

United States Patent [19]**Mighdoll et al.**[11] **Patent Number:** **5,918,013**[45] **Date of Patent:** **Jun. 29, 1999**[54] **METHOD OF TRANSCODING DOCUMENTS
IN A NETWORK ENVIRONMENT USING A
PROXY SERVER**[75] Inventors: **Lee S. Mighdoll**, San Francisco; **Bruce A. Leak**, Palo Alto; **Stephen G. Perlman**, Mountain View; **Phillip Y. Goldman**, Los Altos, all of Calif.[73] Assignee: **WebTV Networks, Inc.**, Mountain View, Calif.[21] Appl. No.: **08/656,924**[22] Filed: **Jun. 3, 1996**[51] Int. Cl.⁶ **G06F 13/00**; G06F 13/14;
G06F 17/00[52] U.S. Cl. **395/200.47**; 395/200.33;
395/200.49; 395/200.58; 395/200.59; 395/200.76;
395/187.01[58] Field of Search 395/200.3–200.33,
395/200.36, 200.47–200.5, 200.56–200.59,
500, 200.76–200.79, 185.01, 185.05, 187.01,
584–685[56] **References Cited****U.S. PATENT DOCUMENTS**

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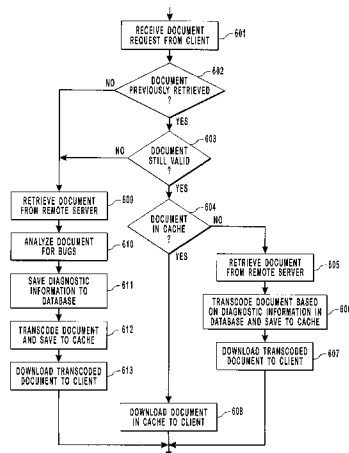
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Primary Examiner—Parshotam S. Lall*Assistant Examiner*—Bharat Barot*Attorney, Agent, or Firm*—Workman, Nydegger, Seeley[57] **ABSTRACT**

A method of providing a document to a client coupled to a server is provided. The server provides a number of Internet services to the client, including functioning as a caching proxy on behalf of the client for purposes of accessing the World Wide Web. The proxying server includes a persistent document database, which stores various attributes of all documents previously retrieved in response to a request from a client. When a Web document is retrieved from a remote server in response to a request from the client, the database is consulted and the stored information relating to the requested document is used by the server in transcoding the document. The document is transcoded for various purposes, including to circumvent bugs or quirks found in the document, to size the document for display on a television set, to improve transmission efficiency of the document, and to reduce latency. The transcoder makes use of the document database to perform these functions. The document database is also used for prefetching previously requested documents and images and for reducing latency when downloading images to the client.

13 Claims, 12 Drawing Sheets

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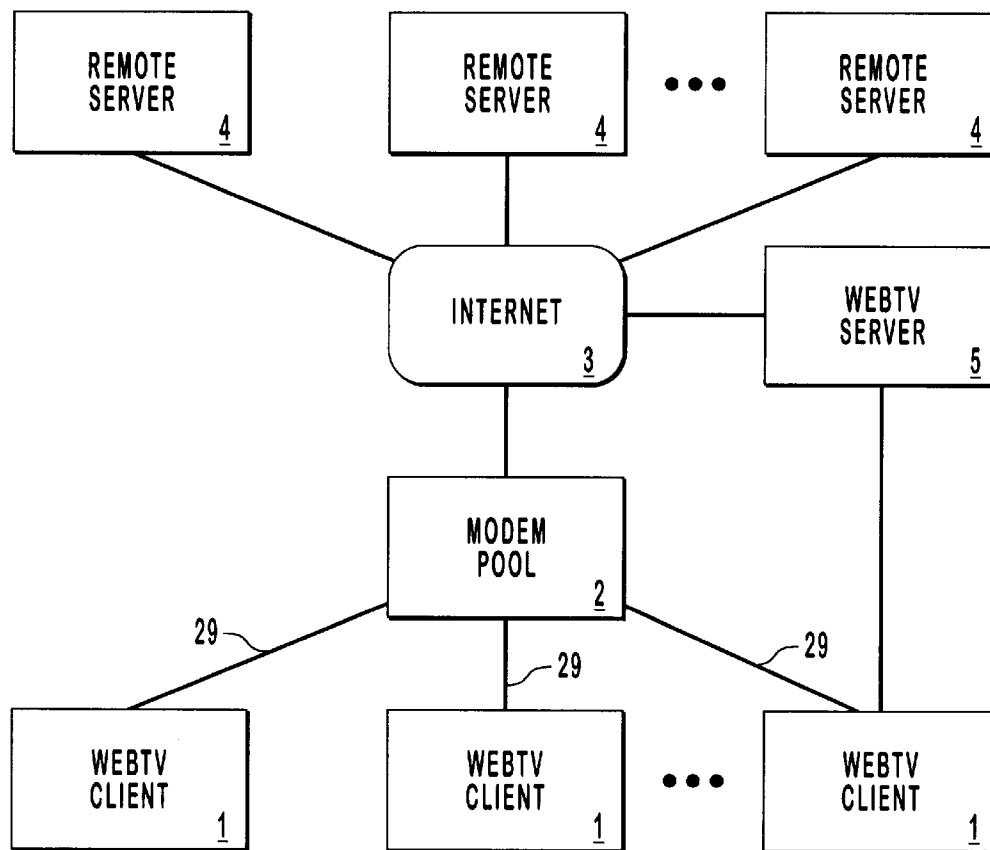


FIG. 1

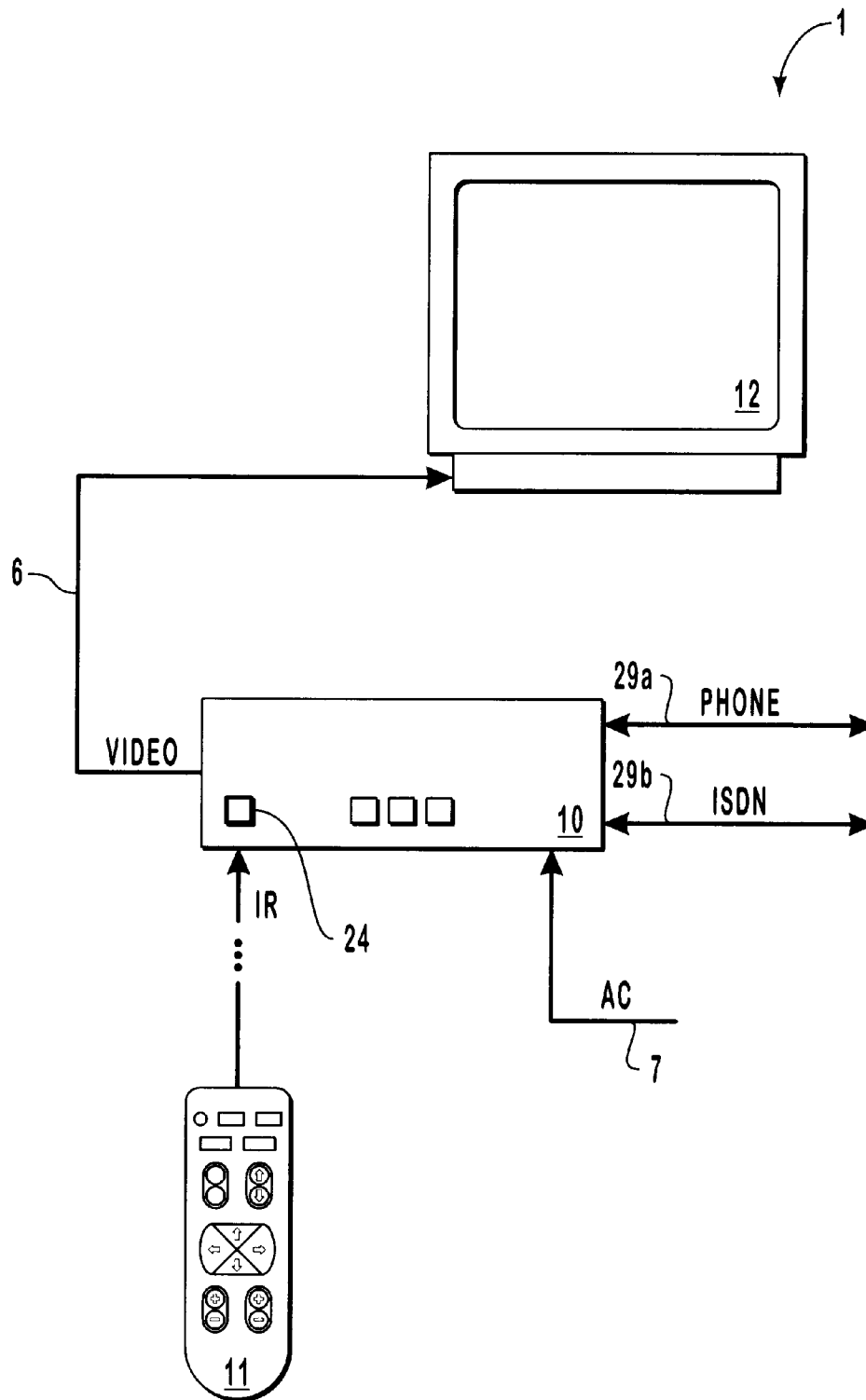


FIG. 2

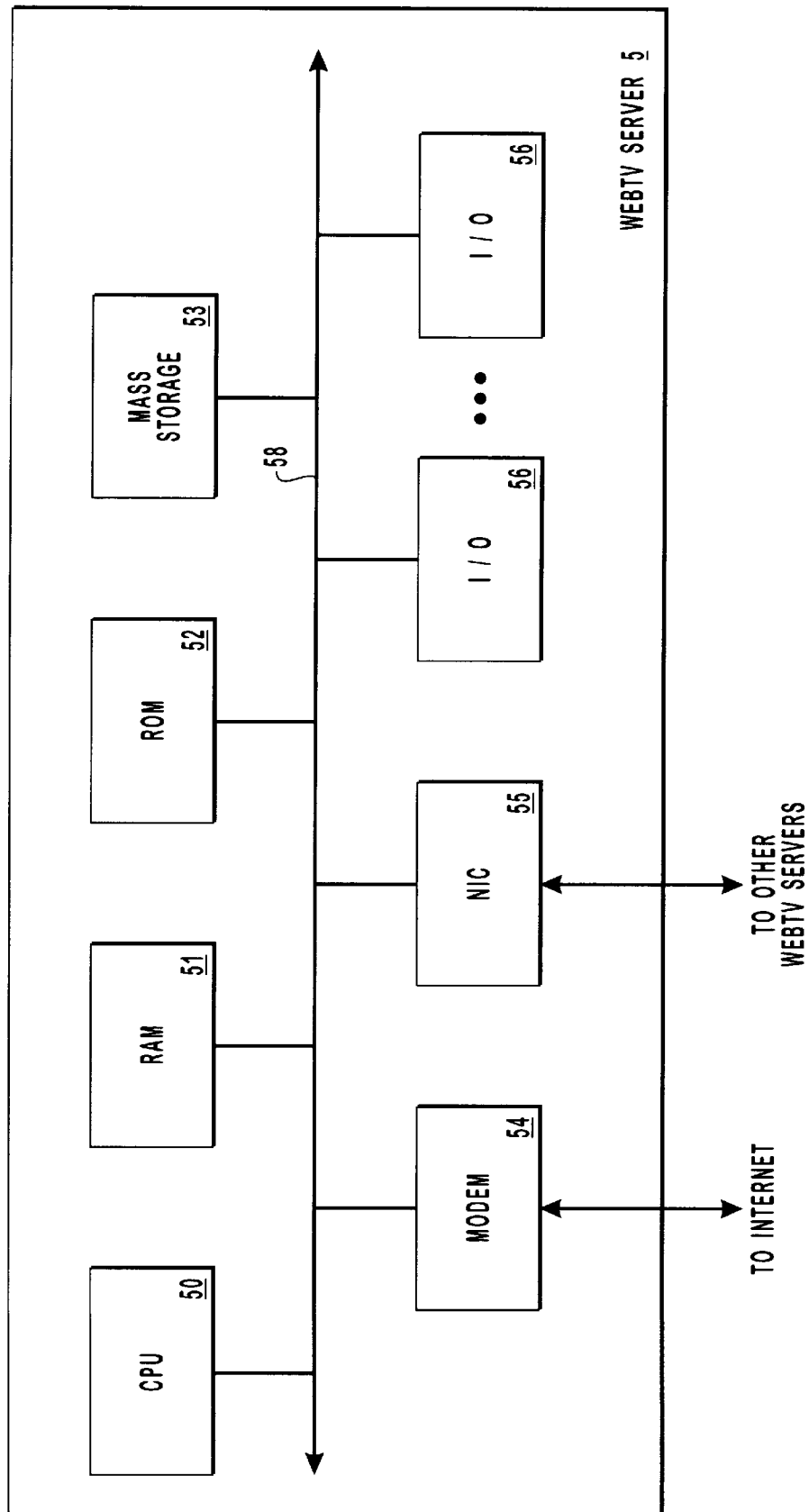


FIG. 3

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