



United States Patent [19]

Wang et al.

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[45] Date of Patent: **Feb. 2, 1999**

[54] SYSTEM, DEVICE, AND METHOD FOR STREAMING A MULTIMEDIA FILE ENCODED AT A VARIABLE BITRATE

5,612,742	3/1997	Krause	348/385
5,659,539	8/1997	Porter	348/13
5,768,539	6/1998	Metz	348/385
5,790,543	8/1998	Cloutier	348/423

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[57] **ABSTRACT**

[21] Appl. No.: **885,271**

[22] Filed: **Jun. 30, 1997**

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.

Related U.S. Application Data

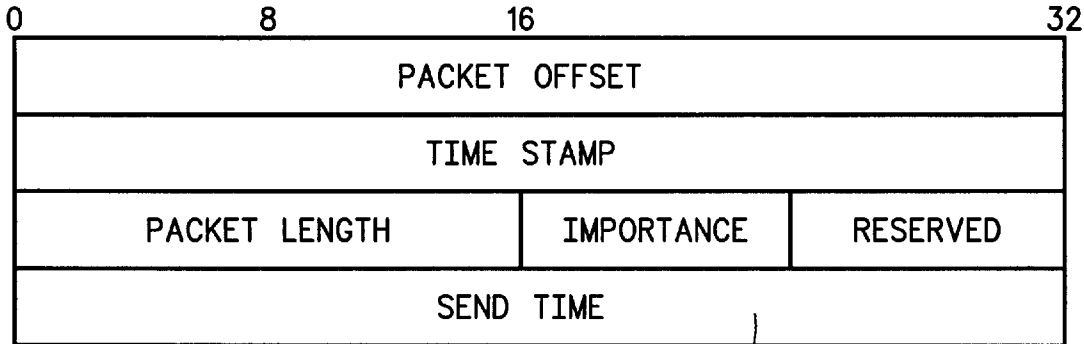
- [63] Continuation-in-part of Ser. No. 711,701, Sep. 6, 1996.
- [51] **Int. Cl.⁶** **H04N 7/26**; H04N 7/52; H04N 7/56; H04N 7/62
- [52] **U.S. Cl.** **348/845**; 348/423
- [58] **Field of Search** 348/845, 845.2, 348/845.3, 423, 12, 13; H04N 7/26, 7/52, 7/56, 7/62

References Cited

U.S. PATENT DOCUMENTS

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2 Claims, 8 Drawing Sheets



610

600

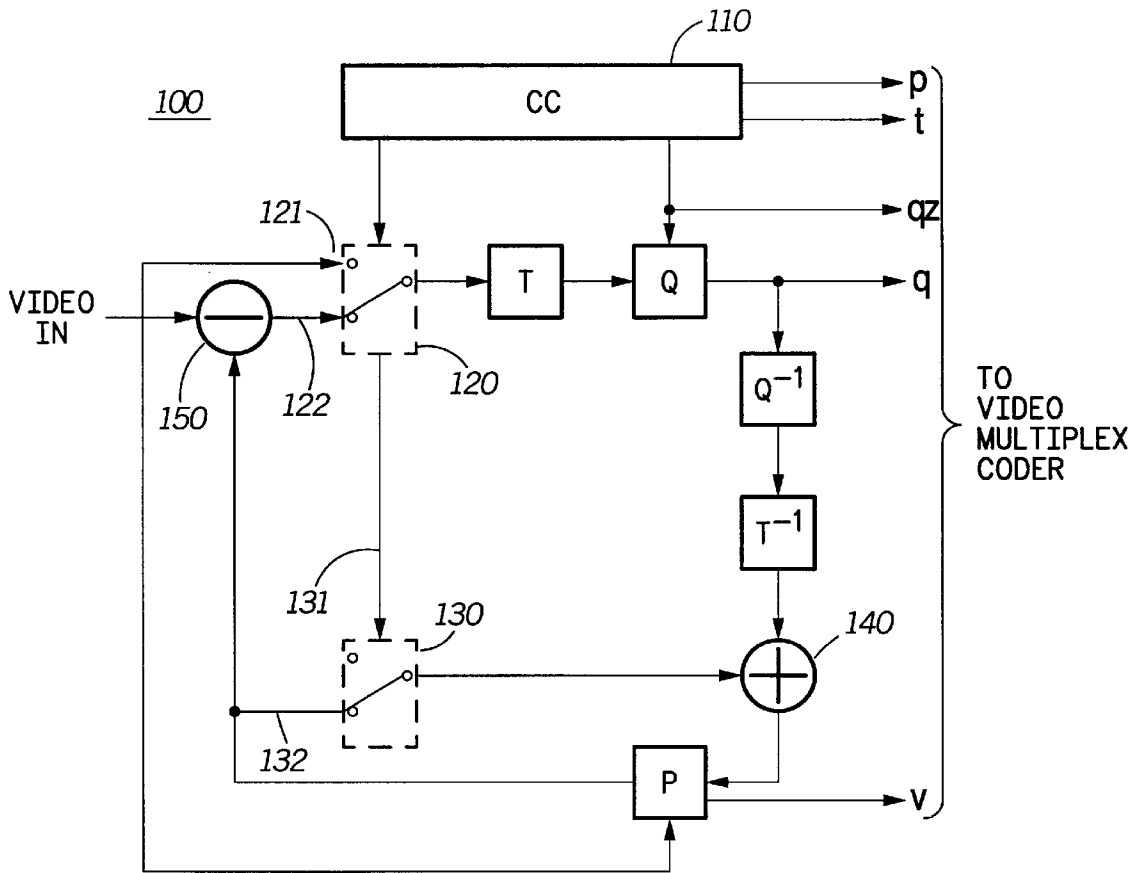


FIG. 1

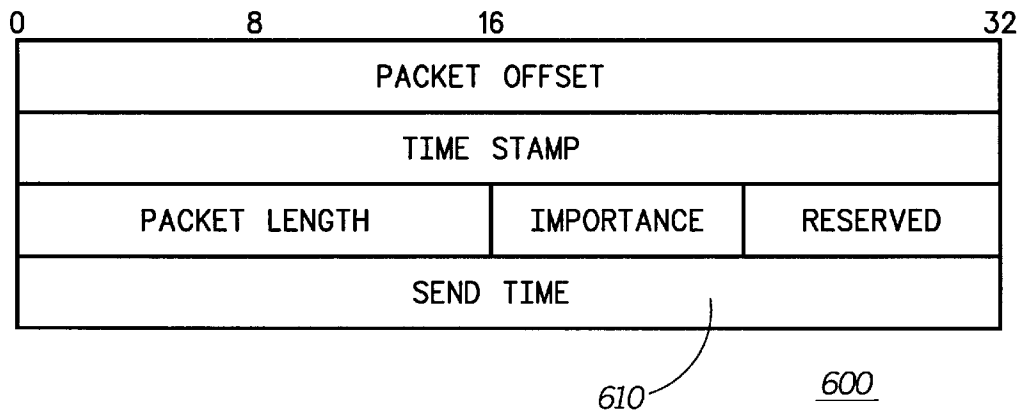


FIG. 6

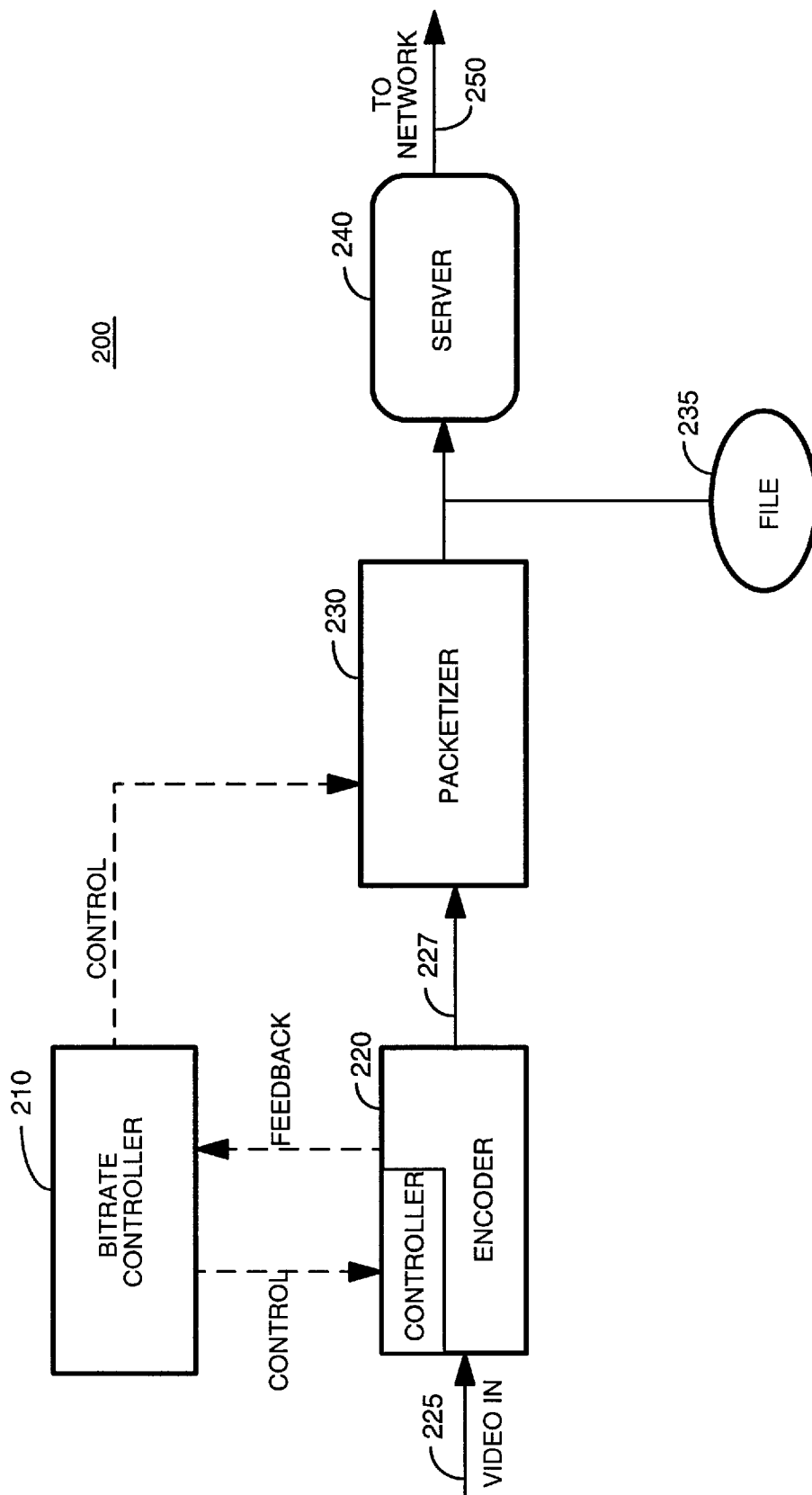


FIG. 2

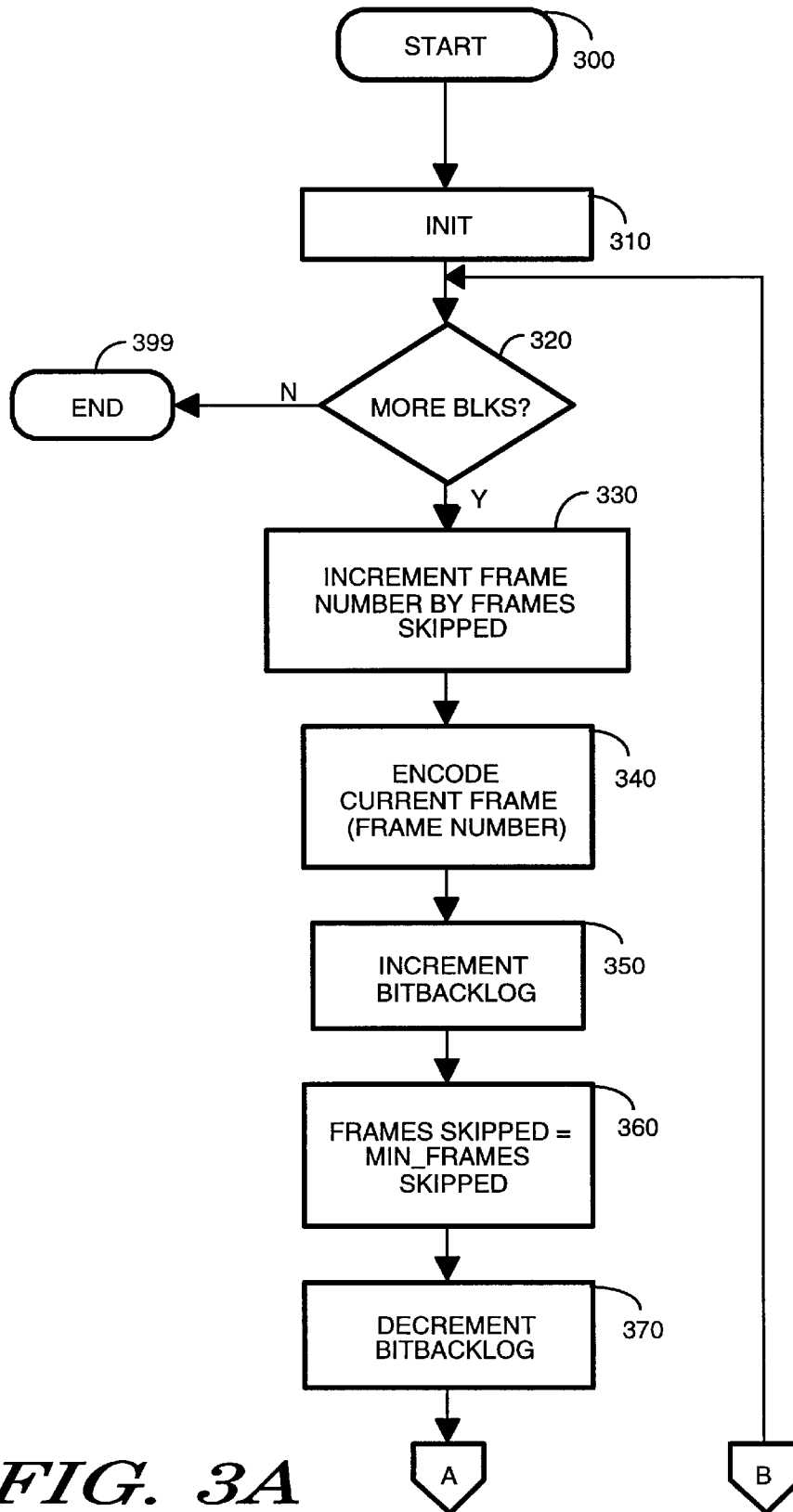


FIG. 3A

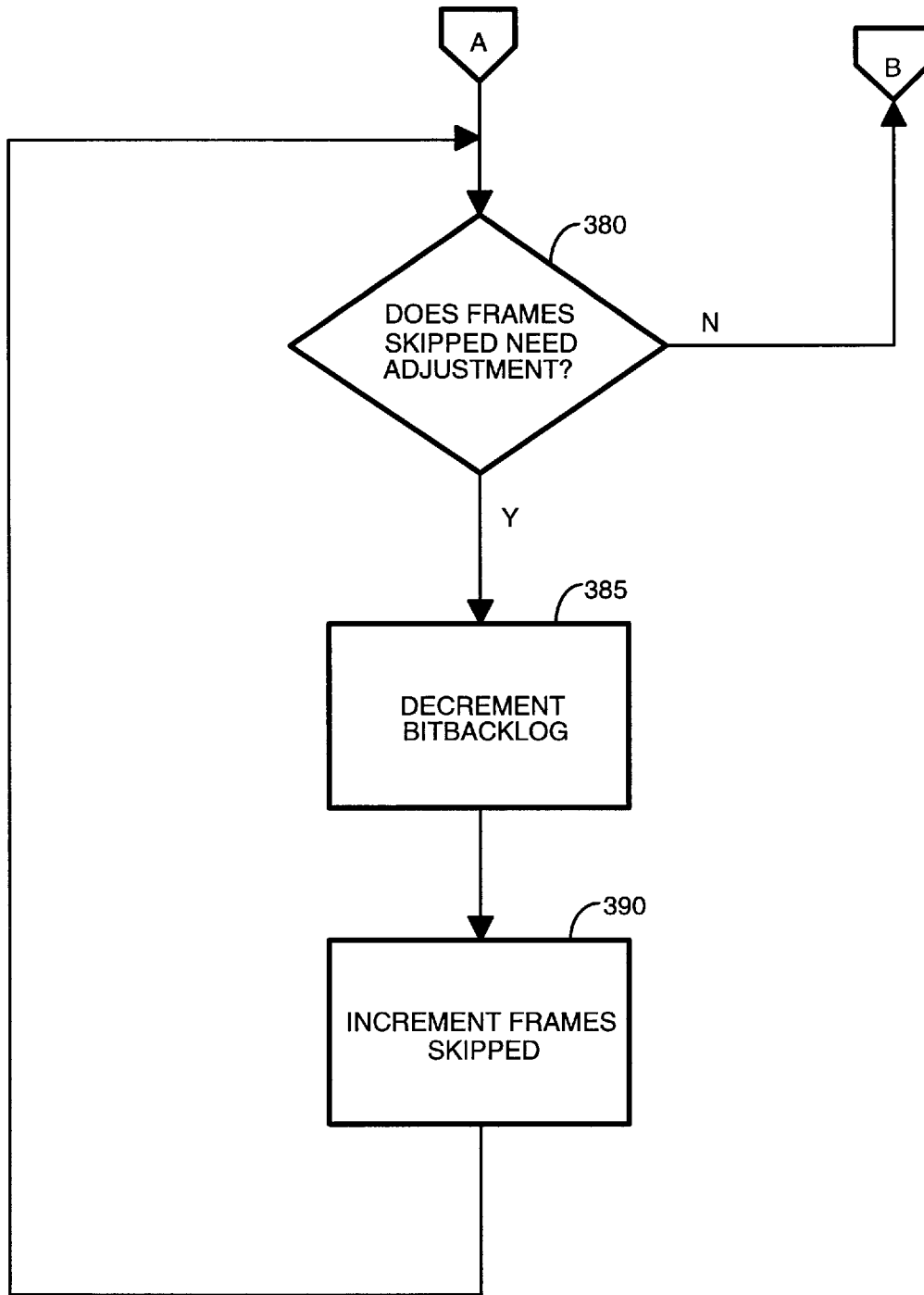


FIG. 3B

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