



US005867230A

United States Patent [19]**Wang et al.**[11] **Patent Number:** **5,867,230**[45] **Date of Patent:** **Feb. 2, 1999**[54] **SYSTEM, DEVICE, AND METHOD FOR
STREAMING A MULTIMEDIA FILE
ENCODED AT A VARIABLE BITRATE**

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[75] Inventors: **Feng Chi Wang**, Newton; **Thomas Goetz**, Attleboro; **Krystyna Wieckiewicz**, Plainville, all of Mass.

Primary Examiner—Howard Britton
Attorney, Agent, or Firm—Peter Dichiara

[73] Assignee: **Motorola Inc.**, Schaumburg, Ill.[57] **ABSTRACT**[21] Appl. No.: **885,271**[22] Filed: **Jun. 30, 1997****Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 711,701, Sep. 6, 1996.

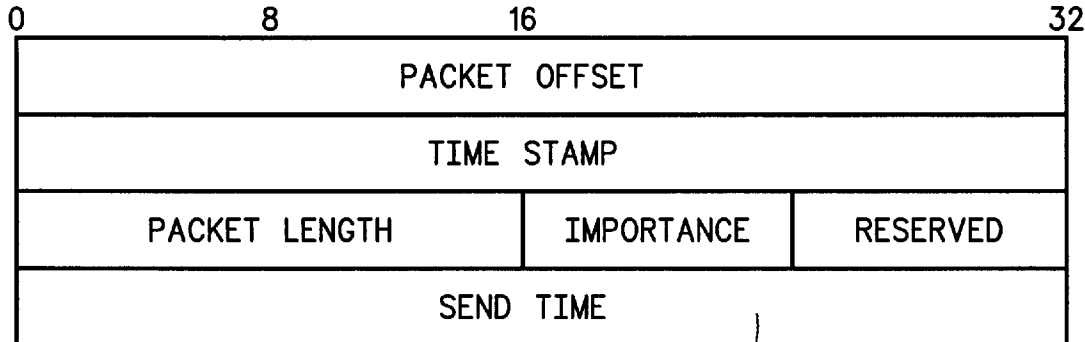
[51] **Int. Cl.**⁶ **H04N 7/26**; H04N 7/52;
H04N 7/56; H04N 7/62[52] **U.S. Cl.** **348/845**; 348/423[58] **Field of Search** 348/845, 845.2,
348/845.3, 423, 12, 13; H04N 7/26, 7/52,
7/56, 7/62

System, Device, And Method For Streaming A Multimedia File Encoded at a Variable Bitrate. The data is encoded at a variable bit rate and formed into packets having a server time stamp. The server time stamps are constructed so that the streaming of the packets will be substantially constant, not variable, and equal to a desired, budgeted bandwidth, such as one corresponding to fully utilizing a modem link. To schedule the sending of packets, the server uses the server time stamp, rather than, for example, the play-back time stamp. By having the data encoded at a variable bit rate, the otherwise-unused capacity, i.e., the capacity not used by the server, can be used to send packets needed in the future. This is accomplished by the server time stamps scheduling packets for transmission that will not be needed until the future.

[56] **References Cited**

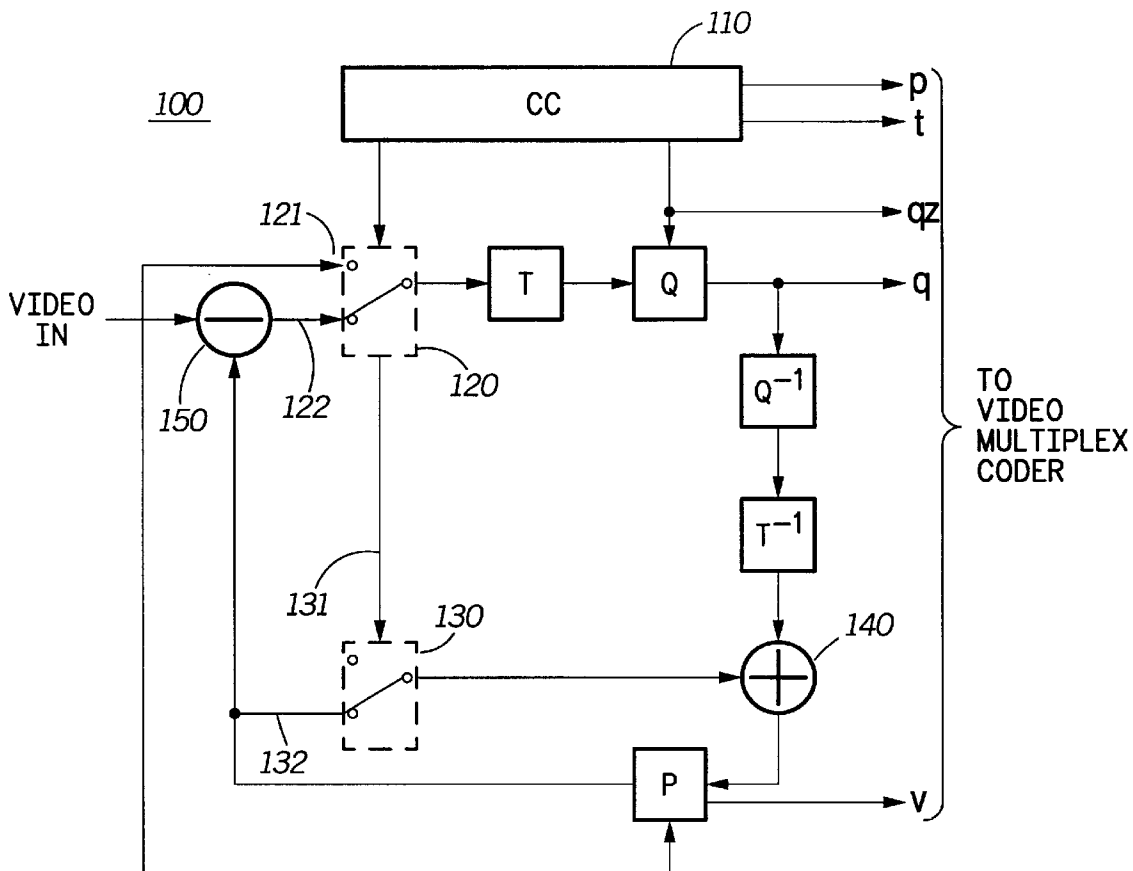
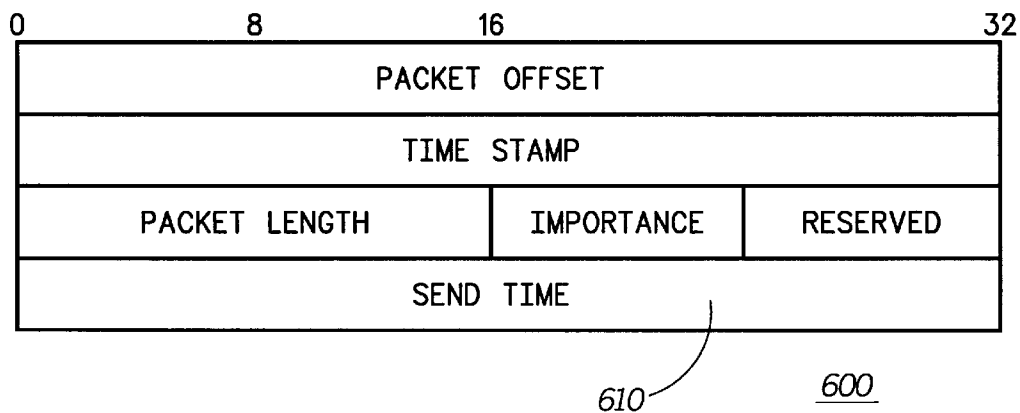
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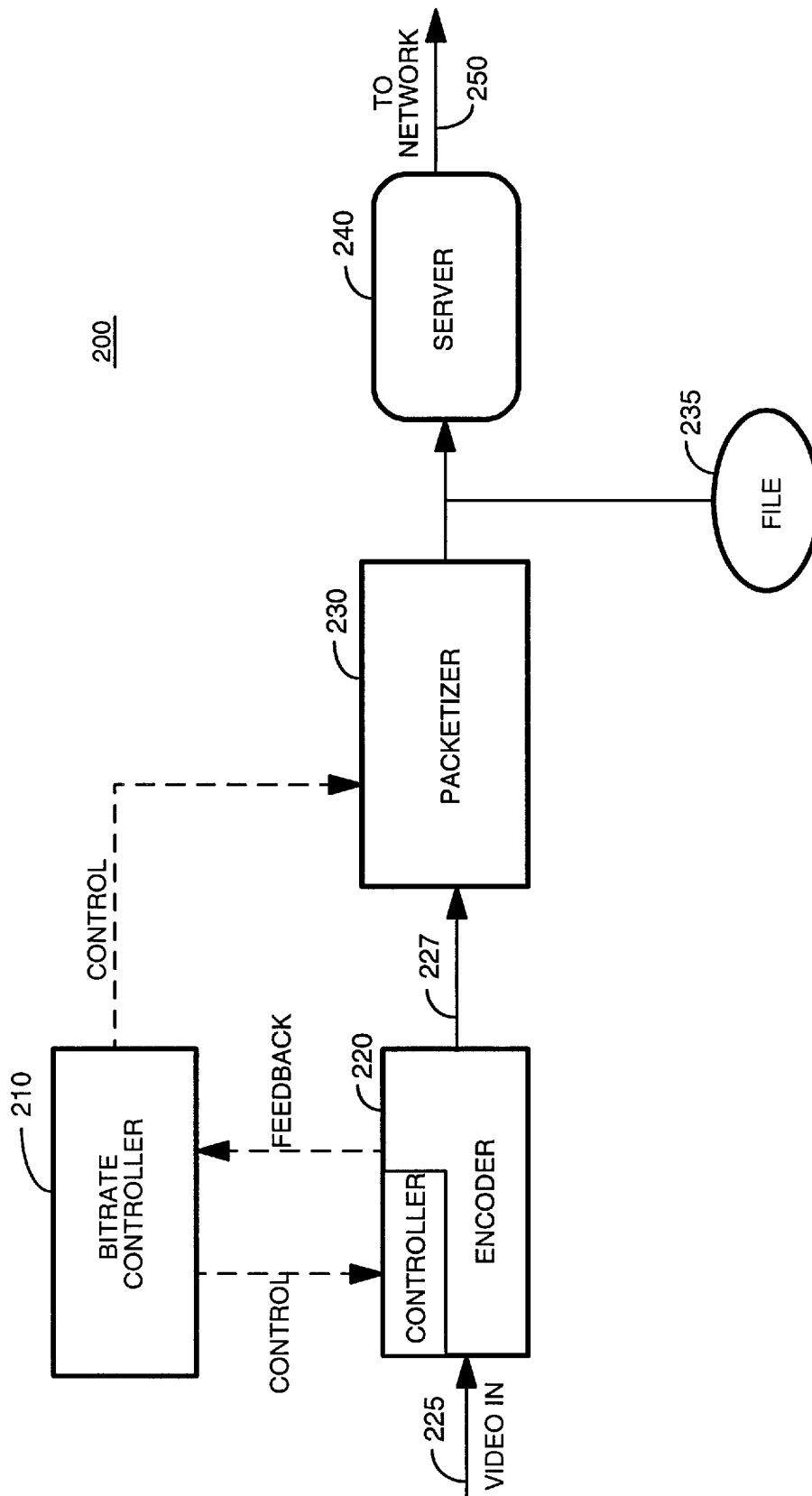
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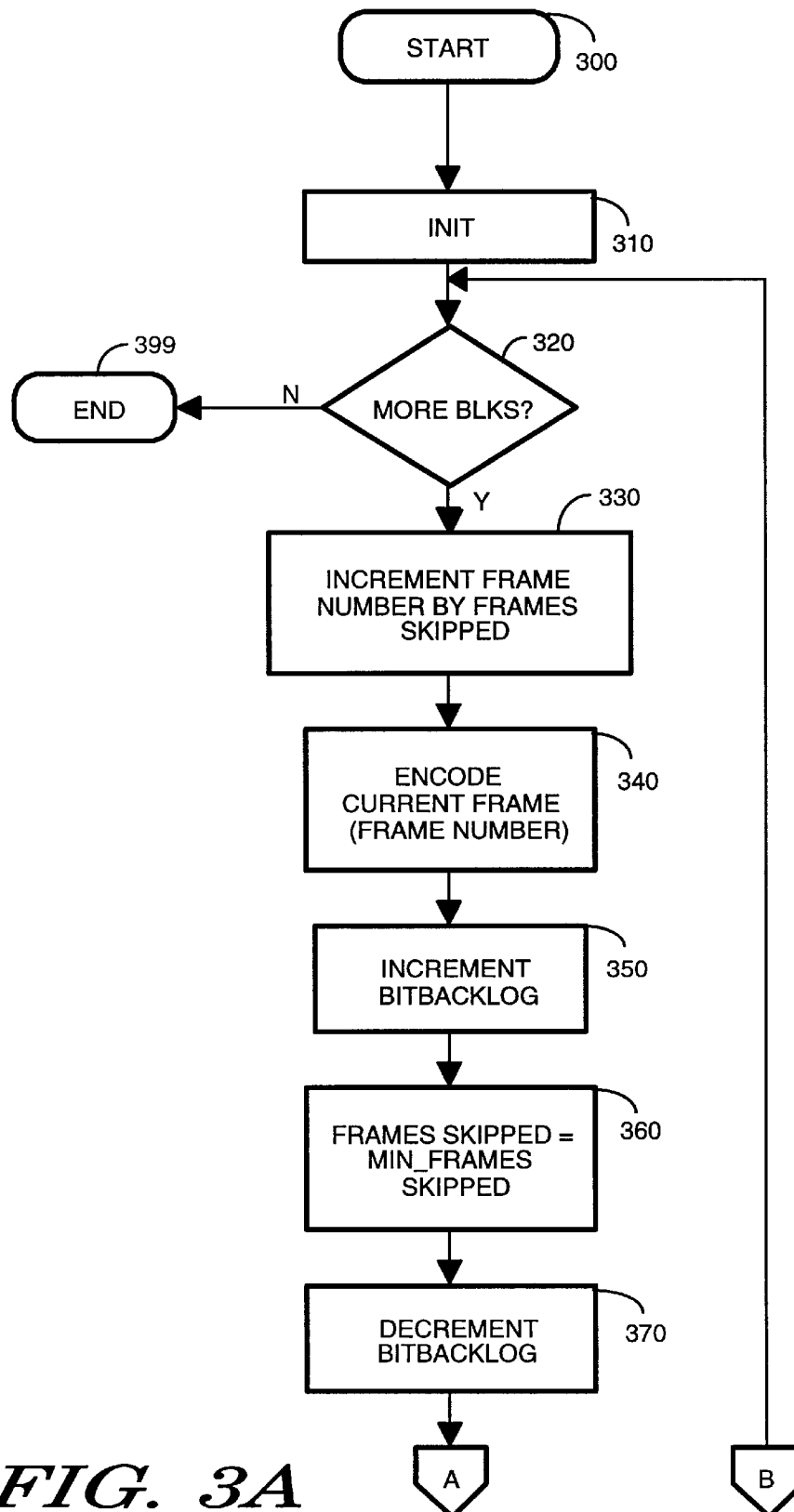
2 Claims, 8 Drawing Sheets

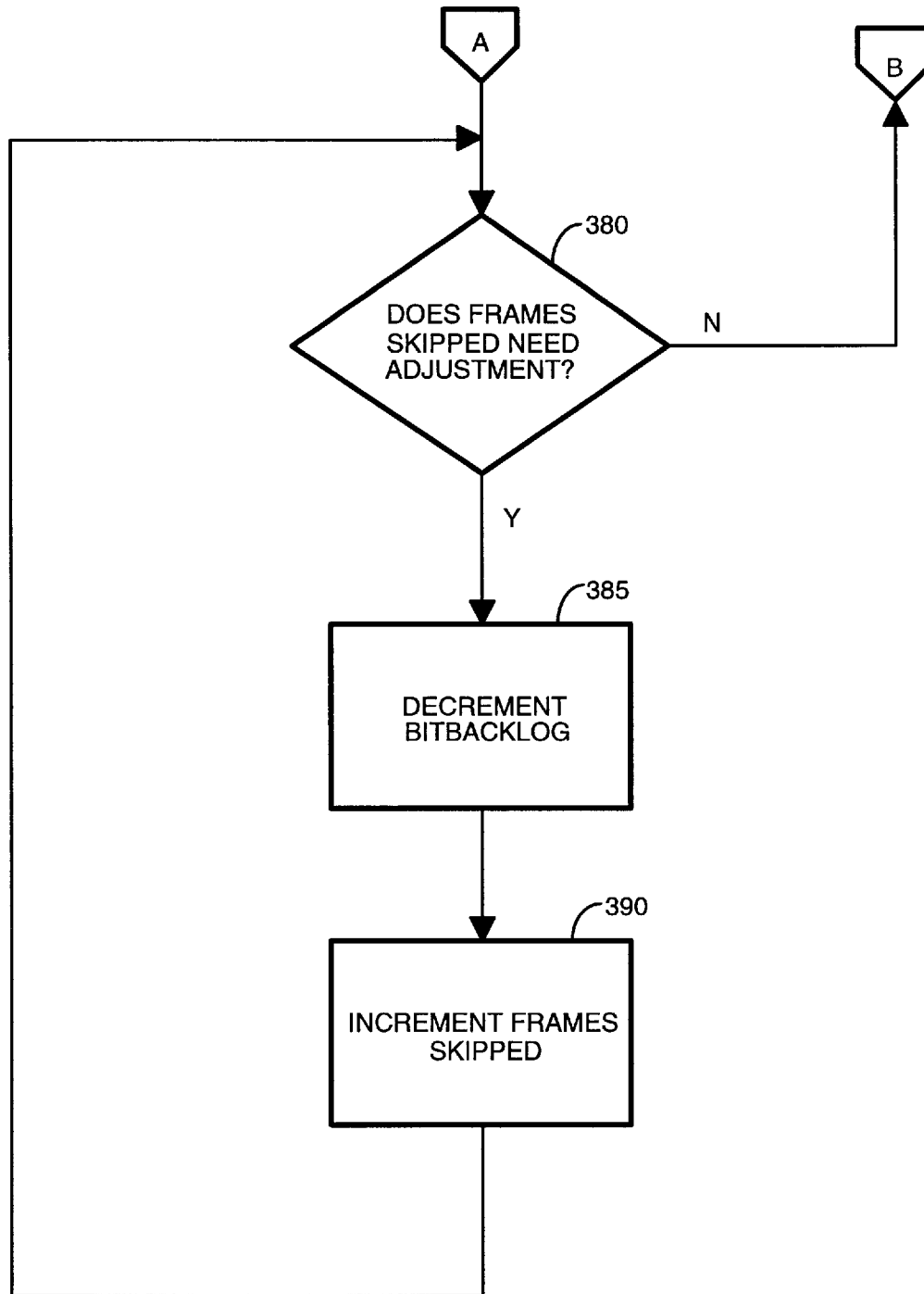
610

600

*FIG. 1**FIG. 6*



*FIG. 3A*

*FIG. 3B*

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