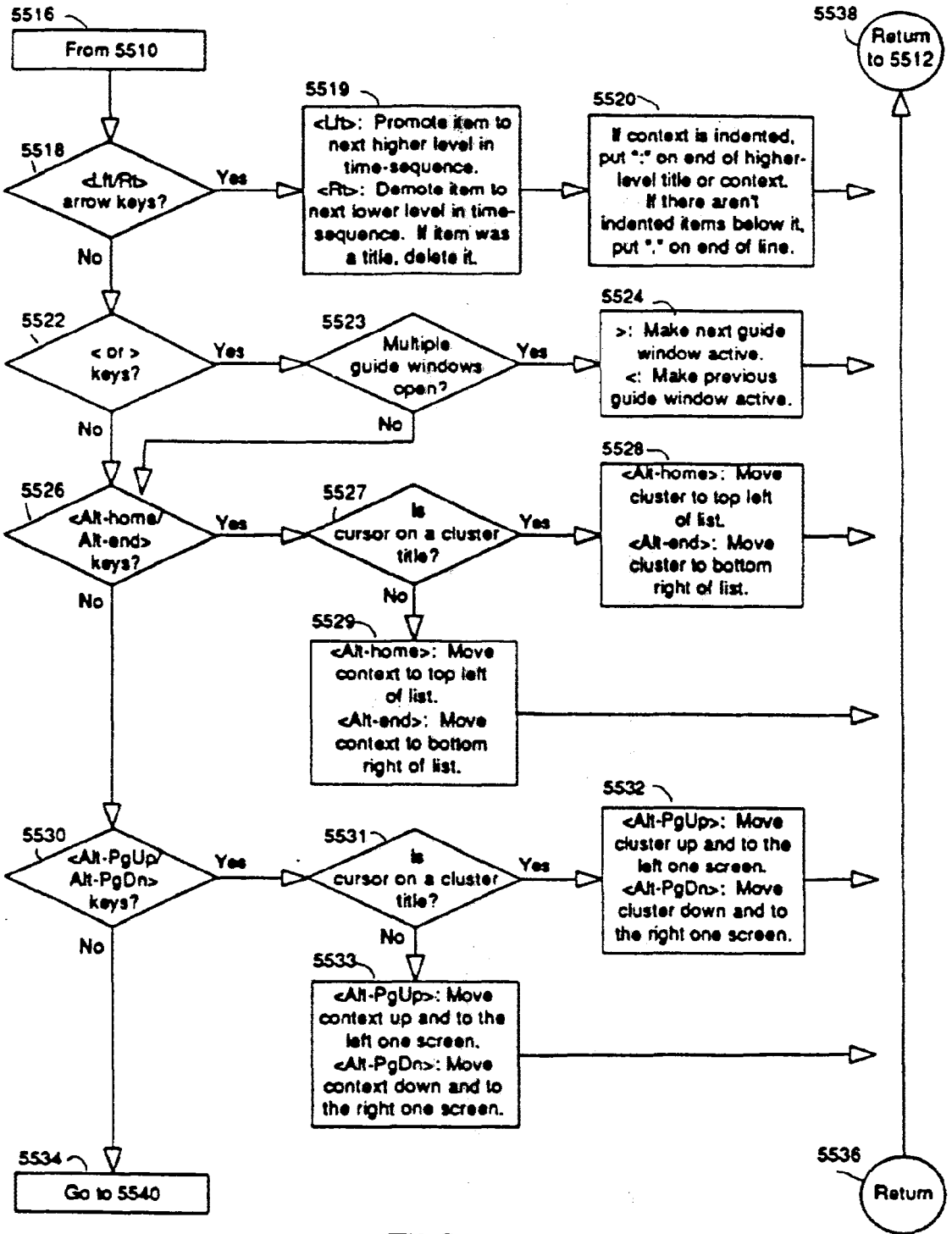

5516
From 5510
5518
<Lft/Rt> arrow keys?
Yes
No
5519
<Lft>: Promote item to next higher level in time-sequence.
<Rt>: Demote item to next lower level in time-sequence. If item was a title, delete it.
5520
If context is indented, put ":" on end of higher-level title or context. If there aren't indented items below it, put "." on end of line.
5522
< or > keys?
Yes
No
5523
Multiple guide windows open?
Yes
No
5524
>: Make next guide window active.
<: Make previous guide window active.
5526
<Alt-home/ Alt-end> keys?
Yes
No
5527
Is cursor on a cluster title?
Yes
No
5528
<Alt-home>: Move cluster to top left of list.
<Alt-end>: Move cluster to bottom right of list.
5529
<Alt-home>: Move context to top left of list.
<Alt-end>: Move context to bottom right of list.
5530
<Alt-PgUp/ Alt-PgDn> keys?
Yes
No
5531
Is cursor on a cluster title?
Yes
No
5532
<Alt-PgUp>: Move cluster up and to the left one screen.
<Alt-PgDn>: Move cluster down and to the right one screen.
5533
<Alt-PgUp>: Move context up and to the left one screen.
<Alt-PgDn>: Move context down and to the right one screen.
5534
Go to 5540
5536
Return
5538
Return to 5512

FIG. 108

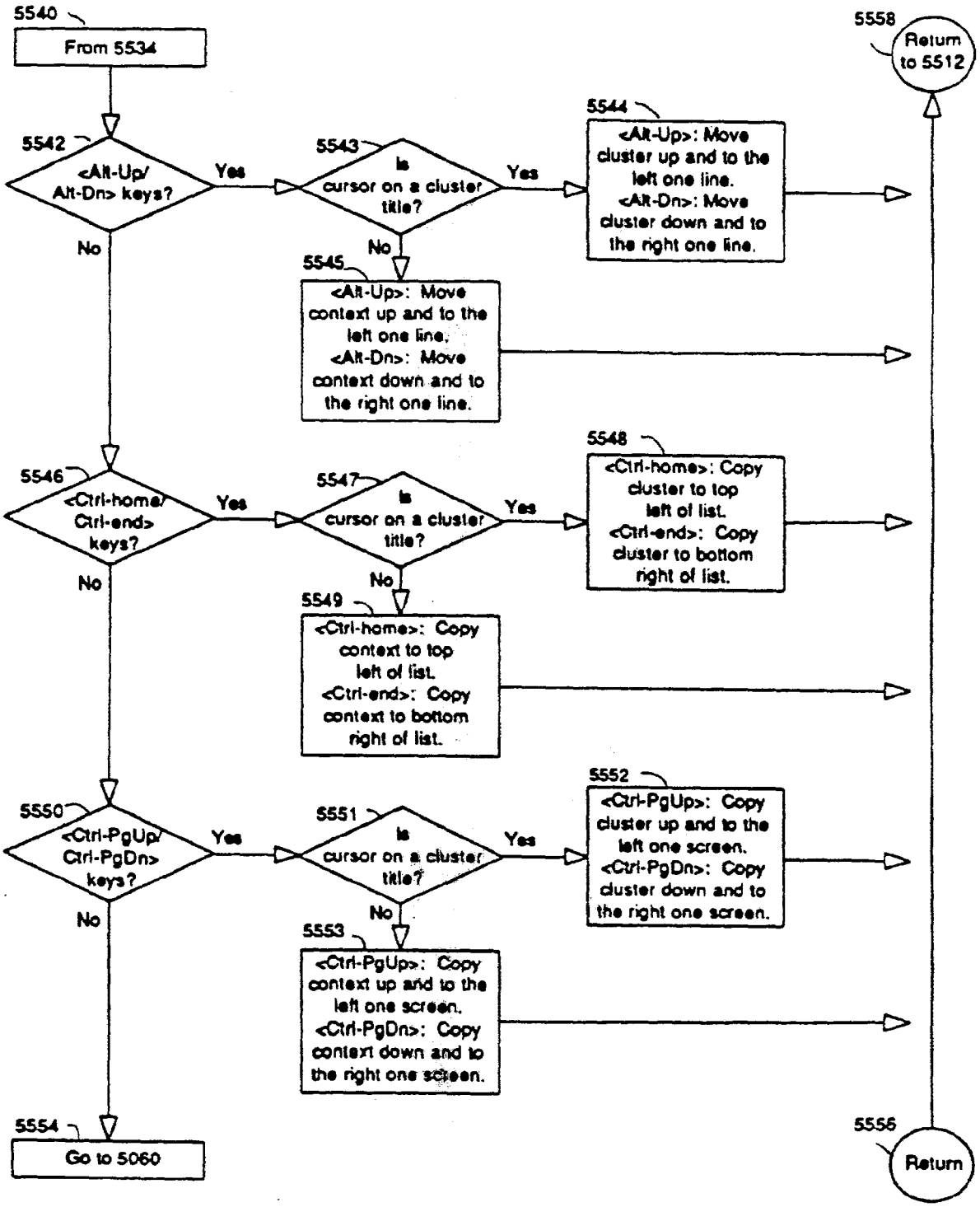

5540
From 5534
5542
<Alt-Up/ Alt-Dn> keys?
Yes
No
5543
Is cursor on a cluster title?
Yes
No
5544
<Alt-Up>: Move cluster up and to the left one line. <Alt-Dn>: Move cluster down and to the right one line.
5545
<Alt-Up>: Move context up and to the left one line. <Alt-Dn>: Move context down and to the right one line.
5546
<Ctrl-home/ Ctrl-end> keys?
Yes
No
5547
Is cursor on a cluster title?
Yes
No
5548
<Ctrl-home>: Copy cluster to top left of list. <Ctrl-end>: Copy cluster to bottom right of list.
5549
<Ctrl-home>: Copy context to top left of list. <Ctrl-end>: Copy context to bottom right of list.
5550
<Ctrl-PgUp/ Ctrl-PgDn> keys?
Yes
No
5551
Is cursor on a cluster title?
Yes
No
5552
<Ctrl-PgUp>: Copy cluster up and to the left one screen. <Ctrl-PgDn>: Copy cluster down and to the right one screen.
5553
<Ctrl-PgUp>: Copy context up and to the left one screen. <Ctrl-PgDn>: Copy context down and to the right one screen.
5554
Go to 5060
5556
Return
5558
Return to 5512

FIG. 109

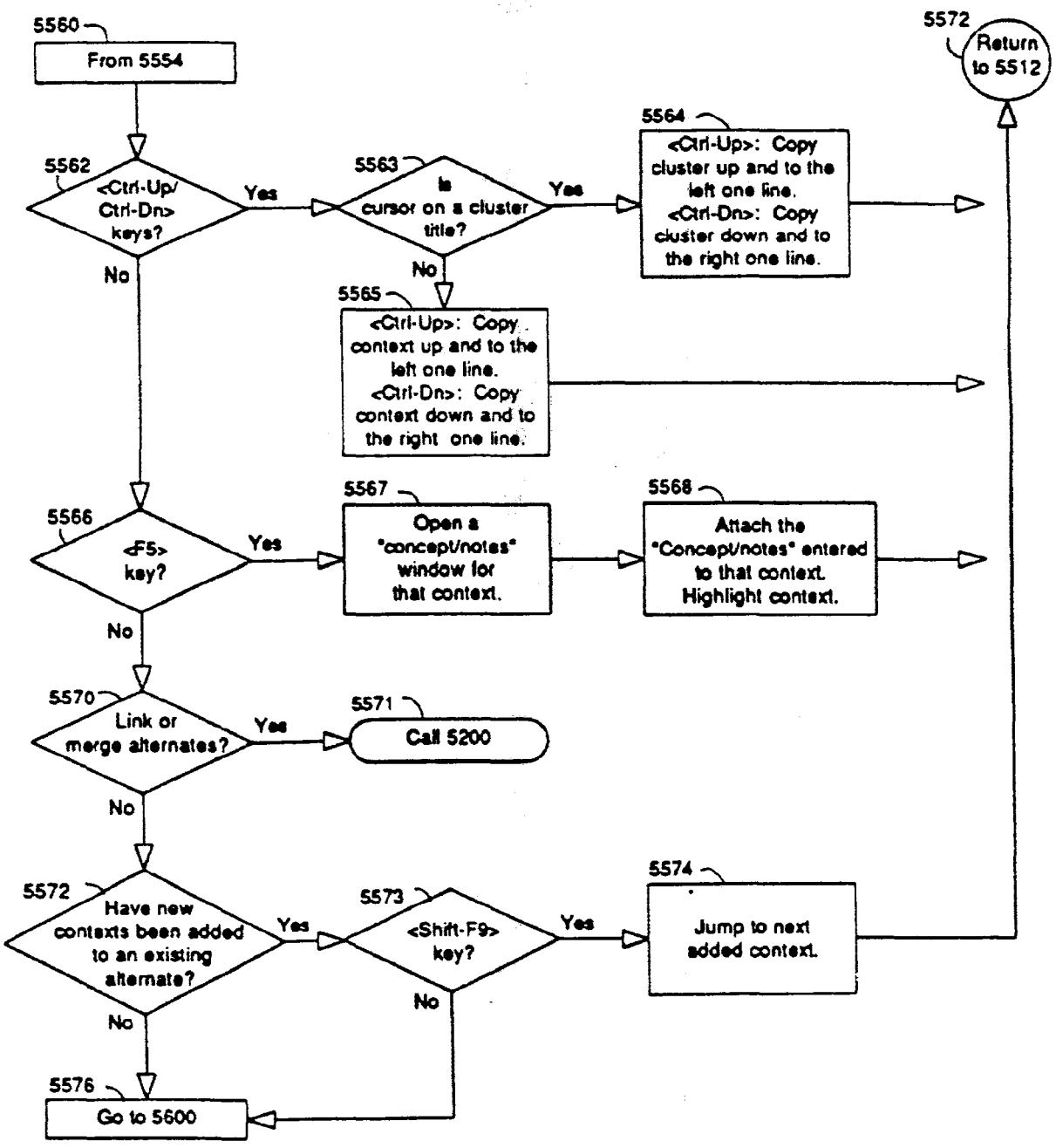

5560
From 5554
5562
<Ctrl-Up/ Ctrl-Dn> keys?
Yes
No
5563
Is cursor on a cluster title?
Yes
No
5564
<Ctrl-Up>: Copy cluster up and to the left one line. <Ctrl-Dn>: Copy cluster down and to the right one line.
5565
<Ctrl-Up>: Copy context up and to the left one line. <Ctrl-Dn>: Copy context down and to the right one line.
5566
<F5> key?
Yes
No
5567
Open a "concept/notes" window for that context.
5568
Attach the "Concept/notes" entered to that context. Highlight context.
5570
Link or merge alternates?
Yes
No
5571
Call 5200
5572
Have new contexts been added to an existing alternate?
Yes
No
5573
<Shift-F9> key?
Yes
No
5574
Jump to next added context.
5572
Return to 5512
5576
Go to 5600

FIG. 110

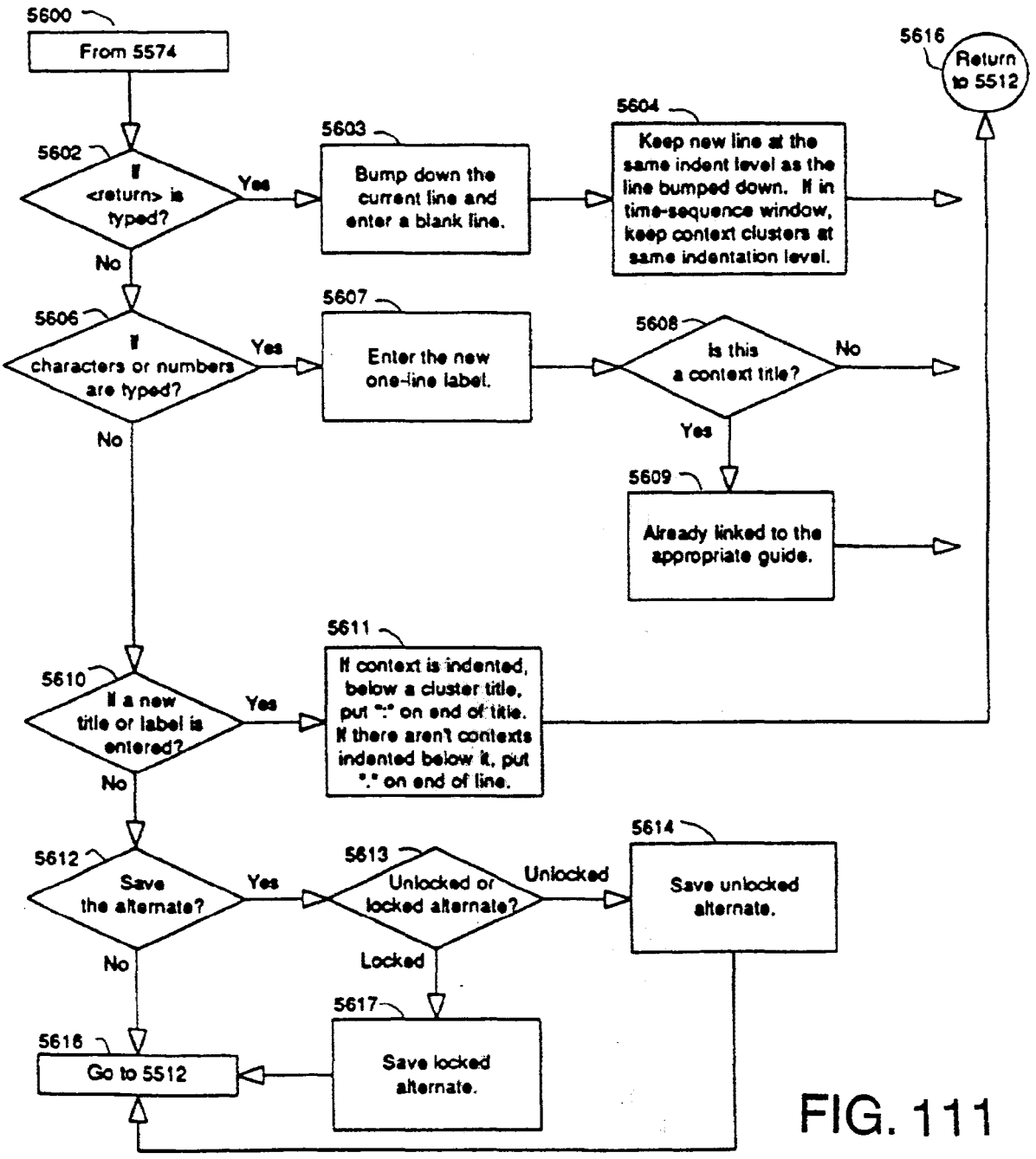

5600
From 5574
5602
If <return> is typed?
Yes
5603
Bump down the current line and enter a blank line.
5604
Keep new line at the same indent level as the line bumped down. If in time-sequence window, keep context clusters at same indentation level.
5616
Return to 5512
No
5606
If characters or numbers are typed?
Yes
5607
Enter the new one-line label.
5608
Is this a context title?
No
Yes
5609
Already linked to the appropriate guide.
No
5610
If a new title or label is entered?
Yes
5611
If context is indented, below a cluster title, put ":" on end of title. If there aren't contexts indented below it, put "." on end of line.
No
5612
Save the alternate?
Yes
5613
Unlocked or locked alternate?
Unlocked
5614
Save unlocked alternate.
No
Locked
5617
Save locked alternate.
5616
Go to 5512

FIG. 111

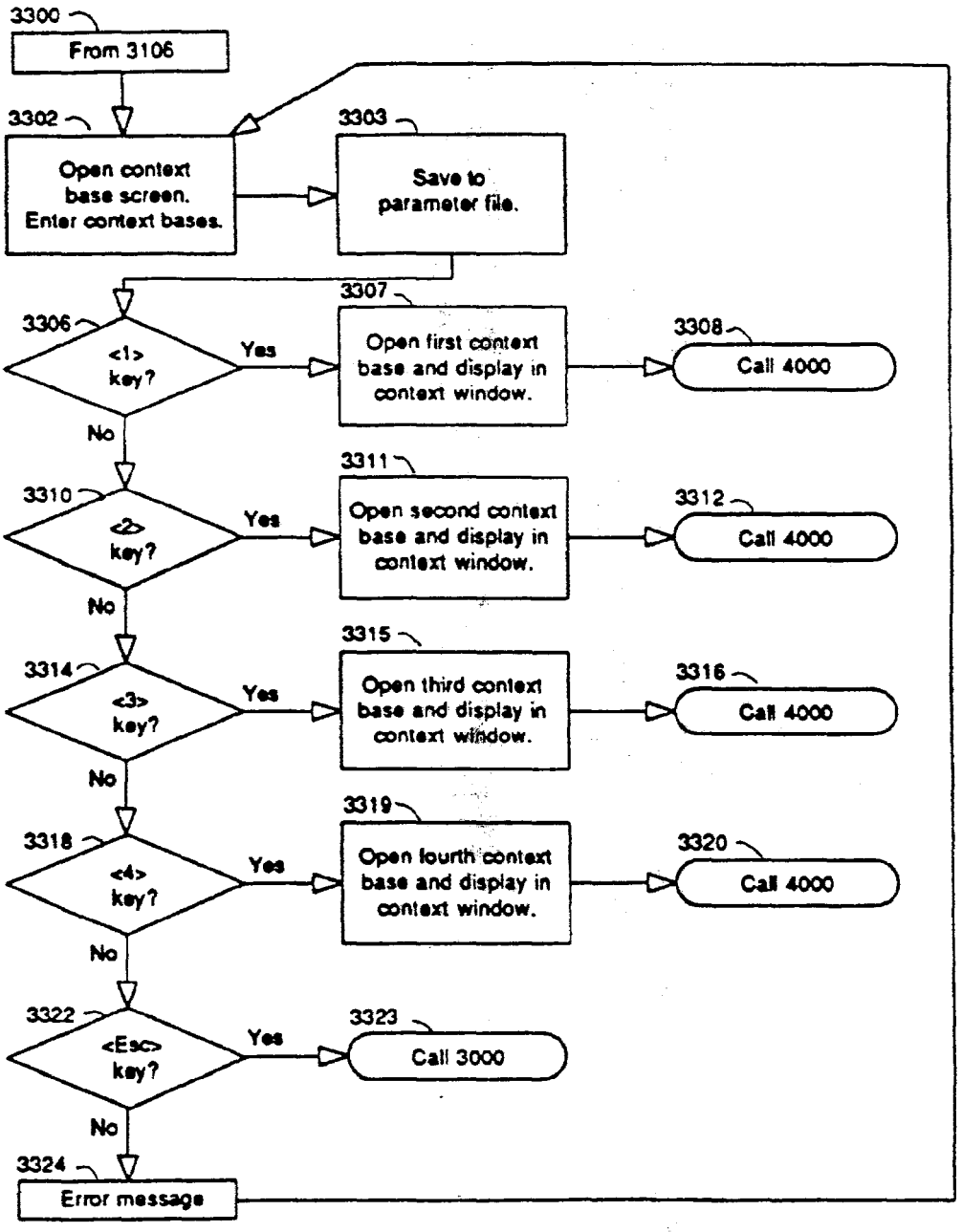

3300
From 3106
3302
Open context base screen. Enter context bases.
3303
Save to parameter file.
3306
<1> key?
Yes
3307
Open first context base and display in context window.
3308
Call 4000
No
3310
<2> key?
Yes
3311
Open second context base and display in context window.
3312
Call 4000
No
3314
<3> key?
Yes
3315
Open third context base and display in context window.
3316
Call 4000
No
3318
<4> key?
Yes
3319
Open fourth context base and display in context window.
3320
Call 4000
No
3322
<Esc> key?
Yes
3323
Call 3000
No
3324
Error message

FIG. 112

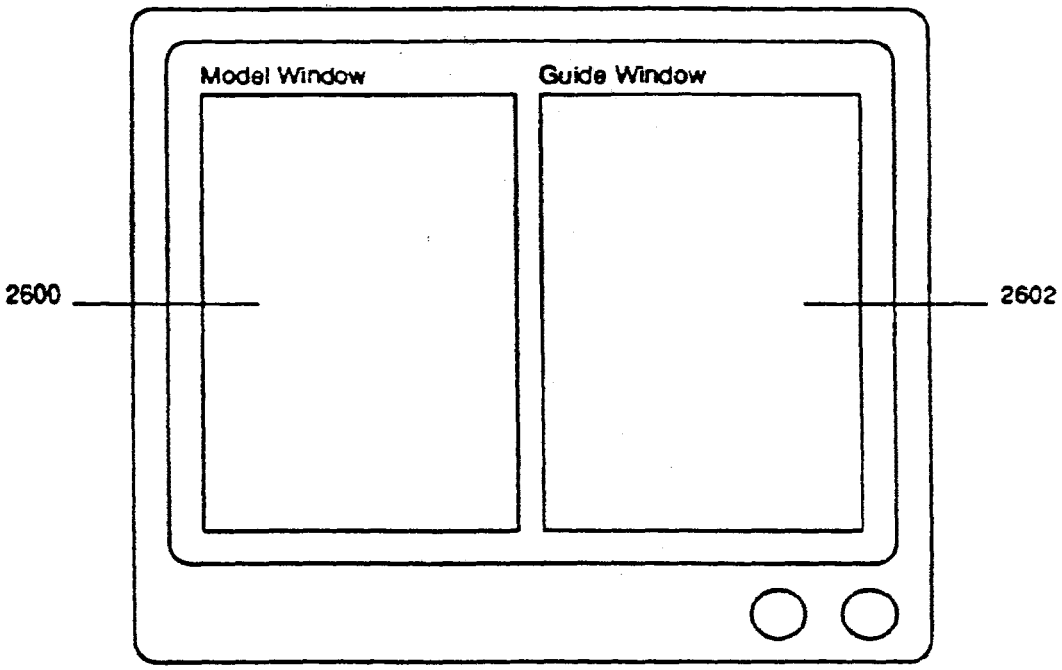


FIG. 113

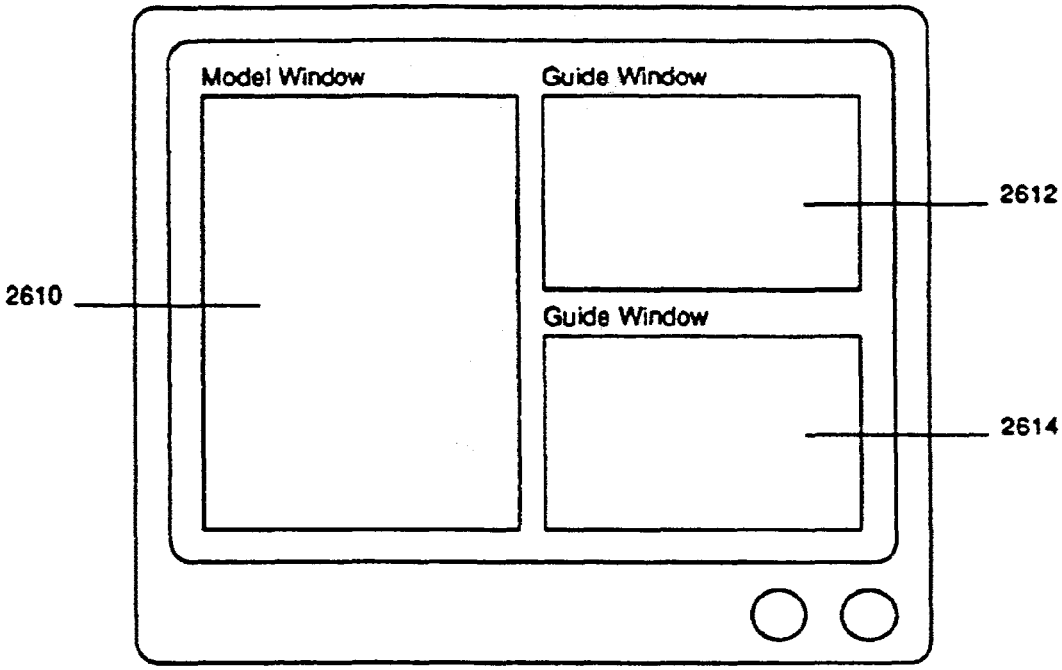


FIG. 114

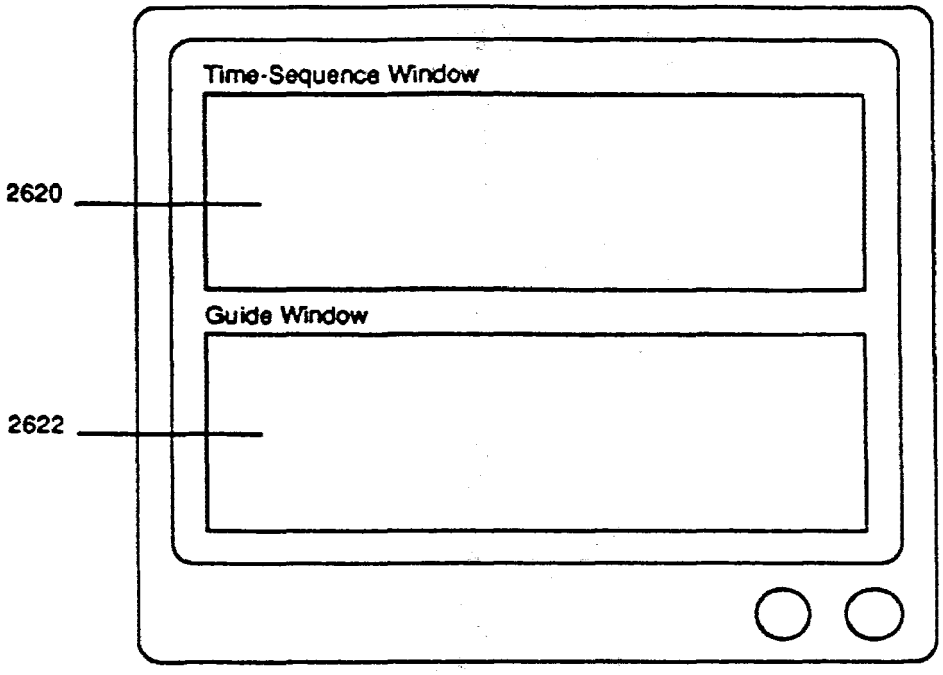


FIG. 115

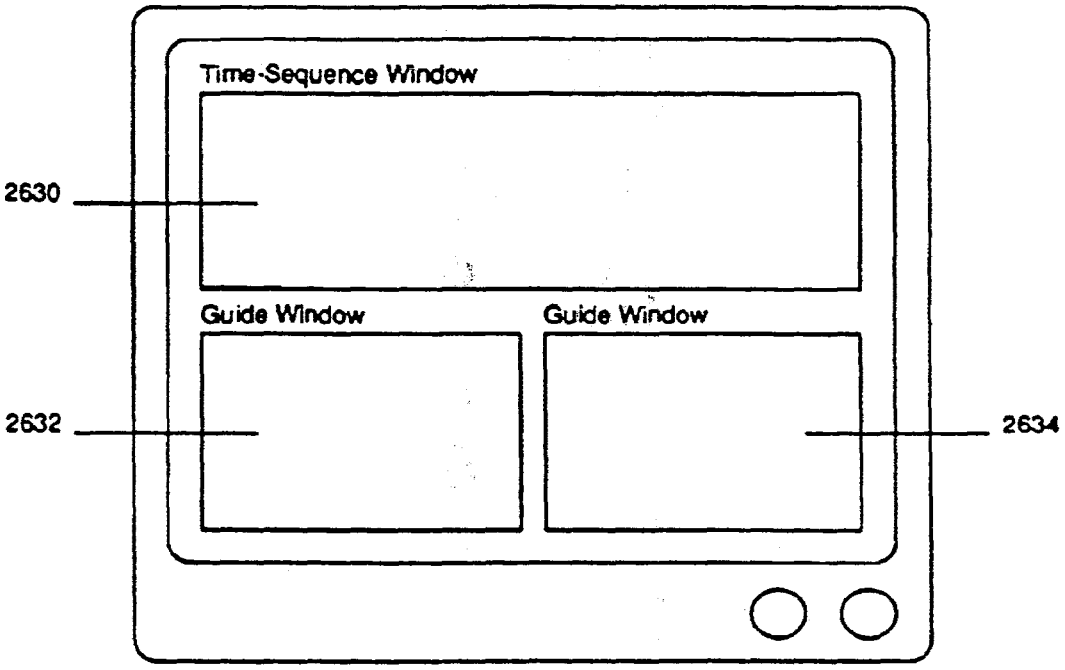

Time-Sequence Window
2630
Guide Window
Guide Window
2632
2634

FIG. 116

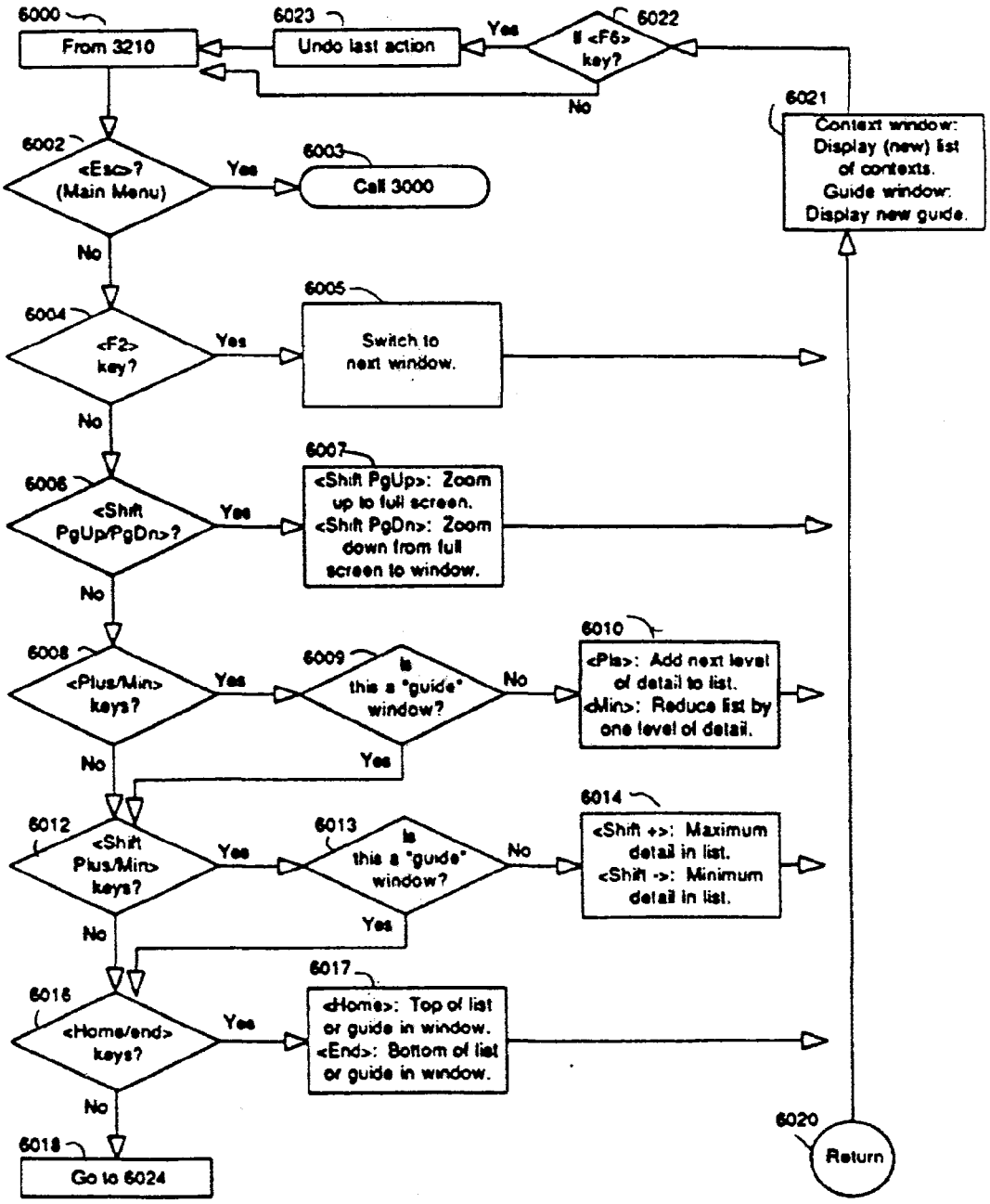

6000
From 3210
6023
Undo last action
Yes
6022
If <F6> key?
No
6021
Context window: Display (new) list of contexts. Guide window: Display new guide.
6002
<Esc>? (Main Menu)
Yes
6003
Call 3000
No
6004
<F2> key?
Yes
6005
Switch to next window.
No
6006
<Shift PgUp/PgDn>?
Yes
6007
<Shift PgUp>: Zoom up to full screen. <Shift PgDn>: Zoom down from full screen to window.
No
6008
<Plus/Min> keys?
Yes
6009
Is this a "guide" window?
No
6010
<Pls>: Add next level of detail to list. <Min>: Reduce list by one level of detail.
Yes
No
6012
<Shift Plus/Min> keys?
Yes
6013
Is this a "guide" window?
No
6014
<Shift +>: Maximum detail in list. <Shift ->: Minimum detail in list.
Yes
No
6016
<Home/end> keys?
Yes
6017
<Home>: Top of list or guide in window. <End>: Bottom of list or guide in window.
No
6018
Go to 6024
6020
Return

FIG. 117

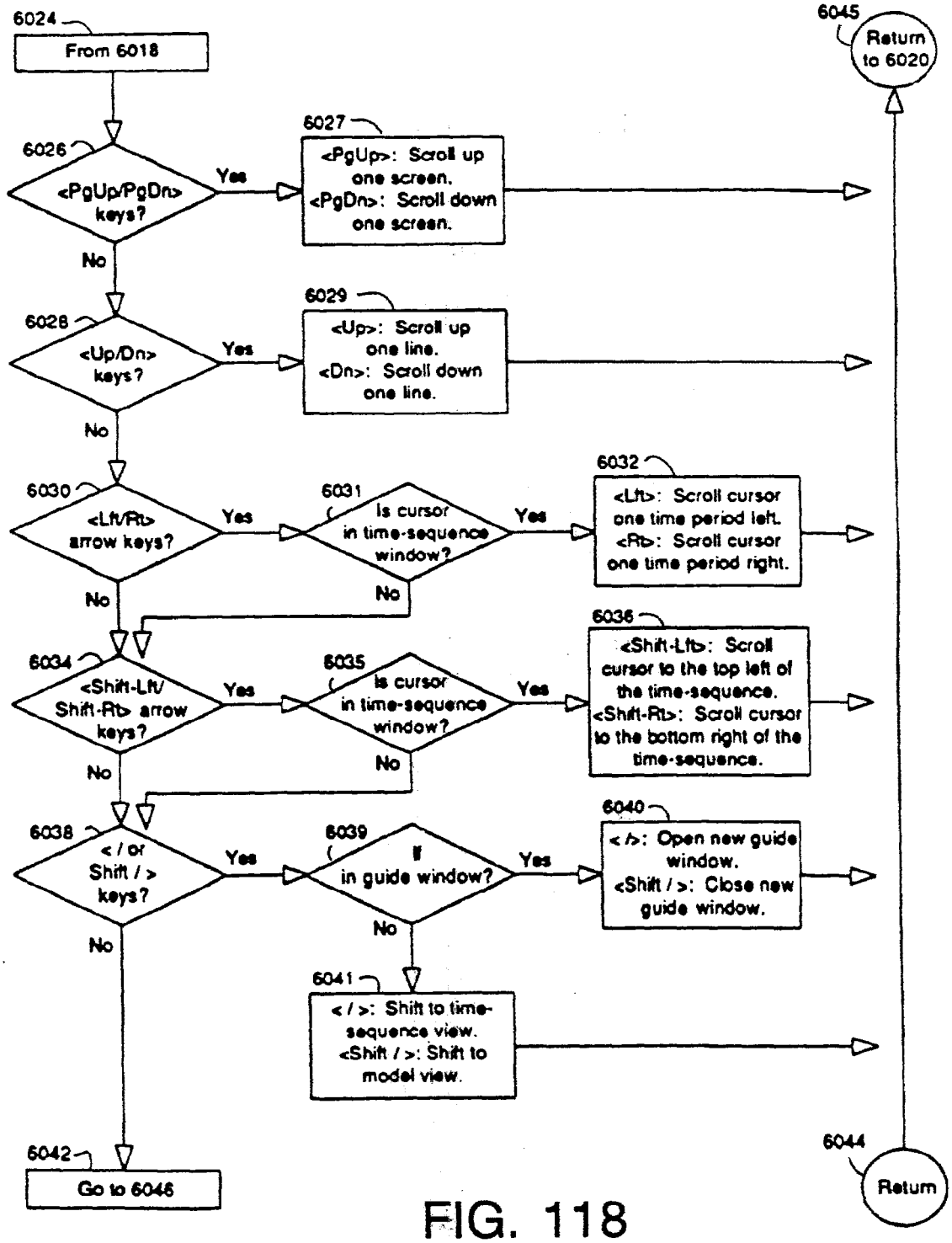

6024
From 6018
6026
<PgUp/PgDn> keys?
Yes
6027
<PgUp>: Scroll up one screen.
<PgDn>: Scroll down one screen.
No
6028
<Up/Dn> keys?
Yes
6029
<Up>: Scroll up one line.
<Dn>: Scroll down one line.
No
6030
<Lft/Rt> arrow keys?
Yes
6031
Is cursor in time-sequence window?
Yes
6032
<Lft>: Scroll cursor one time period left.
<Rt>: Scroll cursor one time period right.
No
No
6034
<Shift-Lft/ Shift-Rt> arrow keys?
Yes
6035
Is cursor in time-sequence window?
Yes
6036
<Shift-Lft>: Scroll cursor to the top left of the time-sequence.
<Shift-Rt>: Scroll cursor to the bottom right of the time-sequence.
No
No
6038
< / or Shift / > keys?
Yes
6039
If in guide window?
Yes
6040
< />: Open new guide window.
<Shift / >: Close new guide window.
No
No
6041
< / >: Shift to time-sequence view.
<Shift / >: Shift to model view.
6042
Go to 6046
6045
Return to 6020
6044
Return

FIG. 118

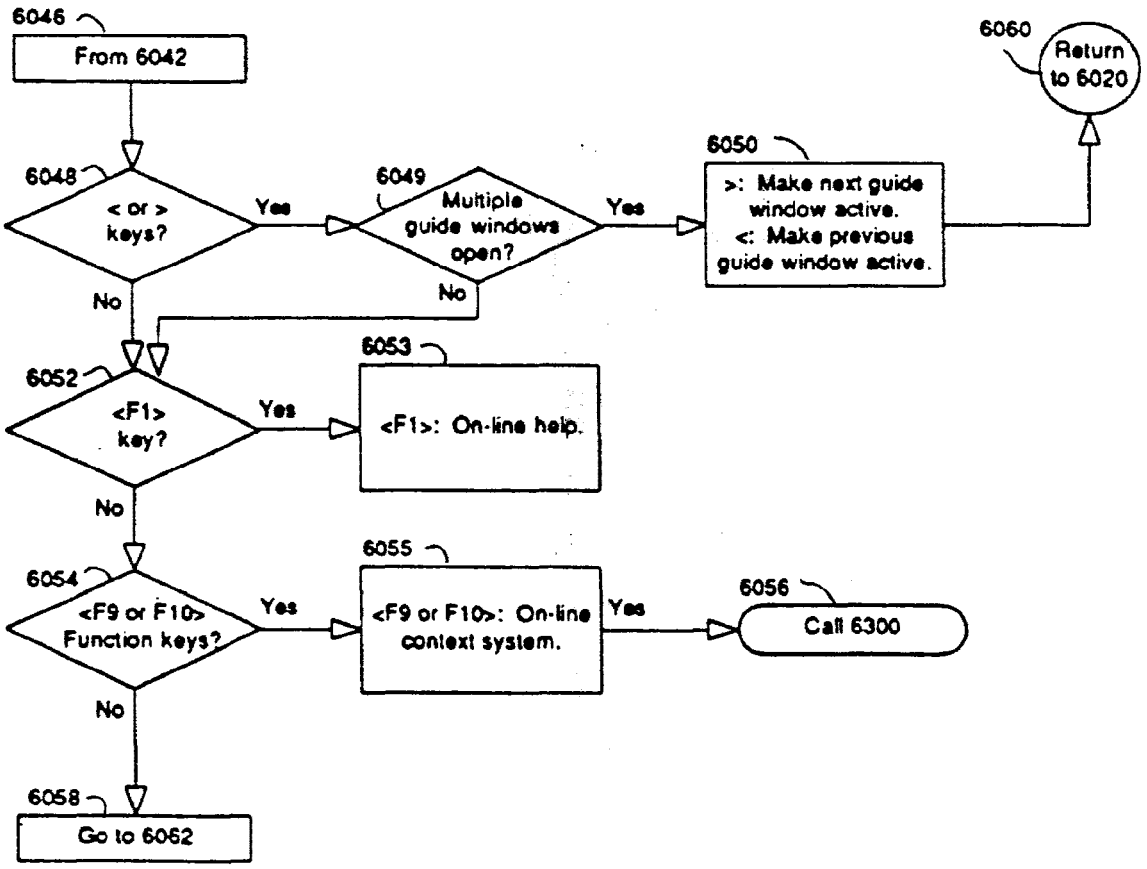

6046
From 6042
6048
< or > keys?
Yes
6049
Multiple guide windows open?
Yes
6050
>: Make next guide window active.
<: Make previous guide window active.
6060
Return to 6020
No
No
6052
<F1> key?
Yes
6053
<F1>: On-line help.
No
6054
<F9 or F10> Function keys?
Yes
6055
<F9 or F10>: On-line context system.
Yes
6056
Call 6300
No
6058
Go to 6062

FIG. 119

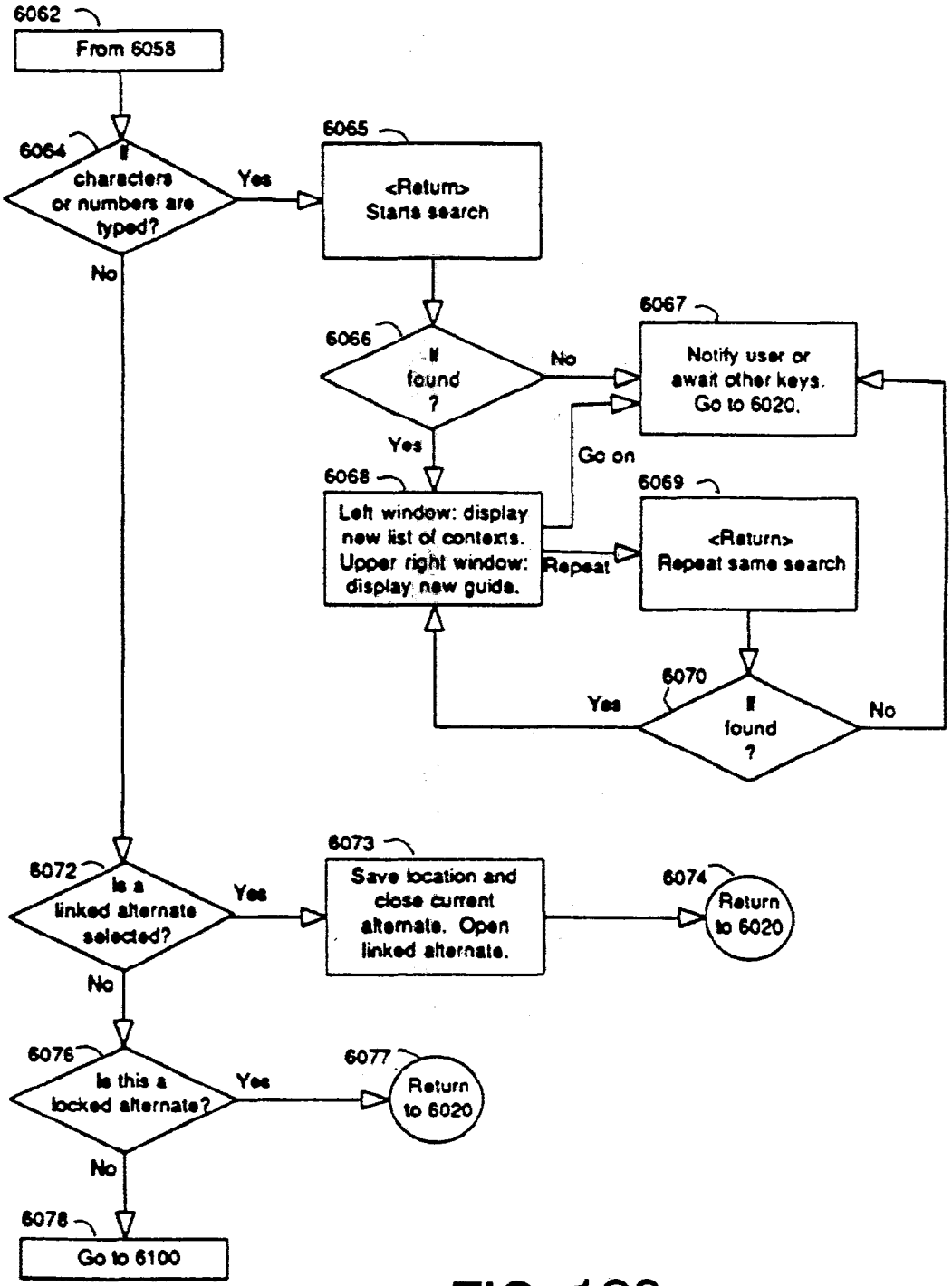

6062
From 6058
6064
If characters or numbers are typed?
Yes
No
6065
<Return> Starts search
6066
If found ?
No
Yes
6067
Notify user or await other keys. Go to 6020.
Go on
6068
Left window: display new list of contexts. Upper right window: display new guide.
Repeat
6069
<Return> Repeat same search
6070
If found ?
Yes
No
6072
Is a linked alternate selected?
Yes
No
6073
Save location and close current alternate. Open linked alternate.
6074
Return to 6020
6076
Is this a locked alternate?
Yes
No
6077
Return to 6020
6078
Go to 6100

FIG. 120

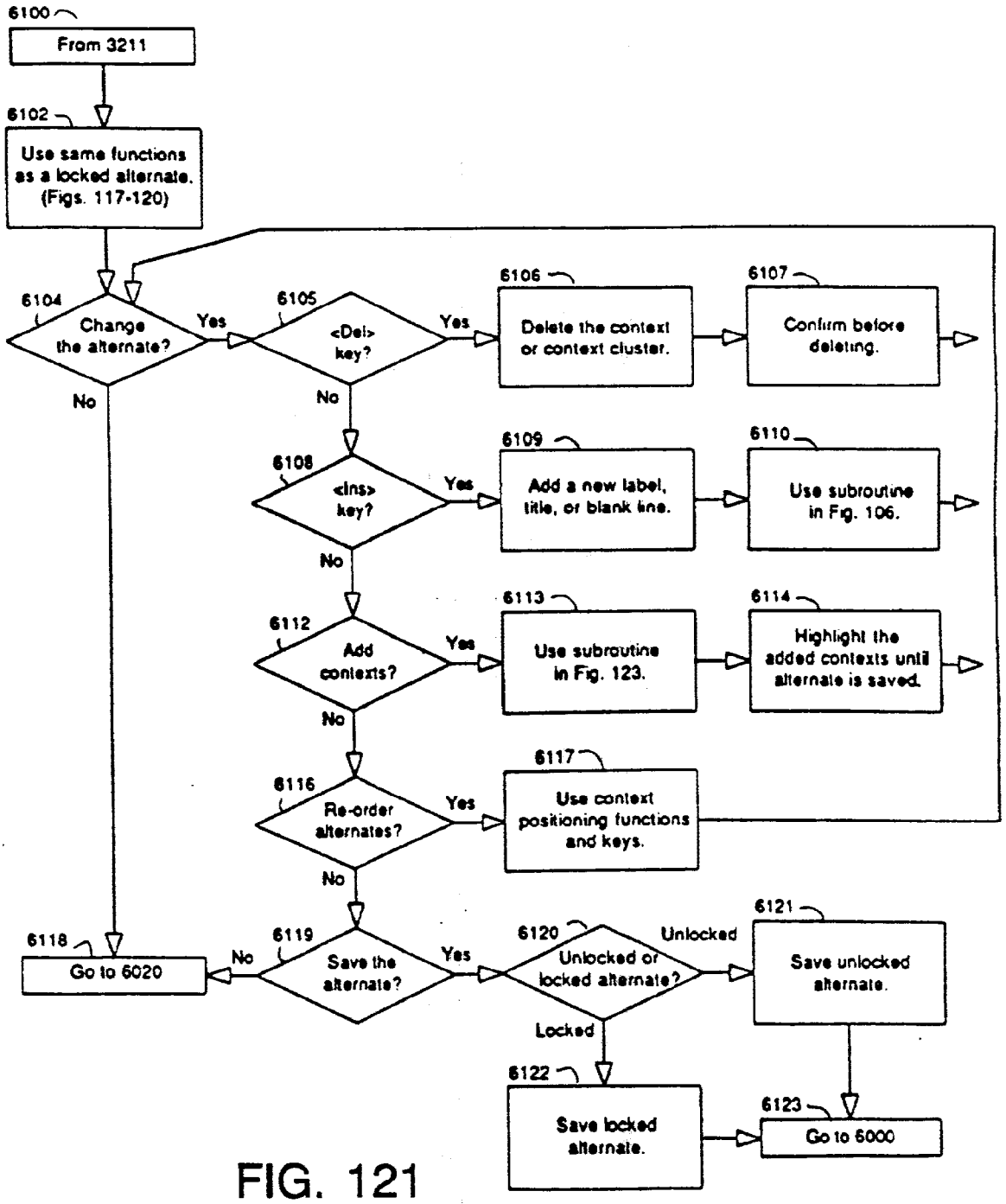

6100
From 3211
6102
Use same functions as a locked alternate. (Figs. 117-120)
6104
Change the alternate?
Yes
No
6105
<Del> key?
Yes
No
6106
Delete the context or context cluster.
6107
Confirm before deleting.
6108
<Ins> key?
Yes
No
6109
Add a new label, title, or blank line.
6110
Use subroutine in Fig. 106.
6112
Add contexts?
Yes
No
6113
Use subroutine in Fig. 123.
6114
Highlight the added contexts until alternate is saved.
6116
Re-order alternates?
Yes
No
6117
Use context positioning functions and keys.
6118
Go to 6020
6119
Save the alternate?
No
Yes
6120
Unlocked or locked alternate?
Unlocked
Locked
6121
Save unlocked alternate.
6122
Save locked alternate.
6123
Go to 6000

FIG. 121

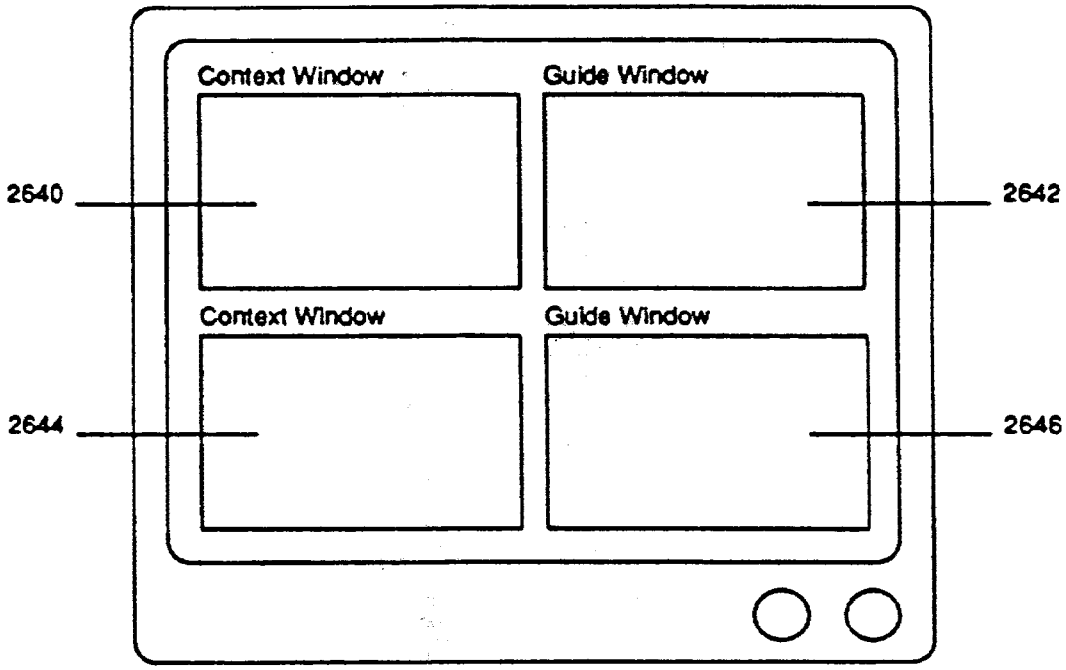

Context Window
Guide Window
2640
2642
Context Window
Guide Window
2644
2646

FIG. 122

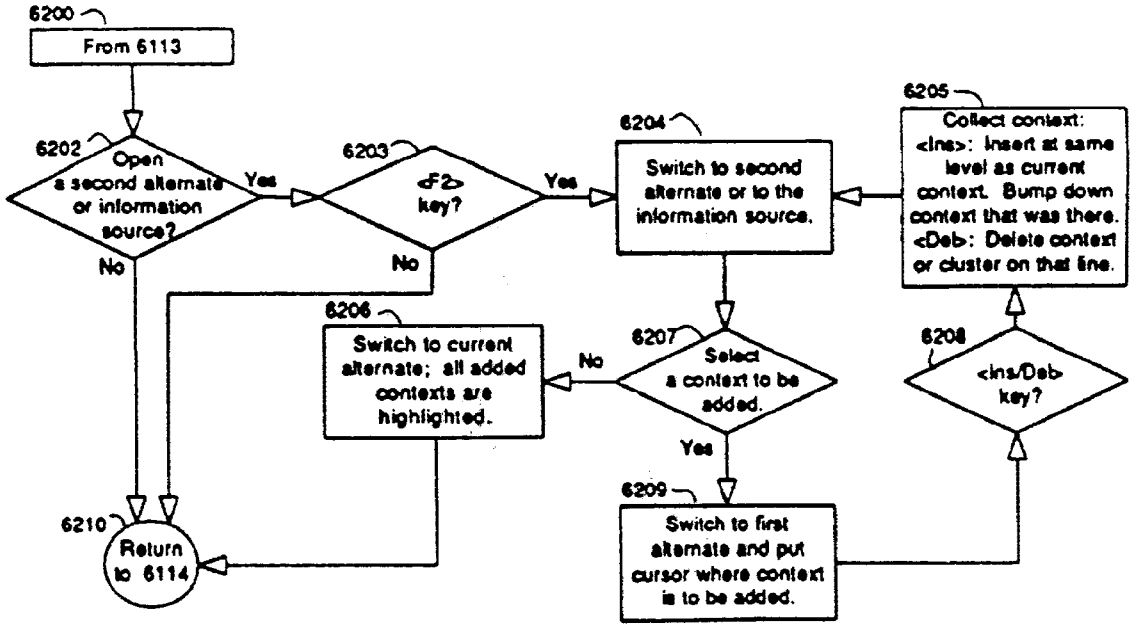

6200
From 6113
6202
Open a second alternate or information source?
Yes
No
6203
<F2> key?
Yes
No
6204
Switch to second alternate or to the information source.
6205
Collect context:
<Ins>: Insert at same level as current context. Bump down context that was there.
<Deb>: Delete context or cluster on that line.
6206
Switch to current alternate; all added contexts are highlighted.
6207
Select a context to be added.
No
Yes
6208
<Ins/Deb> key?
6209
Switch to first alternate and put cursor where context is to be added.
6210
Return to 6114

FIG. 123

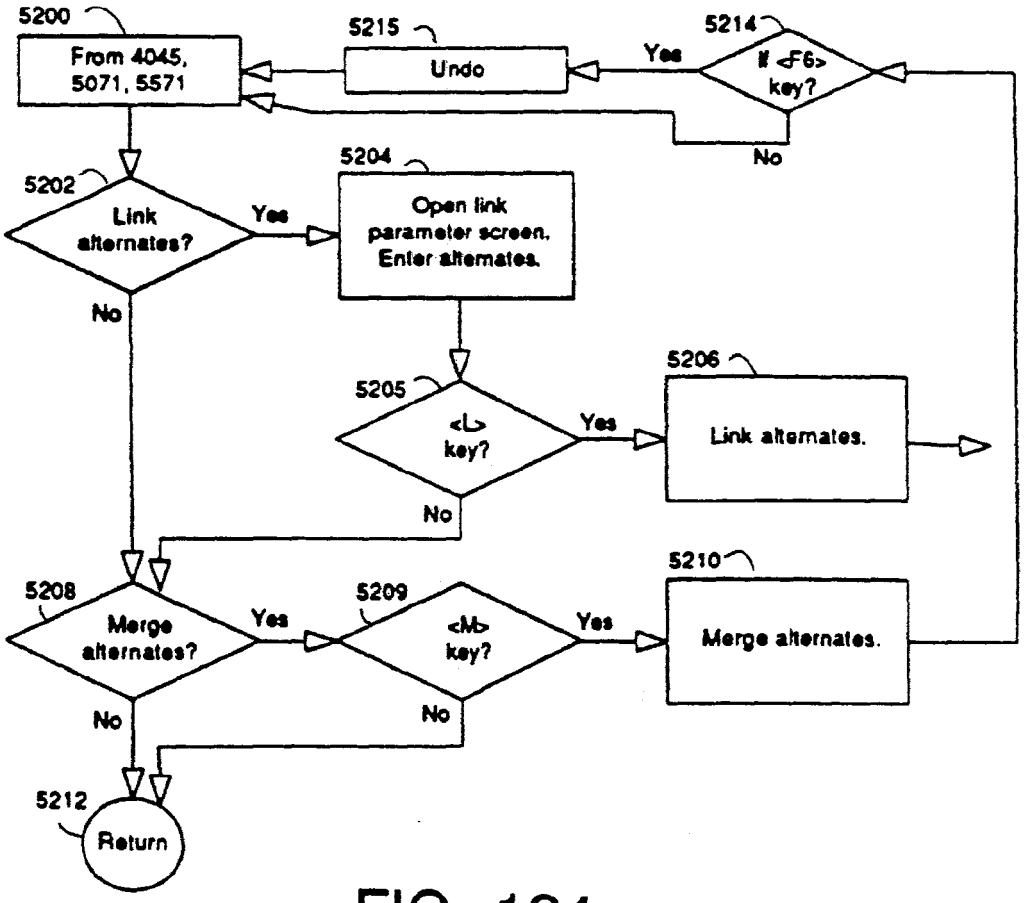

5200
From 4045, 5071, 5571
5215
Undo
Yes
5214
If <F6> key?
No
5202
Link alternates?
Yes
5204
Open link parameter screen. Enter alternates.
No
5205
<L> key?
Yes
5206
Link alternates.
No
5208
Merge alternates?
Yes
5209
<M> key?
Yes
5210
Merge alternates.
No
No
5212
Return

FIG. 124

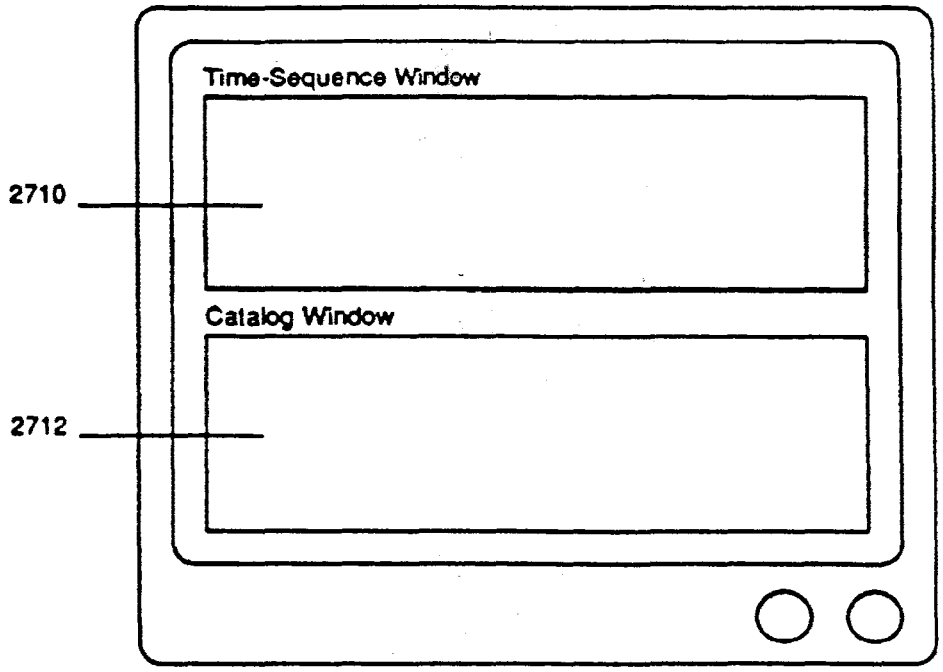


FIG. 125

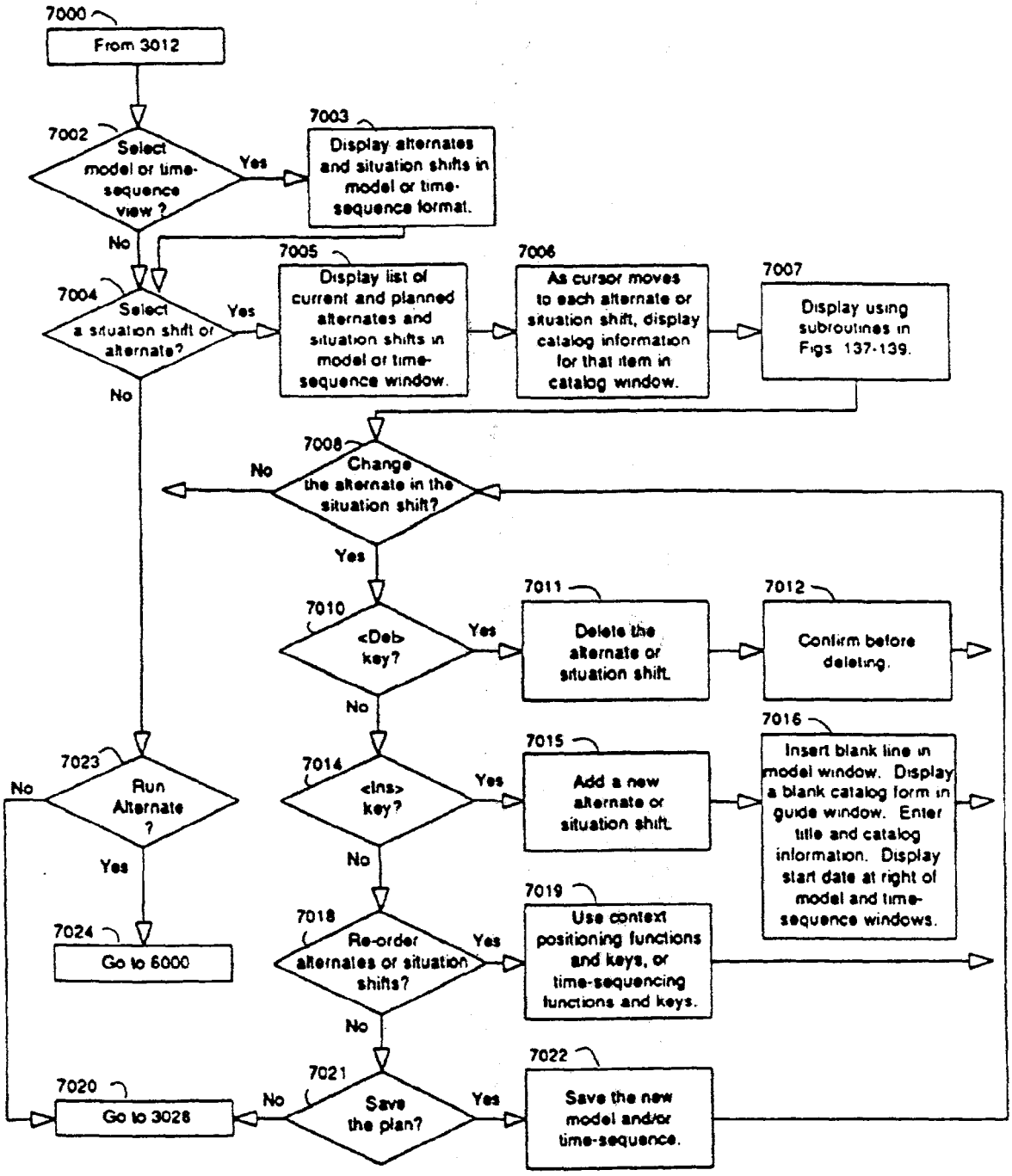

7000
From 3012
7002
Select model or time-sequence view ?
Yes
No
7003
Display alternates and situation shifts in model or time-sequence format.
7004
Select a situation shift or alternate?
Yes
No
7005
Display list of current and planned alternates and situation shifts in model or time-sequence window.
7006
As cursor moves to each alternate or situation shift, display catalog information for that item in catalog window.
7007
Display using subroutines in Figs 137-139.
7008
Change the alternate in the situation shift?
No
Yes
7010
<Del> key?
Yes
No
7011
Delete the alternate or situation shift.
7012
Confirm before deleting.
7014
<Ins> key?
Yes
No
7015
Add a new alternate or situation shift.
7016
Insert blank line in model window. Display a blank catalog form in guide window. Enter title and catalog information. Display start date at right of model and time-sequence windows.
7018
Re-order alternates or situation shifts?
Yes
No
7019
Use context positioning functions and keys, or time-sequencing functions and keys.
7021
Save the plan?
No
Yes
7022
Save the new model and/or time-sequence.
7023
Run Alternate ?
No
Yes
7024
Go to 6000
7020
Go to 3028

FIG. 126

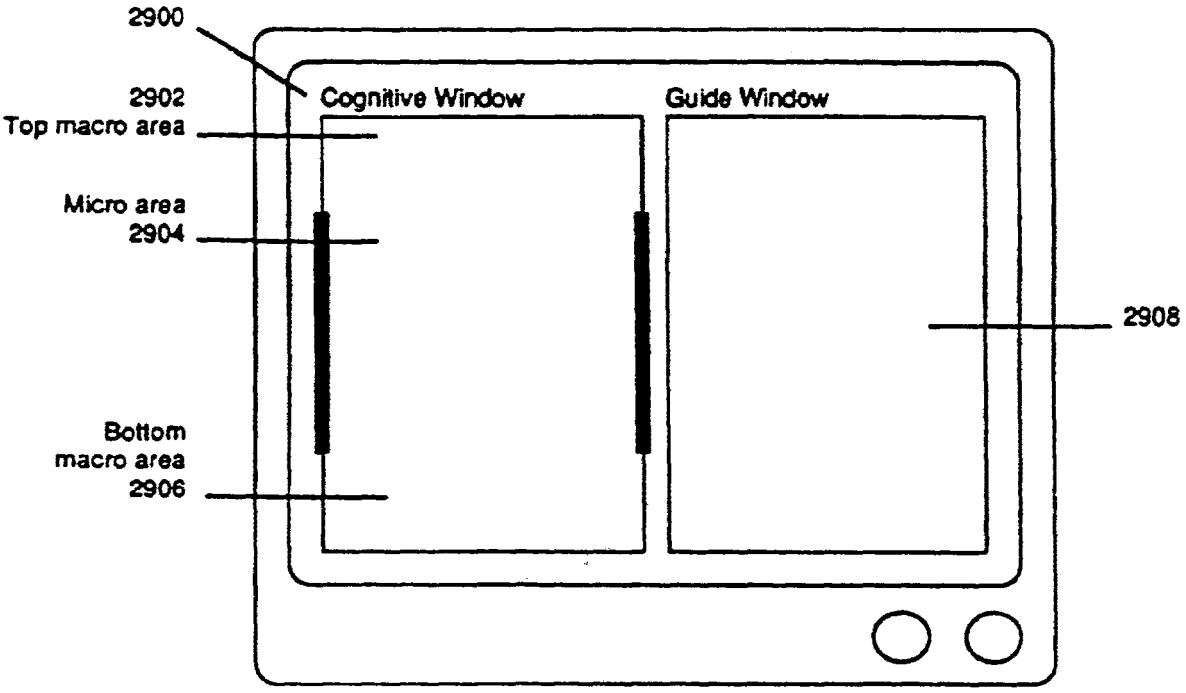

2900
2902
Top macro area
Micro area
2904
Bottom
macro area
2906
Cognitive Window
Guide Window
2908

FIG. 127

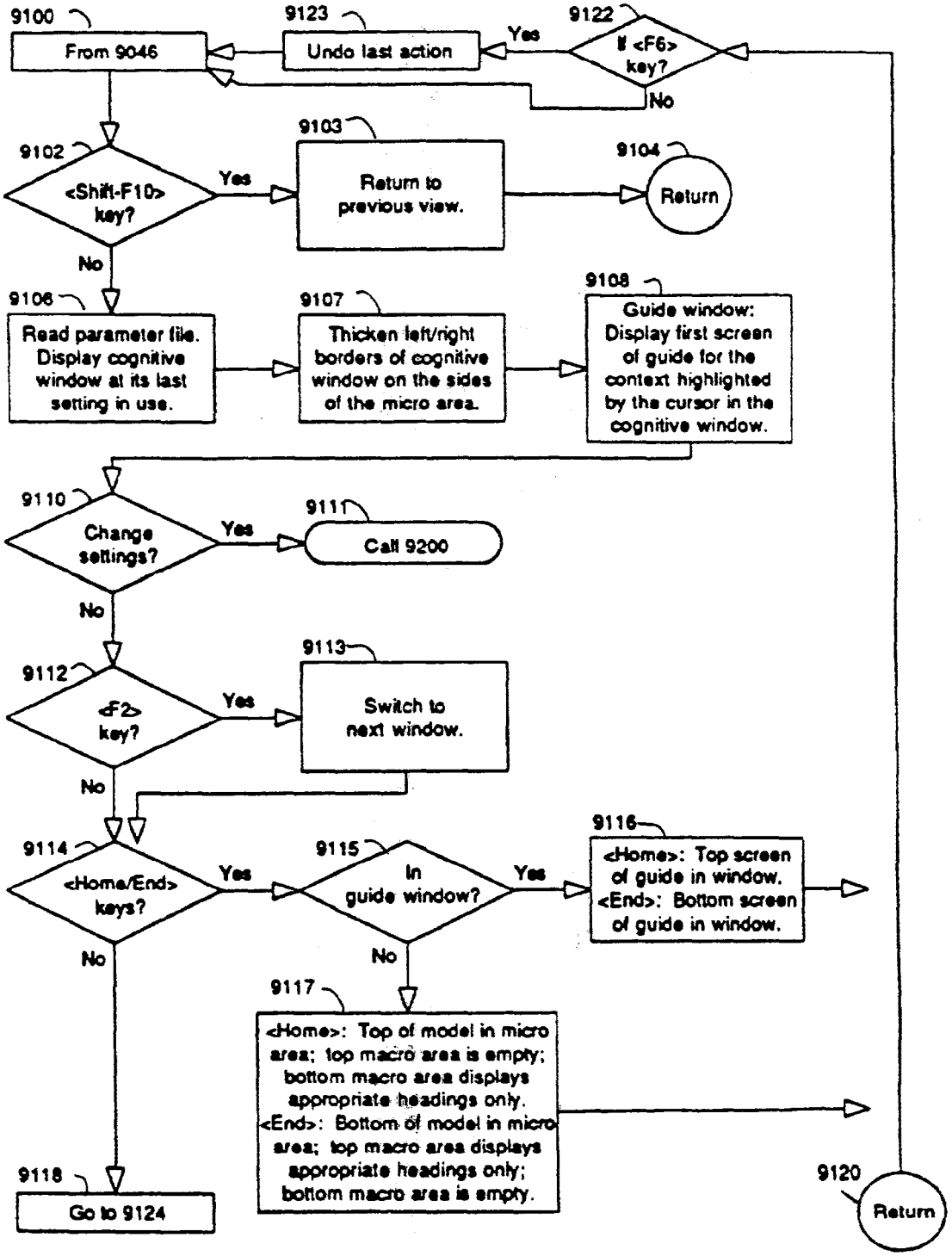

9100
From 9046
9123
Undo last action
Yes
9122
If <F6> key?
No
9102
<Shift-F10> key?
Yes
9103
Return to previous view.
9104
Return
No
9106
Read parameter file. Display cognitive window at its last setting in use.
9107
Thicken left/right borders of cognitive window on the sides of the micro area.
9108
Guide window: Display first screen of guide for the context highlighted by the cursor in the cognitive window.
9110
Change settings?
Yes
9111
Call 9200
No
9112
<F2> key?
Yes
9113
Switch to next window.
No
9114
<Home/End> keys?
Yes
9115
In guide window?
Yes
9116
<Home>: Top screen of guide in window.
<End>: Bottom screen of guide in window.
No
9117
<Home>: Top of model in micro area; top macro area is empty; bottom macro area displays appropriate headings only.
<End>: Bottom of model in micro area; top macro area displays appropriate headings only; bottom macro area is empty.
No
9118
Go to 9124
9120
Return

FIG. 128

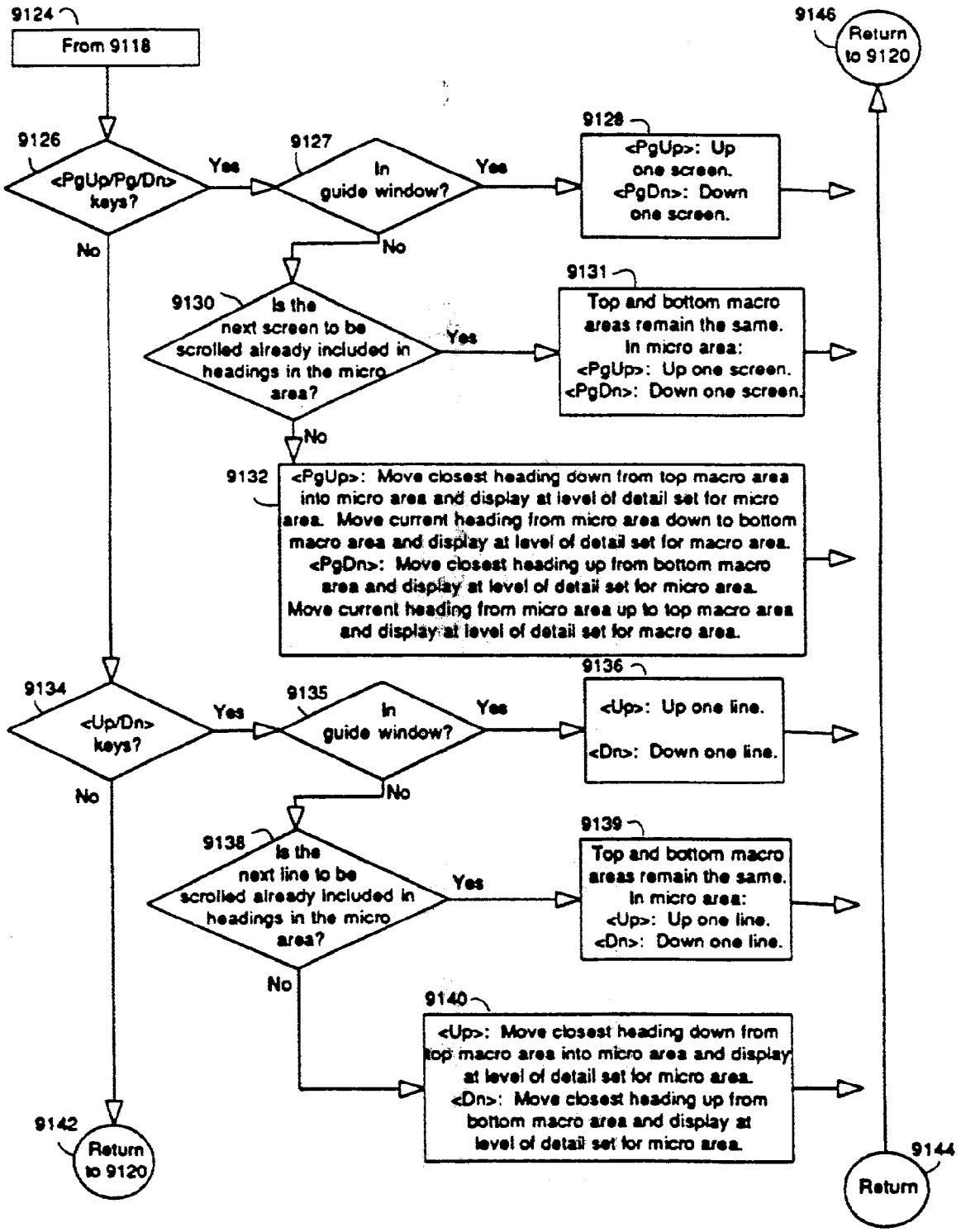

9124
From 9118
9126
<PgUp/Pg/Dn> keys?
Yes
9127
In guide window?
Yes
9128
<PgUp>: Up one screen.
<PgDn>: Down one screen.
No
No
9130
Is the next screen to be scrolled already included in headings in the micro area?
Yes
9131
Top and bottom macro areas remain the same.
In micro area:
<PgUp>: Up one screen.
<PgDn>: Down one screen.
No
9132
<PgUp>: Move closest heading down from top macro area into micro area and display at level of detail set for micro area. Move current heading from micro area down to bottom macro area and display at level of detail set for macro area.
<PgDn>: Move closest heading up from bottom macro area and display at level of detail set for micro area. Move current heading from micro area up to top macro area and display at level of detail set for macro area.
9134
<Up/Dn> keys?
Yes
9135
In guide window?
Yes
9136
<Up>: Up one line.
<Dn>: Down one line.
No
No
9138
Is the next line to be scrolled already included in headings in the micro area?
Yes
9139
Top and bottom macro areas remain the same.
In micro area:
<Up>: Up one line.
<Dn>: Down one line.
No
9140
<Up>: Move closest heading down from top macro area into micro area and display at level of detail set for micro area.
<Dn>: Move closest heading up from bottom macro area and display at level of detail set for micro area.
9142
Return to 9120
9144
Return
9146
Return to 9120

FIG. 129

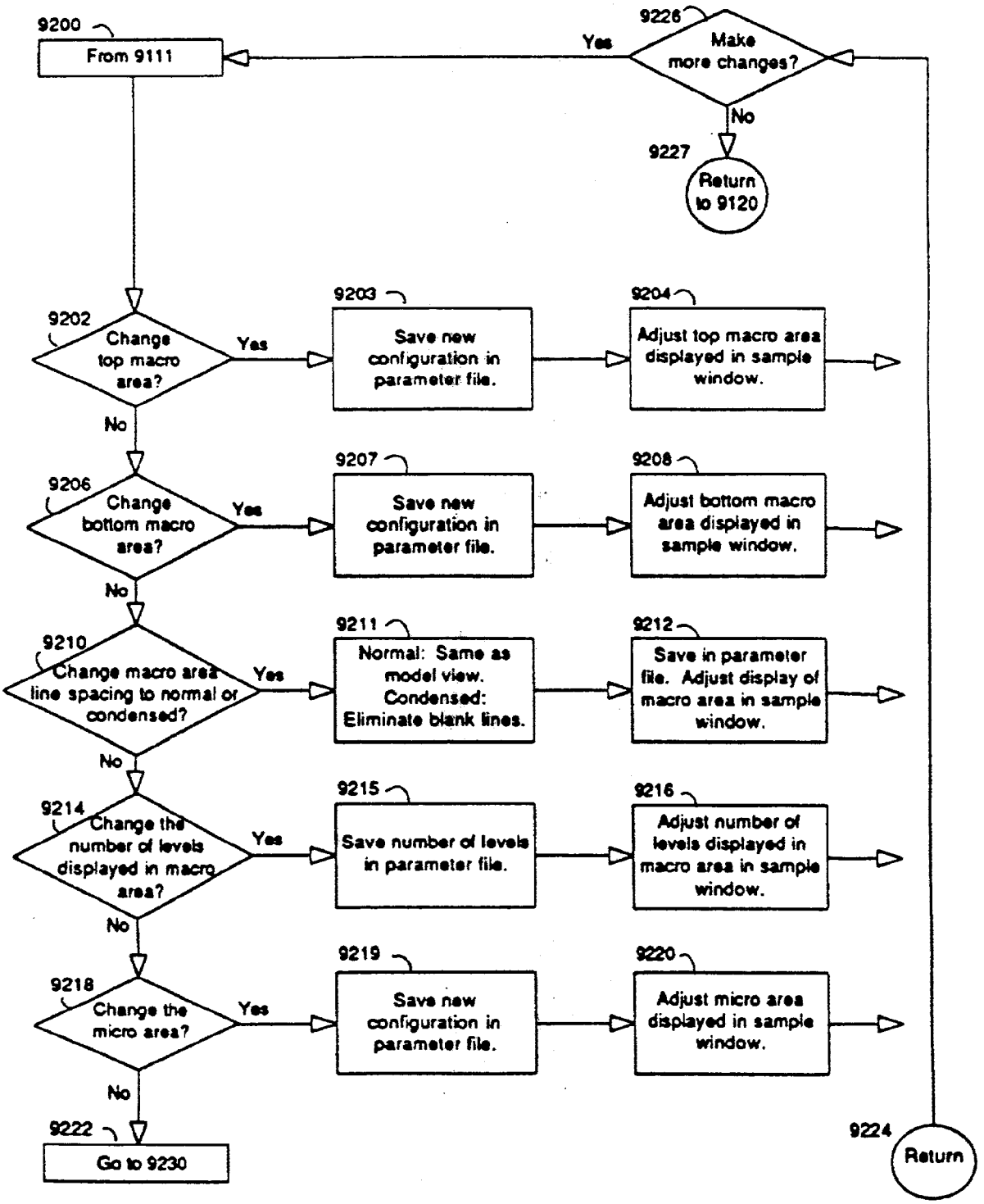

9200
From 9111
9226
Make more changes?
Yes
No
9227
Return to 9120
9202
Change top macro area?
Yes
No
9203
Save new configuration in parameter file.
9204
Adjust top macro area displayed in sample window.
9206
Change bottom macro area?
Yes
No
9207
Save new configuration in parameter file.
9208
Adjust bottom macro area displayed in sample window.
9210
Change macro area line spacing to normal or condensed?
Yes
No
9211
Normal: Same as model view. Condensed: Eliminate blank lines.
9212
Save in parameter file. Adjust display of macro area in sample window.
9214
Change the number of levels displayed in macro area?
Yes
No
9215
Save number of levels in parameter file.
9216
Adjust number of levels displayed in macro area in sample window.
9218
Change the micro area?
Yes
No
9219
Save new configuration in parameter file.
9220
Adjust micro area displayed in sample window.
9222
Go to 9230
9224
Return

FIG. 130

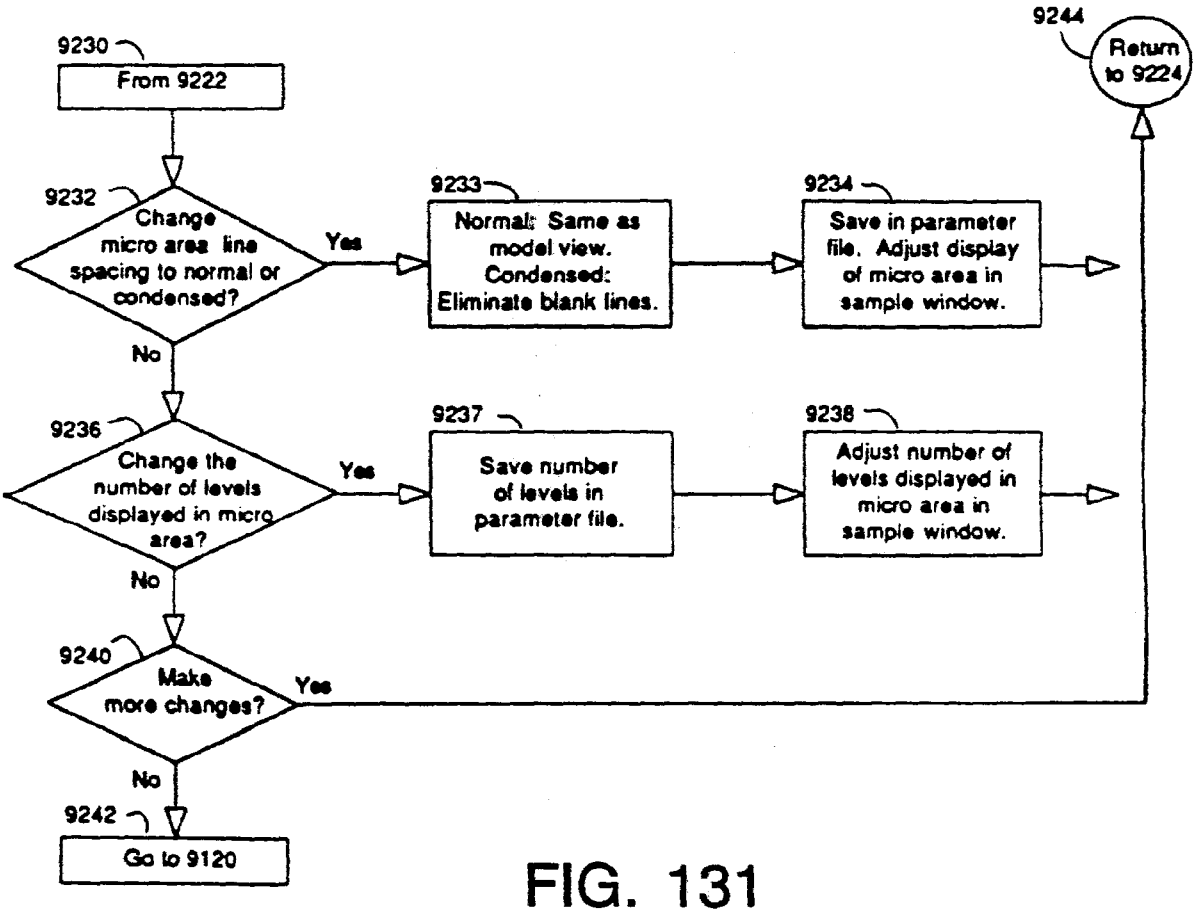

9230
From 9222
9232
Change micro area line spacing to normal or condensed?
Yes
9233
Normal: Same as model view. Condensed: Eliminate blank lines.
9234
Save in parameter file. Adjust display of micro area in sample window.
9244
Return to 9224
No
9236
Change the number of levels displayed in micro area?
Yes
9237
Save number of levels in parameter file.
9238
Adjust number of levels displayed in micro area in sample window.
No
9240
Make more changes?
Yes
No
9242
Go to 9120

FIG. 131

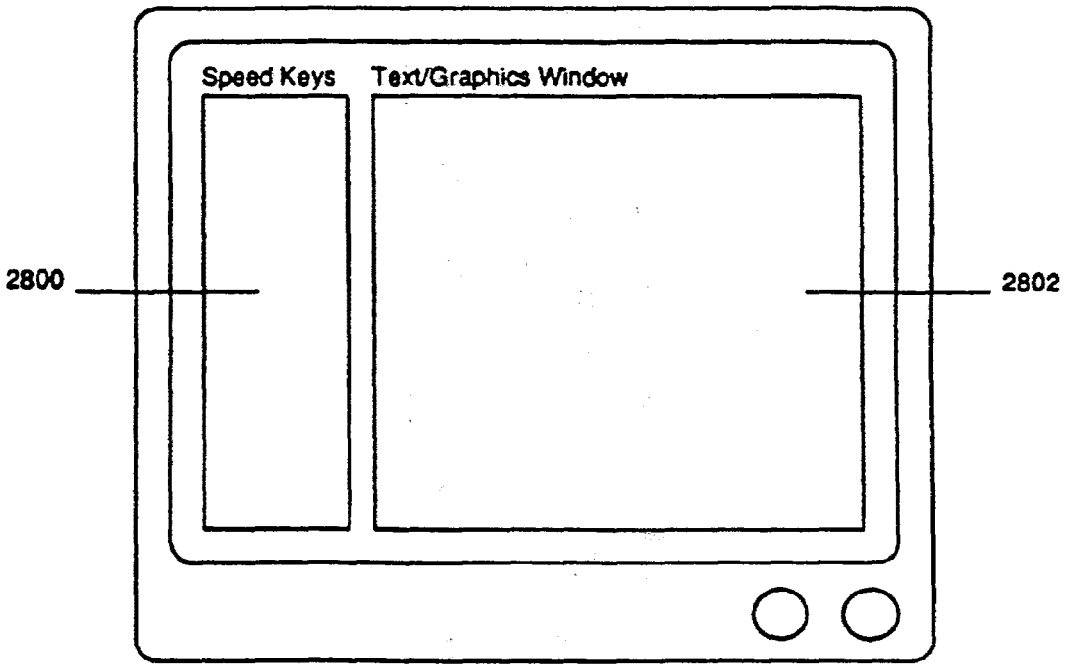


FIG. 132

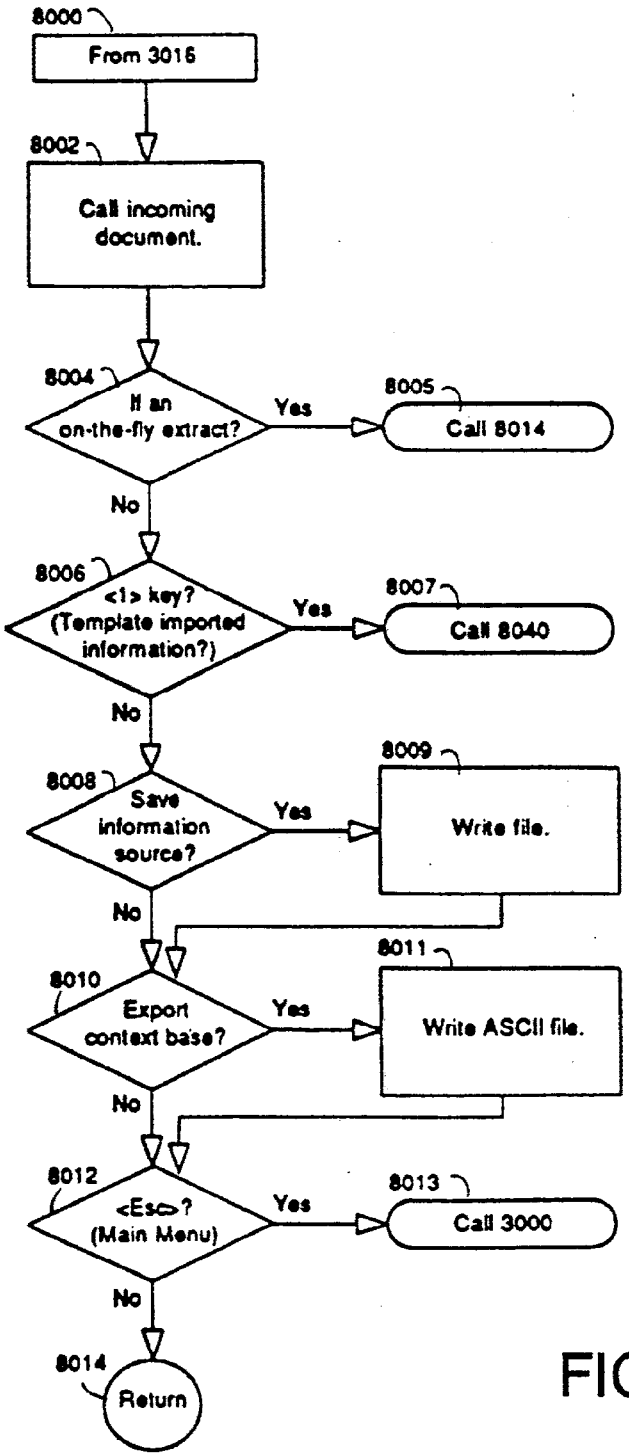

8000
From 3016
8002
Call incoming document.
8004
If an on-the-fly extract?
Yes
8005
Call 8014
No
8006
<1> key? (Template imported information?)
Yes
8007
Call 8040
No
8008
Save information source?
Yes
8009
Write file.
No
8010
Export context base?
Yes
8011
Write ASCII file.
No
8012
<Esc>? (Main Menu)
Yes
8013
Call 3000
No
8014
Return

FIG.133

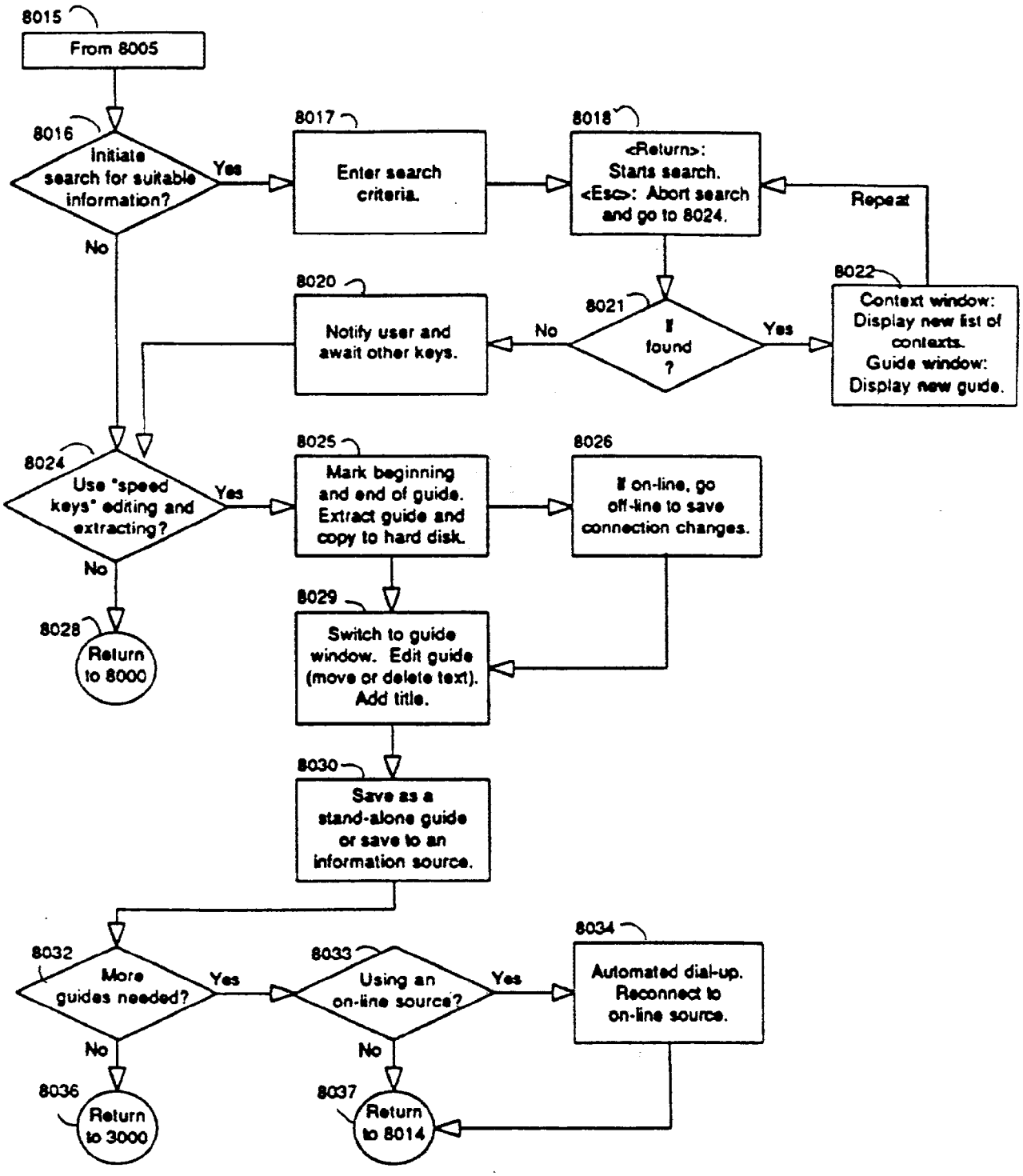

8015
From 8005
8016
Initiate search for suitable information?
Yes
No
8017
Enter search criteria.
8018
<Return>: Starts search. <Esc>: Abort search and go to 8024.
Repeat
8020
Notify user and await other keys.
8021
If found ?
No
Yes
8022
Context window: Display new list of contexts. Guide window: Display new guide.
8024
Use "speed keys" editing and extracting?
Yes
No
8025
Mark beginning and end of guide. Extract guide and copy to hard disk.
8026
If on-line, go off-line to save connection changes.
8028
Return to 8000
8029
Switch to guide window. Edit guide (move or delete text). Add title.
8030
Save as a stand-alone guide or save to an information source.
8032
More guides needed?
Yes
No
8033
Using an on-line source?
Yes
No
8034
Automated dial-up. Reconnect to on-line source.
8036
Return to 3000
8037
Return to 8014

FIG. 134

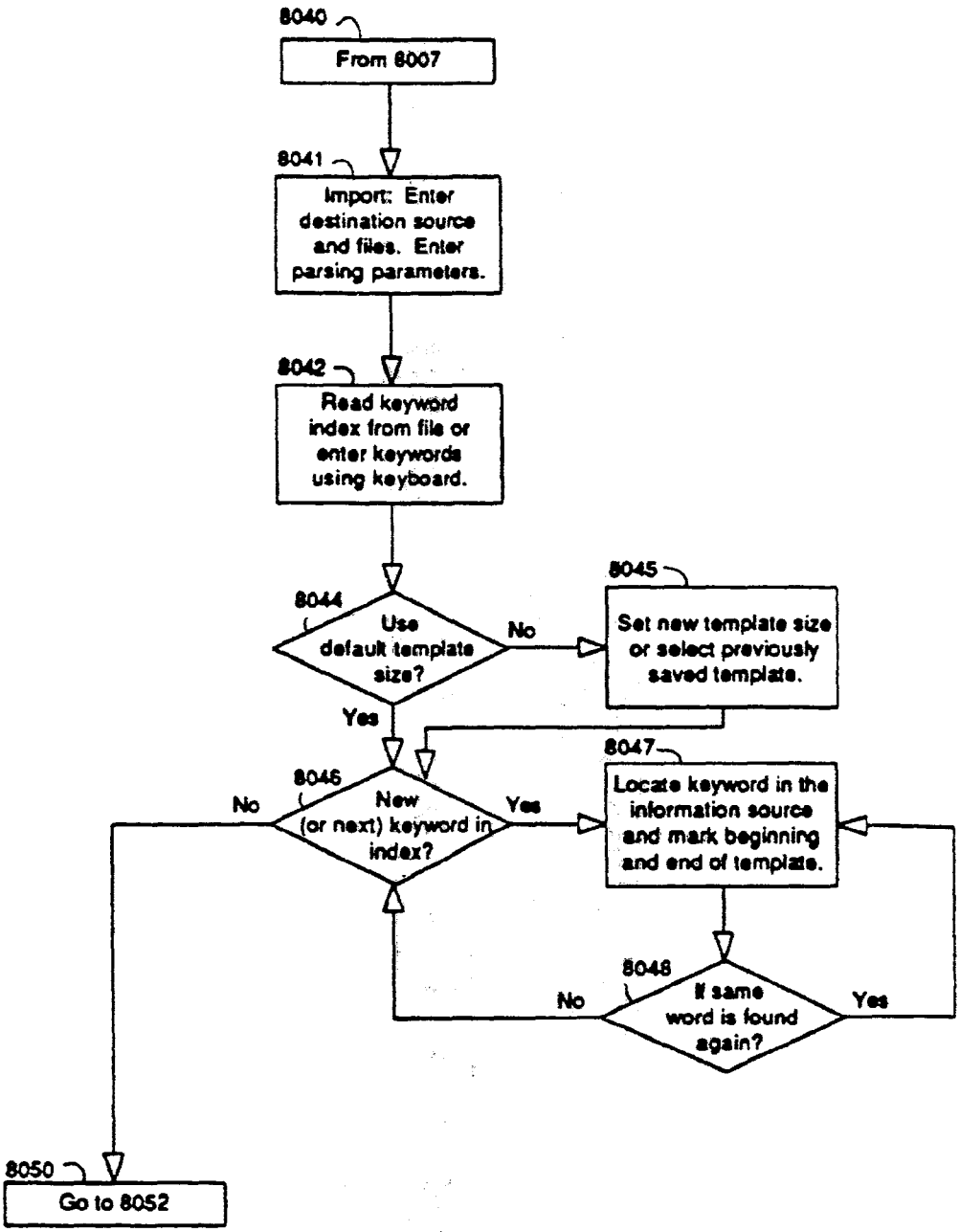

8040
From 8007
8041
Import: Enter destination source and files. Enter parsing parameters.
8042
Read keyword index from file or enter keywords using keyboard.
8044
Use default template size?
No
8045
Set new template size or select previously saved template.
Yes
8047
Locate keyword in the information source and mark beginning and end of template.
8046
New (or next) keyword in index?
No
Yes
8048
If same word is found again?
No
Yes
8050
Go to 8052

FIG. 135

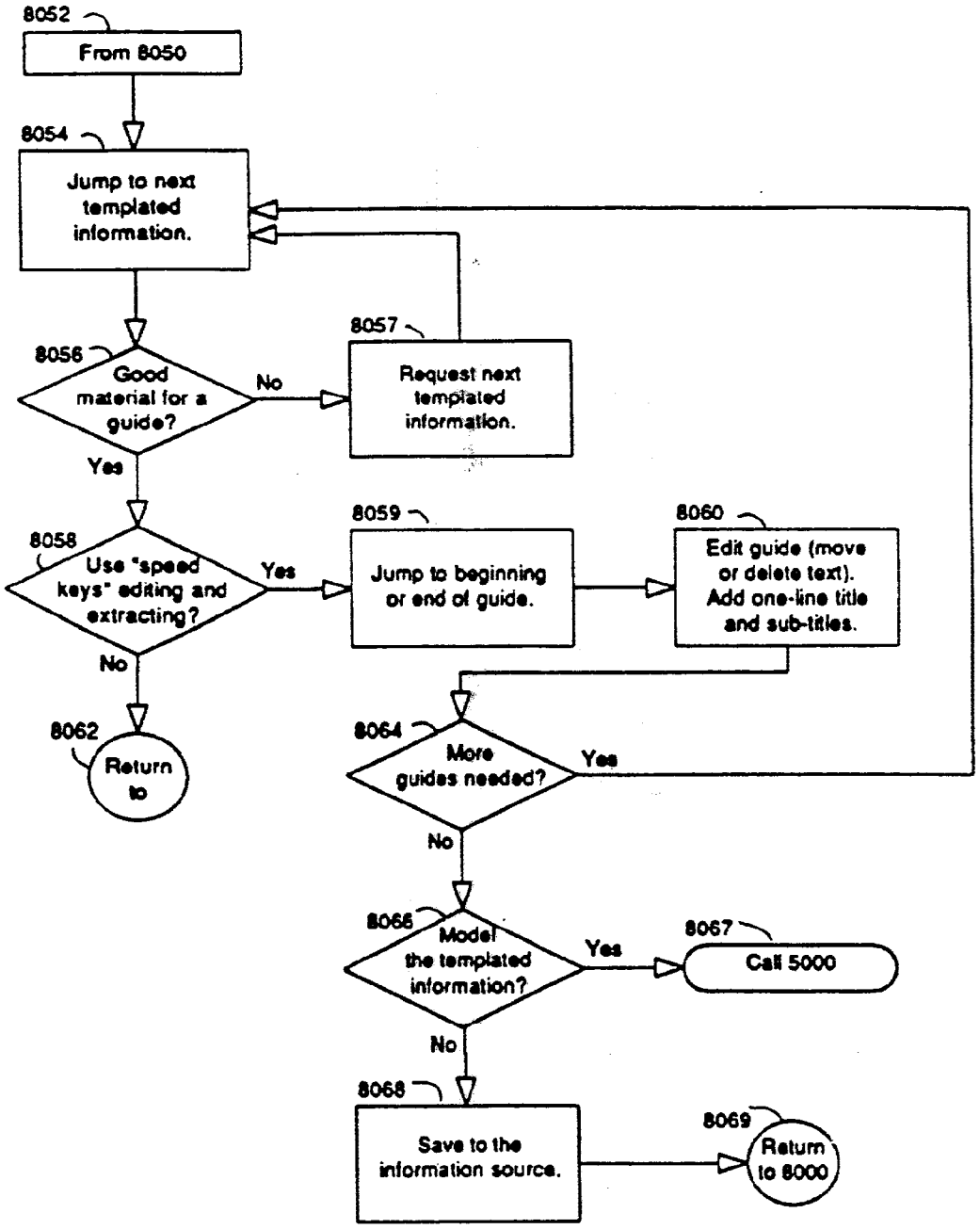

8052
From 8050
8054
Jump to next templated information.
8056
Good material for a guide?
No
8057
Request next templated information.
Yes
8058
Use "speed keys" editing and extracting?
Yes
8059
Jump to beginning or end of guide.
8060
Edit guide (move or delete text). Add one-line title and sub-titles.
No
8062
Return to
8064
More guides needed?
Yes
No
8065
Model the templated information?
Yes
8067
Call 5000
No
8068
Save to the information source.
8069
Return to 8000

FIG. 136

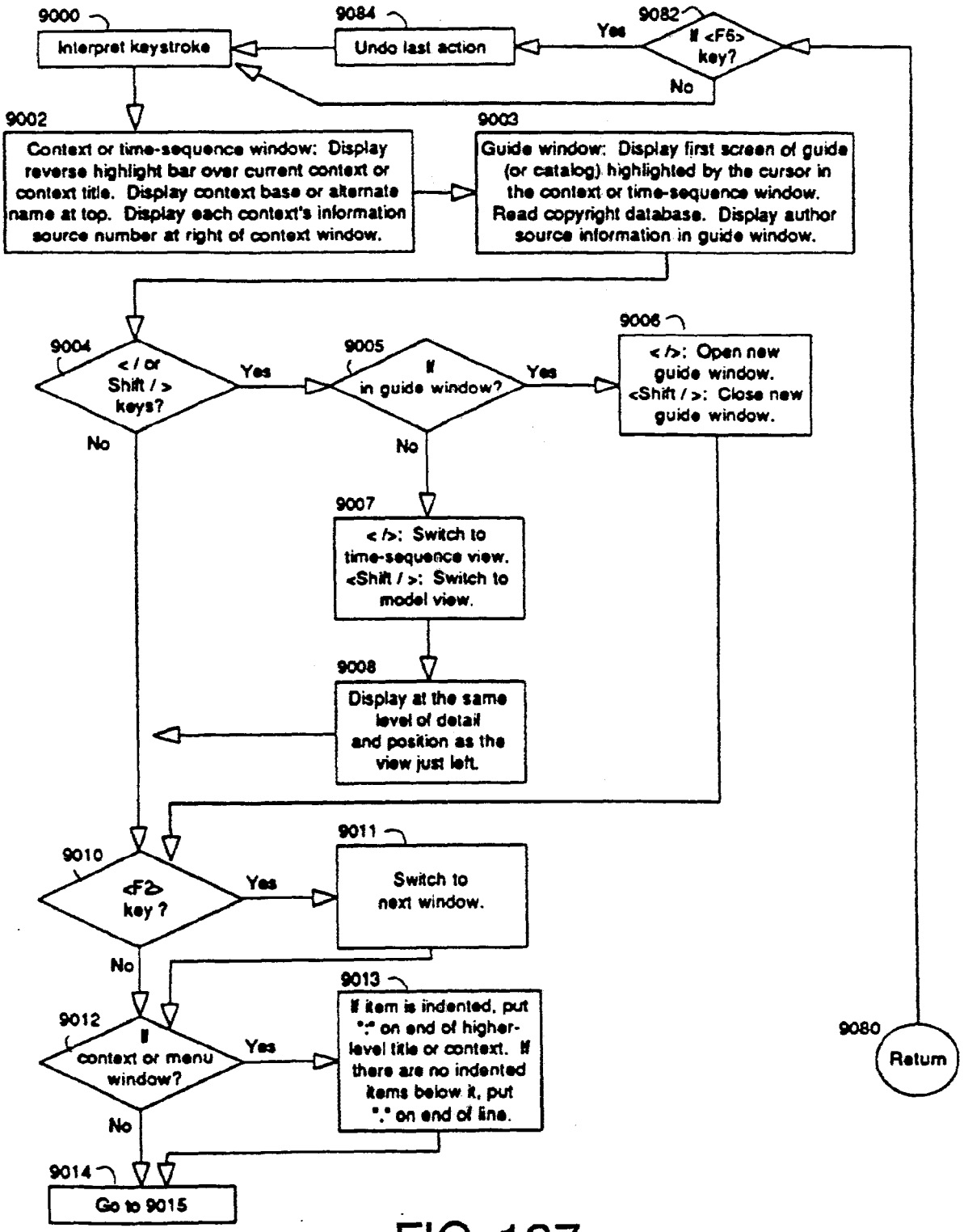

9000
Interpret keystroke
9084
Undo last action
Yes
9082
If <F6> key?
No
9002
Context or time-sequence window: Display reverse highlight bar over current context or context title. Display context base or alternate name at top. Display each context's information source number at right of context window.
9003
Guide window: Display first screen of guide (or catalog) highlighted by the cursor in the context or time-sequence window. Read copyright database. Display author source information in guide window.
9004
< / or Shift / > keys?
Yes
9005
If in guide window?
Yes
9006
< />: Open new guide window. <Shift / >: Close new guide window.
No
No
9007
< />: Switch to time-sequence view. <Shift / >: Switch to model view.
9008
Display at the same level of detail and position as the view just left.
9010
<F2> key ?
Yes
9011
Switch to next window.
No
9012
If context or menu window?
Yes
9013
If item is indented, put ":" on end of higher-level title or context. If there are no indented items below it, put "." on end of line.
No
9014
Go to 9015
9080
Return

FIG. 137

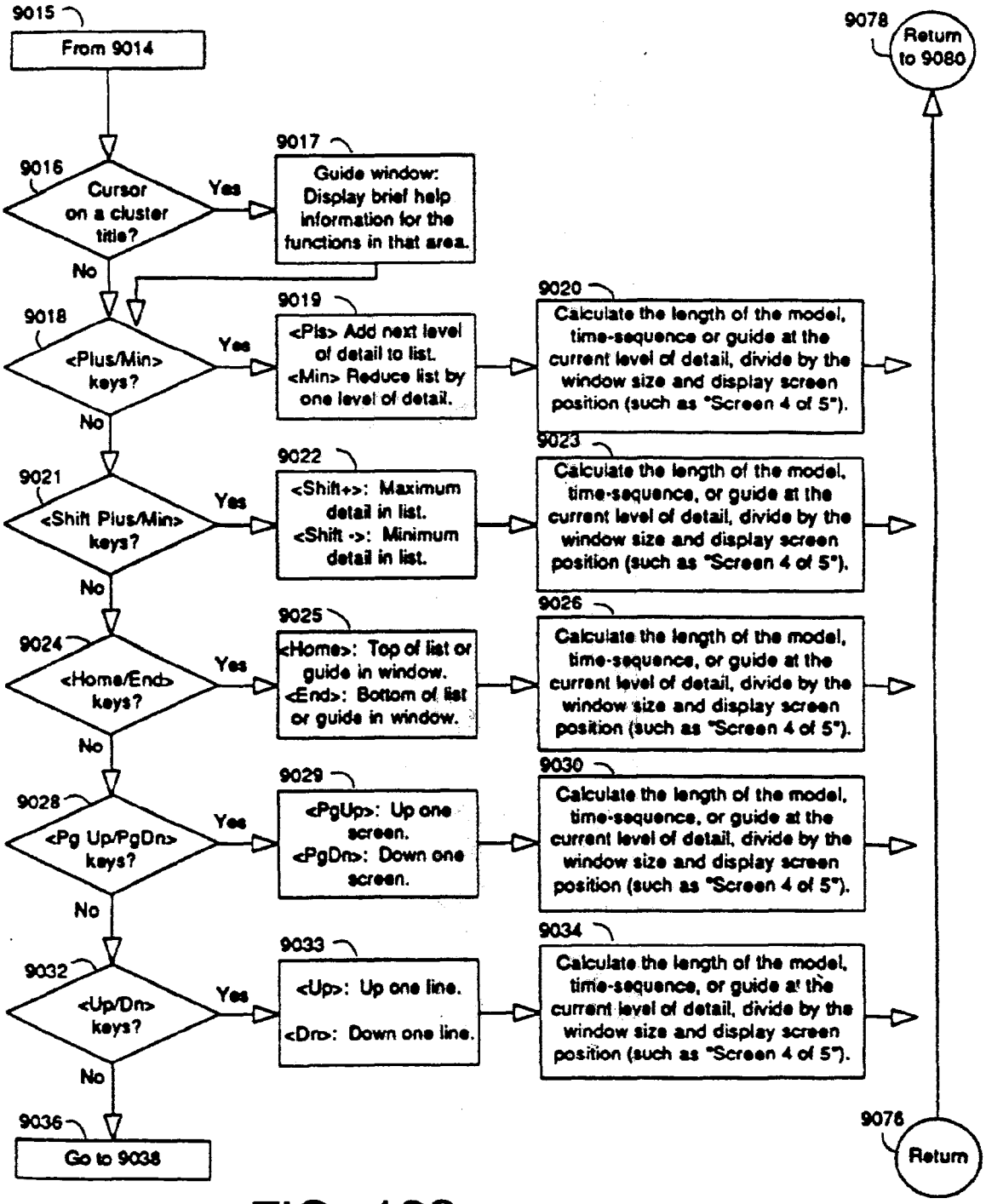

9015
From 9014
9016
Cursor on a cluster title?
Yes
9017
Guide window: Display brief help information for the functions in that area.
No
9018
<Plus/Min> keys?
Yes
9019
<Pls> Add next level of detail to list. <Min> Reduce list by one level of detail.
9020
Calculate the length of the model, time-sequence or guide at the current level of detail, divide by the window size and display screen position (such as "Screen 4 of 5").
No
9021
<Shift Plus/Min> keys?
Yes
9022
<Shift+>: Maximum detail in list. <Shift ->: Minimum detail in list.
9023
Calculate the length of the model, time-sequence, or guide at the current level of detail, divide by the window size and display screen position (such as "Screen 4 of 5").
No
9024
<Home/End> keys?
Yes
9025
<Home>: Top of list or guide in window. <End>: Bottom of list or guide in window.
9026
Calculate the length of the model, time-sequence, or guide at the current level of detail, divide by the window size and display screen position (such as "Screen 4 of 5").
No
9028
<Pg Up/PgDn> keys?
Yes
9029
<PgUp>: Up one screen. <PgDn>: Down one screen.
9030
Calculate the length of the model, time-sequence, or guide at the current level of detail, divide by the window size and display screen position (such as "Screen 4 of 5").
No
9032
<Up/Dn> keys?
Yes
9033
<Up>: Up one line. <Dn>: Down one line.
9034
Calculate the length of the model, time-sequence, or guide at the current level of detail, divide by the window size and display screen position (such as "Screen 4 of 5").
No
9036
Go to 9038
9078
Return to 9080
9076
Return

FIG. 138

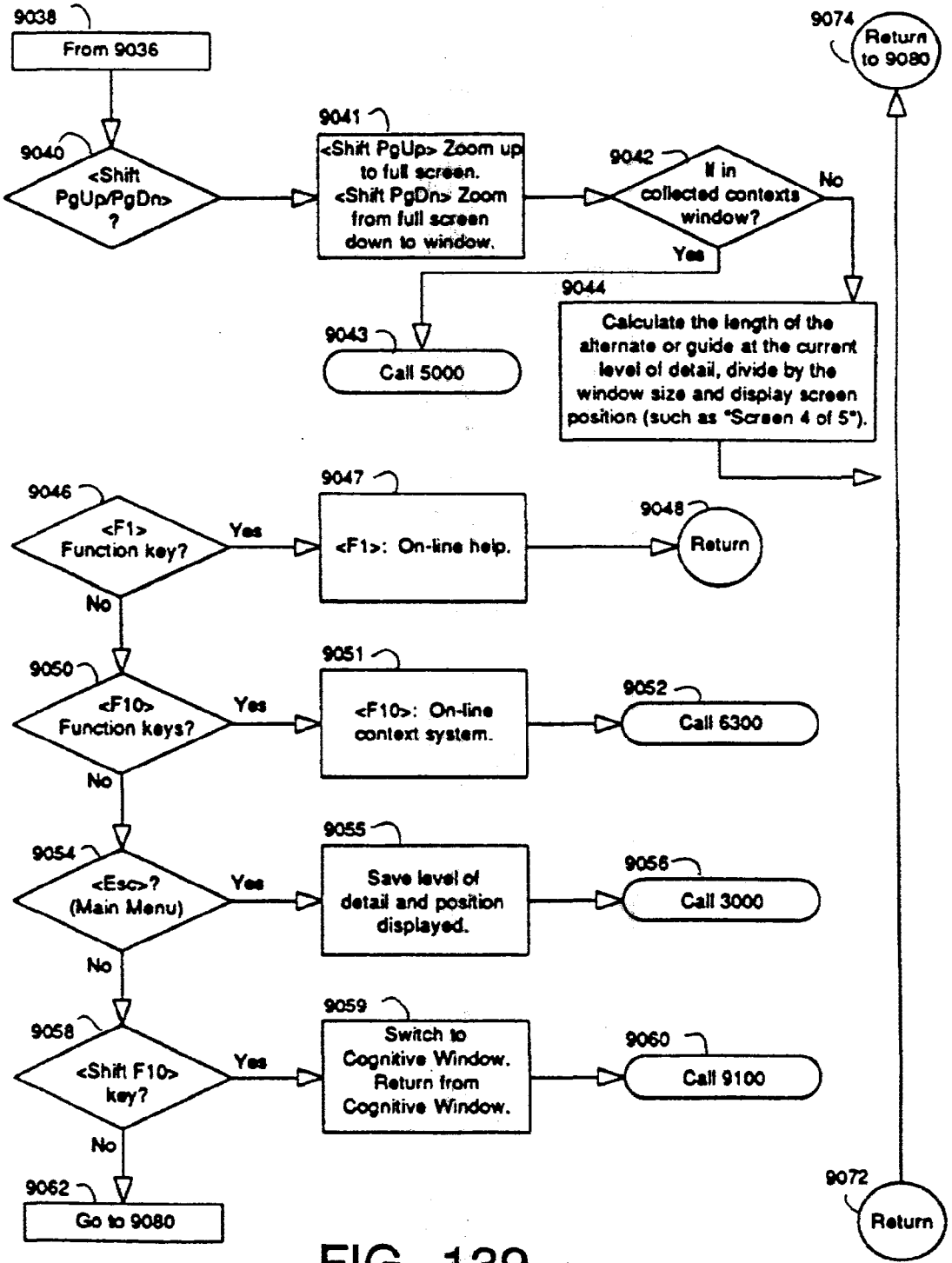

9038
From 9036
9040
<Shift PgUp/PgDn> ?
9041
<Shift PgUp> Zoom up to full screen. <Shift PgDn> Zoom from full screen down to window.
9042
If in collected contexts window?
No
Yes
9043
Call 5000
9044
Calculate the length of the alternate or guide at the current level of detail, divide by the window size and display screen position (such as "Screen 4 of 5").
9074
Return to 9080
9046
<F1> Function key?
Yes
No
9047
<F1>: On-line help.
9048
Return
9050
<F10> Function keys?
Yes
No
9051
<F10>: On-line context system.
9052
Call 6300
9054
<Esc>? (Main Menu)
Yes
No
9055
Save level of detail and position displayed.
9056
Call 3000
9058
<Shift F10> key?
Yes
No
9059
Switch to Cognitive Window. Return from Cognitive Window.
9060
Call 9100
9062
Go to 9080
9072
Return

FIG. 139

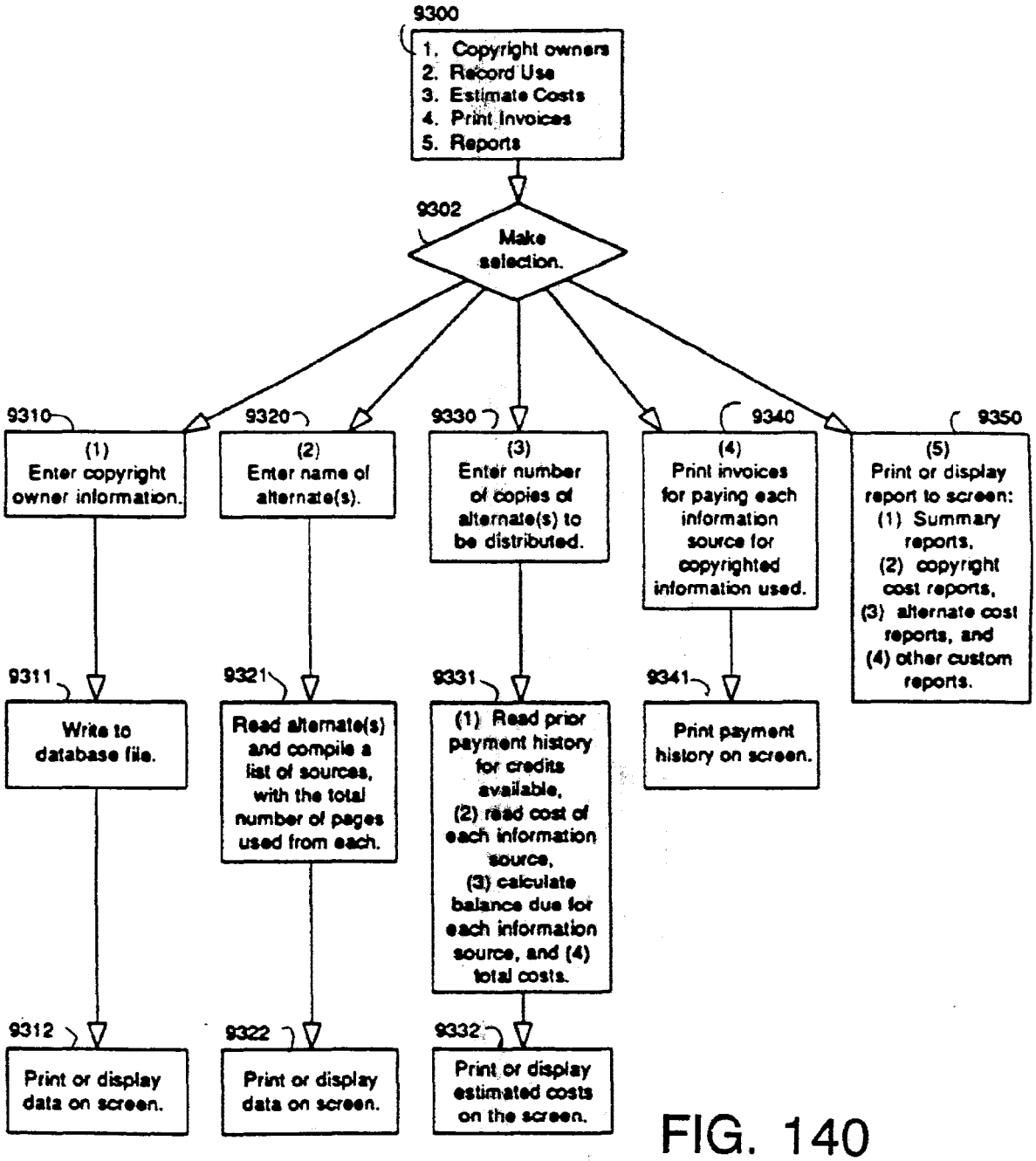

9300
1. Copyright owners
2. Record Use
3. Estimate Costs
4. Print Invoices
5. Reports
9302
Make selection.
9310
(1) Enter copyright owner information.
9320
(2) Enter name of alternate(s).
9330
(3) Enter number of copies of alternate(s) to be distributed.
9340
(4) Print invoices for paying each information source for copyrighted information used.
9350
(5) Print or display report to screen: (1) Summary reports, (2) copyright cost reports, (3) alternate cost reports, and (4) other custom reports.
9311
Write to database file.
9321
Read alternate(s) and compile a list of sources, with the total number of pages used from each.
9331
(1) Read prior payment history for credits available, (2) read cost of each information source, (3) calculate balance due for each information source, and (4) total costs.
9341
Print payment history on screen.
9312
Print or display data on screen.
9322
Print or display data on screen.
9332
Print or display estimated costs on the screen.

FIG. 140

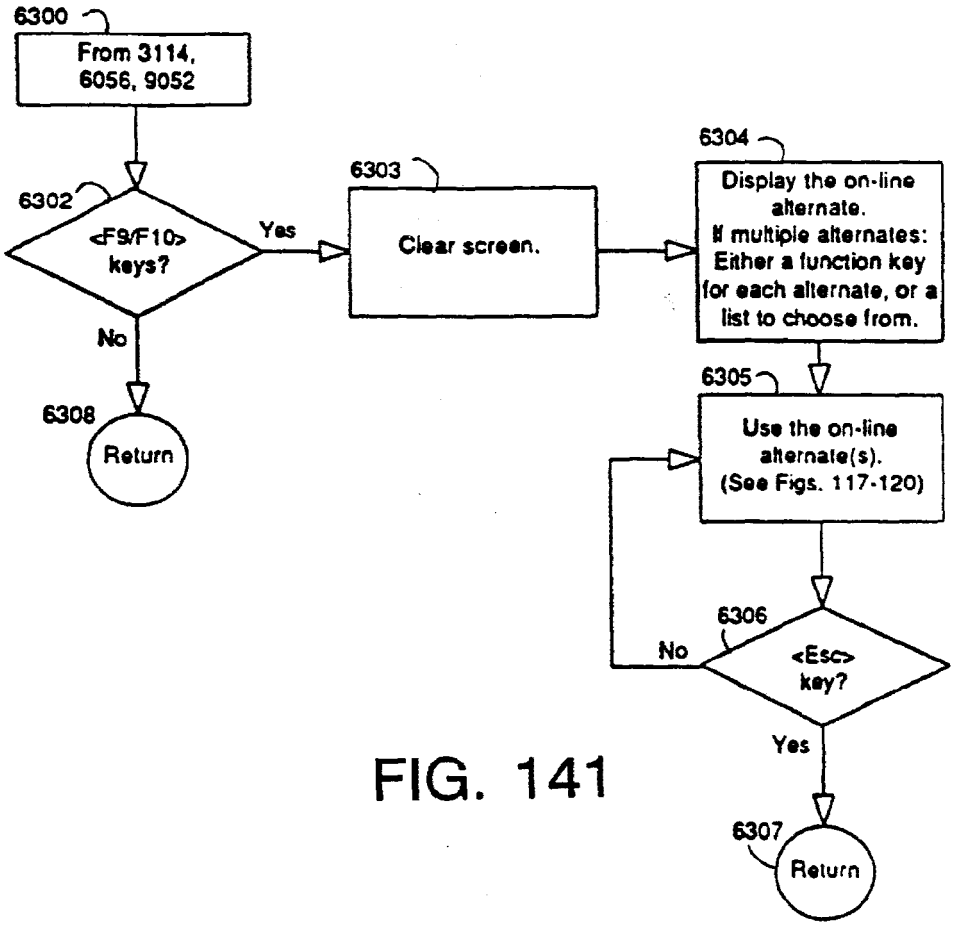

6300
From 3114, 6056, 9052
6302
<F9/F10> keys?
Yes
No
6303
Clear screen.
6304
Display the on-line alternate.
If multiple alternates: Either a function key for each alternate, or a list to choose from.
6305
Use the on-line alternate(s). (See Figs. 117-120)
6306
<Esc> key?
No
Yes
6307
Return
6308
Return

FIG. 141

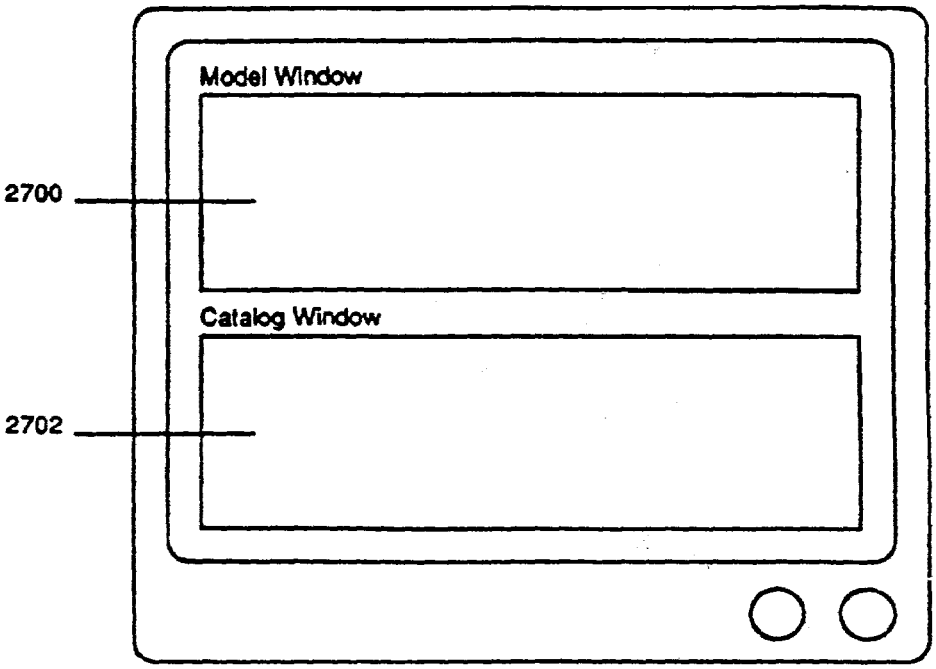


FIG. 142

INTERNATIONAL SEARCH REPORT

International Application No PCT/US91/00807

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)

According to International Patent Classification (IPC) or to both National Classification and IPC

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IPC 5 : G06F 15/62

II. FIELDS SEARCHED

Minimum Documentation Searched

Classification System	Classification Symbols
U.S. CL	364/518,521,523 340/721,723

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched

III. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
X Y	US,A 4,656,603 (DUNN) 07 April 1989 See the entire document.	1-59 and 63-72 60-62
Y	US,A 4,813,013 (DUNN) 14 March 1989 See the entire document	1-72
Y	US,A 4,823,303 (TERASAWA) 18 April 1989 See the entire document.	60-62
X	US,A 4,885,704 (TAKAGI et al) 05 December 1989 See the entire document.	1-59,63-72

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
15 May 1991	02 JUL 1991
International Searching Authority	**Signature of Authorized Officer**
ISA/US	Heather R. Herndon-Primary Examiner

Form PCT/ISA/210 (second sheet) (May 1986)

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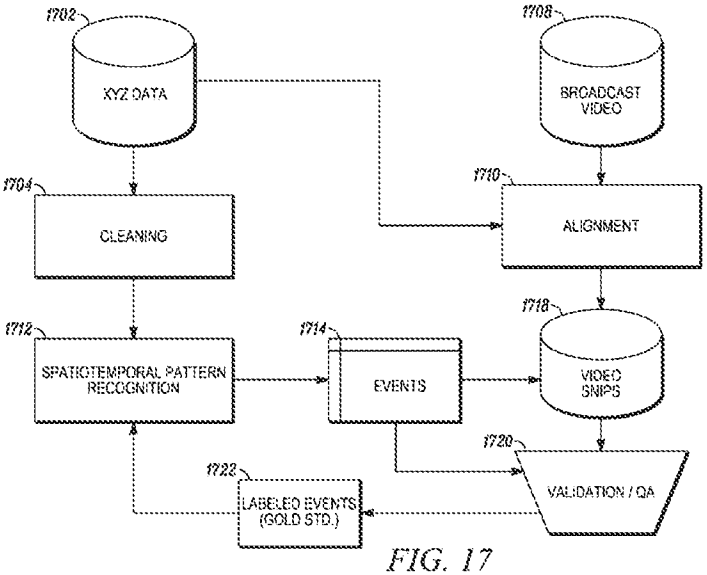


FIG. 17

(57) Abstract: Methods and systems are provided to enable the exploration of event data captured from video feeds, such as from sporting event venues, the discovery of relevant events (such as within a video feed of a sporting event), and the presentation of novel insights, analytic results, and visual displays that enhance decision-making, provide improved entertainment and provide other benefits.

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2015222869 22 May 2019

SYSTEM AND METHOD FOR PERFORMING SPATIO-TEMPORAL ANALYSIS OF SPORTING EVENTS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to the following provisional U.S. patent applications, which are hereby incorporated by reference in their entirety: provisional U.S. patent application 62/072,308 filed October 29, 2014 and provisional U.S. patent application 61/945,899 filed February, 28, 2014.

BACKGROUND

[0002] Field of the Invention

[0003] The present application generally relates to a system and method for performing analysis of events that appear in live and recorded video feeds, such as sporting events. In particular, the present application relates to a system and methods for enabling spatio-temporal analysis of component attributes and elements that make up events within a video feed, such as of a sporting event, systems for discovering, learning, extracting and analyzing such events, metrics and analytic results relating to such events, and methods and systems for display, visualization and interaction with outputs from such methods and systems.

[0004] Description of the Related Art

[0005] Live events, such as sports, especially at the college and professional levels, continue to grow in popularity and revenue as individual colleges and franchises reap billions in revenue each year. To provide valuable insights and gain a competitive advantage in such endeavors, quantitative methodologies, such as Sabermetrics, have grown in importance and ubiquity as a valuable augmentation to traditional scouting methods. However, as no one person can evaluate and accurately store all of the information available from the vast volumes of sporting information generated on a daily basis, there seldom exists a storehouse

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of properly coded and stored information reflecting such large volumes of sports information and, even were such information available, there is lacking the provision of tools capable of mining and analyzing such information.

[0006] Systems are now available for capturing and encoding event information, such as sporting event information, such as "X,Y,Z" motion data captured by imaging cameras deployed in National Basketball Association (NBA) arenas. However, there are many challenges with such systems, including difficulty handling the data, difficulty transforming X,Y,Z data into meaningful and existing sports terminology, difficulty identifying meaningful insights from the data, difficulty visualizing results, and others. Also, there are opportunities to identify and extract novel insights from the data. Accordingly, it is an object of at least preferred embodiments of the present invention to provide for methods and systems that can take event data captured in video feeds and enable discovery and presentation of relevant events, metrics, analytic results, and insights. An additional or alternative object is to at least provide the public with a useful choice.

SUMMARY

[0007] In accordance with various exemplary and non-limiting embodiments, methods and systems disclosed herein enable the exploration of event data captured from video feeds, the discovery of relevant events (such as within a video feed of a sporting event), and the presentation of novel insights, analytic results, and visual displays that enhance decision-making, provide improved entertainment and provide other benefits.

[0008] The term 'comprising' as used in this specification means 'consisting at least in part of'. When interpreting each statement in this specification that includes the term 'comprising', features other than that or those prefaced by the term may also be present. Related terms such as 'comprise' and 'comprises' are to be interpreted in the same manner.

[0009] Embodiments include taking data from a video feed and enabling an automated machine understanding of a game, aligning video sources to the understanding and utilizing the video sources to automatically deliver highlights to an end-user.

[0010] In accordance with another exemplary and non-limiting embodiments, a method comprises receiving a sport playing field configuration and at least one image and determining a camera pose based, at least in part, upon the sport playing field configuration and at least one image.

[0011] In accordance with another exemplary and non-limiting embodiments, a method comprises performing automatic recognition of a camera pose based, at least in part, on video input comprising a scene and augmenting the video input with at least one of additional imagery and graphics rendered within the reconstructed 3D space of the scene.

[0012] Methods and systems described herein may include taking a video feed of an event; taking information associated with a source of the video feed; using machine learning to develop a three-dimensional spatiotemporal understanding of the event based on the video feed and the information associated with the source, wherein the machine learning develops the three-dimensional spatiotemporal understanding by characterizing the event utilizing at least three relative motion types that relate multiple features visible in the video feed, the types selected from the list consisting of: relative direction of motion of at least two visible features, duration of relative motion of visible features with respect to each other, rate of motion of at least two visible features with respect to each other, acceleration of motion of at least two visible features with respect to each other, projected point of intersection of at least two visible features with respect to each other, and separation distance between at least two visible features with respect to each other; automatically, under computer control, aligning the video feed with the understanding; and producing a transformed video feed that includes at least one highlight of the event that may be extracted from the video feed based on the

machine learning of the event. In embodiments, the event may be a sporting event. In embodiments, the event may be an entertainment event. In embodiments, the event may be at least one of a television event and a movie event. In embodiments, the event may be a playground pickup game or other amateur sports game. In embodiments, the event may be any human activity or motion in a home or commercial establishment. In embodiments, the transformed video feed creates a highlight video feed of video for a defined set of players. In embodiments, the defined set of players may be a set of players from a fantasy team. Embodiments may include delivering the video feed to at least one of an inbox, a mobile device, a table, an application, a scoreboard, a Jumbotron board, a video board, and a television network.

[0013]Methods and systems described herein may include acquiring a plurality of video feeds of an event; acquiring information derived from a source of at least one of the plurality of video feeds; using machine learning to develop a spatiotemporal understanding of at least a portion of the event based on the at least one of the plurality of video feeds and the information associated with the source, the machine learning accessing a library of spatiotemporal relationships among a portion of the visible elements in the at least one of the plurality of video feeds, the relationships corresponding to at least one of: relative direction of motion of at least two visible features, duration of relative motion of visible features with respect to each other, rate of motion of at least two visible features with respect to each other, acceleration of motion of at least two visible features with respect to each other, projected point of intersection of at least two visible features with respect to each other, and separation distance between at least two visible features with respect to each other; and producing a video feed that comprises content of at least one of the plurality of video feeds and a reference to at least one highlight of any of the plurality of video feeds, wherein the produced video feed and the highlight are aligned based, at least in part, on the understanding.

[0014]Methods and systems described herein may include taking a source data feed relating to an event; using machine learning to develop an understanding of the event; automatically, under computer control, aligning the source feed with the understanding; and producing a transformed feed that includes at least one highlight that may be extracted from the machine learning of the event. In embodiments, the event may be a sporting event. In embodiments, the event may be an entertainment event. In embodiments, the event may be at least one of a television event and a movie event. In embodiments, the source feed may be at least one of an audio feed, a text feed, a statistics feed, and a speech feed.

[0015]Methods and systems described herein may include: taking a data set associated with a video feed of a live event; taking spatiotemporal features of the live event; applying machine learning to determine at least one spatiotemporal pattern of the event; and using a human validation process to at least one of validate and teach the machine learning of the spatiotemporal pattern. In embodiments, the event may be a sporting event.

[0016]Methods and systems described herein may include taking at least one of a video feed and an image feed; taking data relating to a known configuration of a venue; and automatically, under computer control, recognizing a camera pose based on the video feed and the known configuration. In embodiments, the venue may be a sporting event venue.

[0017] Methods and systems described herein may include taking at least one feed, selected from the group consisting of a video feed and an image feed of a scene; taking data relating to a known configuration of a venue; automatically, under computer control, recognizing a camera pose based on the video feed and the known configuration; and automatically, under computer control, augmenting the at least one feed with at least one of an image and a graphic within the space of the scene. The methods and systems may include using human input to at least one of validate and assisting the automatic recognition of the camera pose. The methods and system may include presenting at least one metric in the

augmented feed. The methods and systems may include enabling a user to interact with at least one of the video feed and a frame of the video feed in a 3D user interface. The methods and systems may include augmenting the at least one feed to create a transformed feed. In embodiments, the transformed video feed may create a highlight video feed of video for a defined set of players.

[0018] Methods and systems described herein may include taking a data set associated with a video feed of a live event; taking spatiotemporal features of the live event; applying machine learning to determine at least one spatiotemporal pattern of the event; and calculating a metric based on the determined pattern. In embodiments, the metric may be at least one of a shot quality (SEFG) metric, an EFG+ metric, a rebound positioning metric, a rebounding attack metric, a rebounding conversion metric, an event-count per playing time metric, and an efficiency per event-count metric.

[0019] Methods and systems described herein may include providing an interactive, graphical user interface for exploration of data extracted by machine learning from the video capture of live events. In embodiments, the graphical user interface enables exploration and analysis of events. In embodiments, the graphical user interface is at least one of a mobile device interface, a laptop interface, a tablet interface, a large-format touchscreen interface, and a personal computer interface. In embodiments, the data may be organized to present at least one of a breakdown, a ranking, a field-based comparison and a statistical comparison. In embodiments, the exploration enables at least one of a touch interaction, a gesture interaction, a voice interaction and a motion-based interaction.

[0020] Methods and systems described herein may include taking a data set associated with a video feed of a live event; automatically, under computer control, recognizing a camera pose for the video; tracking at least one of a player and an object in the video feed; and placing the tracked items in a spatial location corresponding to spatial coordinates.

[0021] Methods and systems described herein may include taking a data set associated with a video feed of a live event; taking spatiotemporal features of the live event; applying machine learning to determine at least one spatiotemporal pattern of the event; and delivering contextualized information during the event. In embodiments, the contextualized information includes at least one of a statistic, a replay, a visualization, a highlight, a compilation of highlights, and a replay. In embodiments, the information may be delivered to at least one of a mobile device, a laptop, a tablet, and a broadcast video feed. The methods and systems may include providing a touch screen interaction with a visual representation of at least one item of the contextualized information.

BRIEF DESCRIPTION OF THE FIGURES

[0022] The following detailed description of certain embodiments may be understood by reference to the following figures:

[0023] FIG. 1 illustrates a technology stack according to an exemplary and non-limiting embodiment.

[0024] FIG. 2 illustrates a stack flow according to an exemplary and non-limiting embodiment.

[0025] FIG. 3 illustrates an exploration loop according to an exemplary and non-limiting embodiment.

[0026] FIG. 4 illustrates ranking user interface according to an exemplary and non-limiting embodiment.

[0027] FIGS. 5A-5B illustrate a ranking user interface according to an exemplary and non-limiting embodiment.

[0028] FIGS. 6A-6B illustrate a filters user interface according to an exemplary and non-limiting embodiment.

[0029] FIG. 7 illustrates a breakdown user interface according to an exemplary and non-limiting embodiment.

[0030] FIG. 8 illustrates a breakdown user interface according to an exemplary and non-limiting embodiment.

[0031] FIG. 9 illustrates a personalized user interface according to an exemplary and non-limiting embodiment.

[0032] FIG. 10 illustrates an alternative video user interface according to an exemplary and non-limiting embodiment.

[0033] FIG. 11 illustrates an alternative report according to an exemplary and non-limiting embodiment.

[0034] FIG. 12 illustrates a court comparison view according to an exemplary and non-limiting embodiment.

[0035] FIG. 13 illustrates a court view according to an exemplary and non-limiting embodiment.

[0036] FIG. 14 illustrates a report according to an exemplary and non-limiting embodiment.

[0037] FIG. 15 illustrates a detailed depiction of a game according to an exemplary and non-limiting embodiment.

[0038] FIG. 16 illustrates querying and aggregation according to an exemplary and non-limiting embodiment.

[0039] FIG. 17 illustrates a hybrid classification process flow according to an exemplary and non-limiting embodiment.

[0040] FIG. 18 illustrates test inputs according to an exemplary and non-limiting embodiment.

[0041] FIG. 19 illustrates test inputs according to an exemplary and non-limiting

embodiment.

[0042] FIG. 20 illustrates player detection according to an exemplary and non-limiting embodiment.

[0043] FIG. 21 illustrates a process flow according to an exemplary and non-limiting embodiment.

[0044] FIG. 22 illustrates rebounding according to an exemplary and non-limiting embodiment.

[0045] FIG. 23 illustrates scatter rank according to an exemplary and non-limiting embodiment.

[0046] FIGS. 24A-24B illustrate reports according to an exemplary and non-limiting embodiment.

[0047] FIG. 25 illustrates a quality assurance user interface according to an exemplary and non-limiting embodiment.

[0048] FIG. 26 illustrates a quality assurance user interface according to an exemplary and non-limiting embodiment.

[0049] FIG. 27 illustrates camera pose detection according to an exemplary and non-limiting embodiment.

[0050] FIG. 28 illustrates camera pose detection according to an exemplary and non-limiting embodiment.

[0051] FIG. 29 illustrates auto-rotoscoping according to an exemplary and non-limiting embodiment.

[0052] FIGS. 30A-30C illustrate scripted storytelling with assets according to an exemplary and non-limiting embodiment.

[0053] FIG. 31 illustrates an example according to an exemplary and non-limiting embodiment.

[0054] FIG. 32 illustrates an example according to an exemplary and non-limiting embodiment.

[0055] FIG. 33 illustrates an example according to an exemplary and non-limiting embodiment.

[0056] FIG. 34 illustrates an example according to an exemplary and non-limiting embodiment.

[0057] FIG. 35 illustrates an example according to an exemplary and non-limiting embodiment.

[0058] FIG. 36 illustrates an example according to an exemplary and non-limiting embodiment.

[0059] FIG. 37 illustrates an example according to an exemplary and non-limiting embodiment.

[0060] FIG. 38 illustrates a screen shot according to an exemplary and non-limiting embodiment.

[0061] FIGS. 39A-39E illustrate a screen shot according to an exemplary and non-limiting embodiment.

[0062] FIG. 40 illustrates a screen shot according to an exemplary and non-limiting embodiment.

[0063] FIGS. 41A-41B illustrate a screen shot according to an exemplary and non-limiting embodiment.

[0064] FIGS. 42A-42C illustrate a screen shot according to an exemplary and non-limiting embodiment.

[0065] FIG. 43 illustrates a screen shot according to an exemplary and non-limiting embodiment.

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DETAILED DESCRIPTION

[0066] Fig. 1 illustrates a technology stack 100 indicative of technology layers configured to execute a set of capabilities, in accordance with an embodiment of the present invention. The technology stack 100 may include a customization layer 102, an interaction layer 104, a visualizations layer 108, an analytics layer 110, a patterns layer 112, an events layer 114, and a data layer 118, without limitations. The different technology layers or the technology stack 100 may be referred to as an "Eagle" Stack 100, which should be understood to encompass the various layers allow precise monitoring, analytics, and understanding of spatio-temporal data associated with an event, such as a sports event and the like. For example, the technology stack may provide an analytic platform that may take spatio-temporal data (e.g., 3D motion capture "XYZ" data) from National Basketball Association (NBA) arenas or other sports arenas and, after cleansing, may perform spatio-temporal pattern recognition to extract certain "events". The extracted events may be for example (among many other possibilities) events that correspond to particular understandings of events within the overall sporting event, such as "pick and roll" or "blitz." Such events may correspond to real events in a game, and may in turn be subject to various metrics, analytic tools, and visualizations around the events. Event recognition may be based on pattern recognition by machine learning, such as spatio-temporal pattern recognition, and in some cases may be augmented, confirmed, or aided by human feedback.

[0067] The customization layer 102 may allow performing custom analytics and interpretation using analytics, visualization, and other tools, as well as optional crowd-sourced feedback for developing team-specific analytics, models, exports and related insights. For example, among many other possibilities, the customization layer 102 may facilitate in generating visualizations for different spatio-temporal movements of a football player, or group of players and counter movements associated with other players or groups of

players during a football event.

[0068] The interaction layer 104 may facilitate generating real-time interactive tasks, visual representations, interfaces, videos clips, images, screens, and other such vehicles for allowing viewing of an event with enhanced features or allowing interaction of a user with a virtual event derived from an actual real-time event. For example, the interaction layer 104 may allow a user to access features or metrics such as a shot matrix, a screens breakdown, possession detection, and many others using real-time interactive tools that may slice, dice and analyze data obtained from the real-time event such as a sports event.

[0069] The visualizations layer 108 may allow dynamic visualizations of patterns and analytics developed from the data obtained from the real-time event. The visualizations may be presented in the form of a scatter rank, shot comparisons, a clip view and many others. The visualizations layer 108 may use various types of visualizations and graphical tools for creating visual depictions. The visuals may include various types of interactive charts, graphs, diagrams, comparative analytical graphs and the like. The visualizations layer 108 may be linked with the interaction layer so that the visual depictions may be presented in an interactive fashion for a user interaction with real-time events produced on a virtual platform such as analytic platform of the present invention.

[0070] The analytics layer 110 may involve various analytics and Artificial Intelligence (AI) tools to perform analysis and interpretation of data retrieved from the real-time event such as a sports event so that the analyzed data results in insights that make sense out of the pulled big data from the real-time event. The analytics and AI tools may comprise such as search and optimization tools, inference rules engines, algorithms, learning algorithms, logic modules, probabilistic tools and methods, decision analytics tools, machine learning algorithms, semantic tools, expert systems and the like without limitations.

[0071] Output from the analytics 110 and patterns layers 112 is exportable by the user as

a database that enables the customer to configure their own machines to read and access the events and metrics stored in the system. In accordance with various exemplary and non-limiting embodiments, patterns and metrics are structured and stored in an intuitive way. In general, the database utilized for storing the events and metric data is designed to facilitate easy export and to enable integration with a team's internal workflow. In one embodiment, there is a unique file corresponding to each individual game. Within each file, individual data structures may be configured in accordance with included structure definitions for each data type indicative of a type of event for which data may be identified and stored. For example, types of events that may be recorded for a basketball game include, but are not limited to, isos, handoffs, posts, screens, transitions, shots, closeouts and chances. With reference to, for example, the data type "screens", table 1 is an exemplary listing of the data structure for storing information related to each occurrence of a screen. As illustrated, each data type is comprised of a plurality of component variable definitions each comprised of a data type and a description of the variable.

[0072]

screens

id
INT
Internal ID of this screen.

possession_id
STRING
Internal ID of the possession in which this event took place.

frame
INT
Frame ID, denoting frame number from the start of the current period. Currently, this marks the frame at which the screener and ballhandler are closest.

frame_time
INT
Time stamp provided in SportVU data for a frame, measured in milliseconds in
the current epoch (i.e. from 00:00:00 UTC on 1 January 1970).

game_code
INT
Game code provided in SportVU data.

period
INT
Regulation periods 1-4, overtime periods 5 and up.
game_clock
NUMBER
Number of seconds remaining in period, from 720.00 to 0.00.
location_x
NUMBER
Location along length of court, from 0 to 94.
location_y
NUMBER
Location along baseline of court, from 0 to 50.
screener
INT
ID of screener, matches SportVU ID.
ballhandler
INT
ID of the ball handler, matches SportVU ID.
screener_defender
INT
ID of the screener's defender, matches SportVU ID.
ballhandler_defender
INT
ID of the ball handler's defender, matches SportVU ID.
oteam
INT
ID of team on offense, matches IDs in SportVU data.
dteam
INT
ID of team on defense, matches IDs in SportVU data.
rdef
STRING
String representing the observed actions of the ballhandler's defender.
sdef
STRING
String representing the observed actions of the screener's defender.
scr_type
STRING
Classification of the screen into take, reject, or slip.
outcomes_bhr
ARRAY
Actions by the ballhandler, taken from the outcomes described at the end of the document, such as FGX or FGM.
outcomes_scr
ARRAY
Actions by the screener, taken from the outcomes described at the end of the document, such as FGX or FGM.

Table 1.

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[0073] These exported files, one for each game, enable other machines to read the stored understanding of the game and build further upon that knowledge. In accordance with various embodiments, the data extraction and/or export is optionally accomplished via a JSON schema.

[0074] The patterns layer 112 may provide a technology infrastructure for rapid discovery of new patterns arising out of the retrieved data from the real-time event such as a sports event. The patterns may comprise many different patterns that corresponding to an understanding of the event, such as a defensive pattern (e.g., blitz, switch, over, under, up to touch, contain-trap, zone, man-to-man, or face-up pattern), various offensive patterns (e.g., pick-and-roll, pick-and-pop, horns, dribble-drive, off-ball screens, cuts, post-up, and the like), patterns reflecting plays (scoring plays, three-point plays, "red zone" plays, pass plays, running plays, fast break plays, etc.) and various other patterns associated with a player in the game or sports, in each case corresponding to distinct spatio-temporal events.

[0075] The events layer 114 may allow creating new events or editing or correcting current events. For example, the events layer may allow analyzing accuracy of markings or other game definitions and may comment on whether they meet standards and sports guidelines. For example, specific boundary markings in an actual real-time event may not be compliant with the guidelines and there may exist some errors, which may be identified by the events layers through analysis and virtual interactions possible with the platform of the present invention. Events may corresponding to various understandings of a game, including offensive and defensive plays, matchups among players or groups of players, scoring events, penalty or foul events, and many others.

[0076] The data layer 118 facilitates management of the big data retrieved from the real-time event such as a sports event. The data layer 118 may allow creating libraries that may

store raw data, catalogues, corrected data, analyzed data, insights and the like. The data layer 118 may manage online warehousing in a cloud storage setup or in any other manner in various embodiments.

[0077] FIG. 2 illustrates a process flow diagram 200, in accordance with an embodiment of the present invention. The process 200 may include retrieving spatio-temporal data associated with a sports or game and storing in a data library at step 202. The spatio-temporal data may relate to a video feed that was captured by a 3D camera, such as one positioned in a sports arena or other venue, or it may come from another source.

[0078] The process 200 may further include cleaning of the rough spatio-temporal data at step 204 through analytical and machine learning tools and utilizing various technology layers as discussed in conjunction with FIG. 1 so as to generate meaningful insights from the cleansed data.

[0079] The process 200 may further include recognizing spatio-temporal patterns through analysis of the cleansed data at step 208. Spatio-temporal patterns may comprise a wide range of patterns that are associated with types of events. For example, a particular pattern in space, such as the ball bouncing off the rim, then falling below it, may contribute toward recognizing a "rebound" event in basketball. Patterns in space and time may lead to recognition of single events, or multiple events that comprise a defined sequence of recognized events (such as in types of plays that have multiple steps).

[0080] The recognized patterns may define a series of events associated with the sports that may be stored in an event datastore at step 210. These events may be organized according to the recognized spatio-temporal patterns; for example, a series of events may have been recognized as "pick," "rebound," "shot," or like events in basketball, and they may be stored as such in the event datastore 210. The event datastore 210 may store a wide range of such events, including individual patterns recognized by spatiotemporal pattern

recognitions and aggregated patterns, such as when one pattern follows another in an extended, multi-step event (such as in plays where one event occurs and then another occurs, such as "pick and roll" or "pick and pop" events in basketball, football events that involve setting an initial block, then springing out for a pass, and many others).

[0081] The process 200 may further include querying or aggregation or pattern detection at step 212. The querying of data or aggregation may be performed with the use of search tools that may be operably and communicatively connected with the data library or the events datastore for analyzing, searching, aggregating the rough data, cleansed or analyzed data, or events data or the events patterns.

[0082] At step 214, metrics and actionable intelligence may be used for developing insights from the searched or aggregated data through artificial intelligence and machine learning tools.

[0083] At step 218, for example, the metrics and actionable intelligence may convert the data into interactive visualization portals or interfaces for use by a user in an interactive manner.

[0084] Raw input XYZ data obtained from various data sources is frequently noisy, missing, or wrong. XYZ data is sometimes delivered with attached basic events already identified in it, such as possession, pass, dribble, and shot events; however, these associations are frequently incorrect. This is important because event identification further down the process (in Spatiotemporal Pattern Recognition) sometimes depends on the correctness of these basic events. For example, if two players' XY positions are switched, then "over" vs "under" defense would be incorrectly characterized, since the players' relative positioning is used as a critical feature for the classification. Even player-by-player data sources are occasionally incorrect, such as associating identified events with the wrong player.

[0085] First, validation algorithms are used to detect all events, including the basic events

such as possession, pass, dribble, shot, and rebound that are provided with the XYZ data. Possession / Non-possession models may use a Hidden Markov Model to best fit the data to these states. Shots and rebounds may use the possession model outputs, combined with 1) projected destination of the ball, and 2) player by player information (PBP) information. Dribbles may be identified using a trained ML algorithm and also using the output of the possession model. These algorithms may decrease the basic event labeling error rate by approximately 50% or more.

[0086] Second, the system has a library of anomaly detection algorithms to identify potential problems in the data including, but not limited to, temporal discontinuities (intervals of missing data are flagged), spatial discontinuities (objects traveling is a non-smooth motion, "jumping") and interpolation detection (data that is too smooth, indicating that post-processing was done by the data supplier to interpolate between known data points in order to fill in missing data). This problem data is flagged for human review, so that events detected during these periods are subject to further scrutiny.

[0087] Spatiotemporal Pattern Recognition

[0088] Spatiotemporal pattern recognition 208 is used to automatically identify relationships between physical and temporal patterns and various types of events. In the example of basketball, one challenge is how to turn x, y, z positions of ten players and one ball at twenty-five frames/sec into usable input for machine learning and pattern recognition algorithms. For patterns one is trying to detect (e.g. pick & rolls), the raw inputs may not suffice. The instances within each pattern category can look very different from each other. One therefore may benefit from a layer of abstraction and generality. Features that relate multiple actors in time are key components to the input. Examples include, but are not limited to, the motion of player one (P1) towards player two (P2), for at least T seconds, a rate of motion of at least V m/s for at least T seconds and at the projected point of

intersection of paths A and B, and a separation distance less than D.

[0089] In embodiments of the present disclosure, there is provided a library of such features involving multiple actors over space and time. In the past machine learning (ML) literature, there has been relatively little need for such a library of spatiotemporal features, because there were few datasets with these characteristics on which learning could have been considered as an option. The library may include relationships between actors (e.g., players one through ten in basketball), relationships between the actors and other objects such as the ball, and relationships to other markers, such as designated points and lines on the court or field, and to projected locations based on predicted motion.

[0090] Another key challenge is there have not been a labeled dataset for training the ML algorithms. Such a labeled dataset may be used in connection with various embodiments disclosed herein. For example, there has previously been no XYZ player-tracking dataset that already has higher level events, such as pick and roll (P&R) events) labeled at each time frame they occur. Labeling such events, for many different types of events and sub-types, is a laborious process. Also, the number of training examples required to adequately train the classifier may be unknown. One may use a variation of active learning to solve this challenge. Instead of using a set of labeled data as training input for a classifier trying to distinguish A and B, the machine finds an unlabeled example that is closest to the boundary between As and Bs in the feature space. The machine then queries a human operator/labeler for the label for this example. It uses this labeled example to refine its classifier, and then repeats.

[0091] In one exemplary embodiment of active learning, the system also incorporates human input in the form of new features. These features are either completely devised by the human operator (and inputted as code snippets in the active learning framework), or they are suggested in template form by the framework. The templates use the spatiotemporal pattern

library to suggest types of features that may be fruitful to test. The operator can choose a pattern, and test a particular instantiation of it, or request that the machine test a range of instantiations of that pattern.

Multi-Loop Iterative Process

[0092] Some features are based on outputs of the machine learning process itself. Thus, multiple iterations of training are used to capture this feedback and allow the process to converge. For example, a first iteration of the ML process may suggest that the Bulls tend to ice the P&R. This fact is then fed into the next iteration of ML training as a feature, which biases the algorithm to label Bulls' P&R defense as ices. The process converges after multiple iterations. In practice, two iterations has typically been sufficient to yield good results.

[0093] In accordance with exemplary embodiments, a canonical event datastore 210 may contain a definitive list of events that the system knows occurred during a game. This includes events extracted from the XYZ data, as well as those specified by third-party sources, such as PBP data from various vendors. The events in the canonical event datastore 210 may have game clock times specified for each event. The datastore 210 may be fairly large. To maintain efficient processing, it is shared and stored in-memory across many machines in the cloud. This is similar in principle to other methods such as Hadoop™; however, it is much more efficient, because in embodiments involving events, such as sporting events, where there is some predetermined structure that is likely to be present (e.g., the 24-second shot clock, or quarters or halves in a basketball game), it makes key structural assumptions about the data. Because the data is from sports games, for example, in embodiments one may enforce that no queries will run across multiple quarters/periods. Aggregation steps can occur across quarters/periods, but query results will not. This is one instantiation of this assumption. Any other domain in which locality of data can be enforced

will also fall into this category.

[0094] Such a design allows rapid and complex querying across all of the data, allowing arbitrary filters, rather than relying on either 1) long-running processes, or 2) summary data, or 3) pre-computed results on pre-determined filters.

[0095] In accordance with exemplary and non-limiting embodiments, data is divided into small enough shards that each worker shard has a low latency response time. Each distributed machine may have multiple workers corresponding to the number of processes the machine can support concurrently. Query results never rely on more than one shard, since we enforce that events never cross quarter/period boundaries. Aggregation functions all run incrementally rather than in batch process, so that as workers return results, these are incorporated into the final answer immediately. To handle results such as rankings pages, where many rows must be returned, the aggregator uses hashes to keep track of the separate rows and incrementally updates them.

[0096] Referring to Fig. 3, an exploration loop may be enabled by the methods and systems disclosed herein, where questioning and exploration can occur, such as using visualizations (e.g., data effects, referred to as DataFX in this disclosure), processing can occur, such as to identify new events and metrics, and understanding emerges, leading to additional questions, processing and understanding.

[0097] Referring to Fig. 4, the present disclosure provides an instant player rankings feature as depicted in the illustrated user interface. A user can select among various types of available rankings 402, as indicated in the drop down list 410, such as rankings relating to shooting, rebounding, rebound ratings, isolations (Isos), picks, postups, handoffs, linups, matchups, possessions (including metrics and actions), transitions, plays and chances. Rankings can be selected in a menu element 404 for players, teams or other entities. Rankings can be selected for different types of play in the menu element 408, such as for

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offense, defense, transition, special situations, and the like. The ranking interface allows a user to quickly query the system to answer a particular question instead of thumbing through pages of reports. The user interface lets a user locate essential factors and evaluate talent of a player to make more informed decisions.

[0098] Figs. 5A-5B shows certain basic, yet quite in-depth, pages in the systems described herein, referred to in some cases as the "Eagle system." This user interface may allow the user to rank players and teams by a wide variety of metrics. This may include identified actions, metrics derived from these actions, and other continuous metrics. Metrics may relate to different kinds of events, different entities (players and teams), different situations (offense and defense) and any other patterns identified in the spatiotemporal pattern recognition system. Examples of items on which various entities can be ranked in the case of basketball include chances, charges, closeouts, drives, frequencies, handoffs, isolations, lineups, matches, picks, plays, possessions, postups, primary defenders, rebounding (main and raw), off ball screens, shooting, speed/load and transitions.

[0099] The Rankings UI makes it easy for a user to understand relative quality of one row item versus other row items, along any metric. Each metric may be displayed in a column, and that row's ranking within the distribution of values for that metrics may be displayed for the user. Color coding makes it easy for the user to understand relative goodness.

[00100] Figs. 6A-6B show a set of filters in the UI, which can be used to filter particular items to obtain greater levels of detail or selected sets of results. Filters may exist for seasons, games, home teams, away teams, earliest and latest date, postseason/regular season, wins/losses, offense home/away, offensive team, defensive team, layers on the court for offense/defense, players off court for offense/defense, locations, offensive or defensive statistics, score differential, periods, time remaining, after timeout play start, transition/no transition, and various other features. The filters 602 for offense may include selections for