United States Patent [19]

Chao et al.

[11] **Patent Number: 4,893,306**

[45] **Date of Patent: Jan. 9, 1990**

[54] **METHOD AND APPARATUS FOR MULTIPLEXING CIRCUIT AND PACKET TRAFFIC**

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[73] Assignee: **Bell Communications Research, Inc.**, Livingston, N.J.

[21] Appl. No.: **118,977**

[22] Filed: **Nov. 10, 1987**

[51] **Int. Cl.**[4] **H04J 3/16**; H04J 3/26

[52] **U.S. Cl.** **370/94.2**; 370/84; 370/99; 370/112

[58] **Field of Search** 370/94, 60, 84, 99, 370/111, 112, 82, 110.1, 89

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,321,703	3/1982	Schwäertz et al.	370/89
4,516,240	5/1985	Kume et al.	370/94
4,594,708	6/1986	Servel et al.	370/94
4,685,105	8/1987	Shikama et al.	370/89
4,706,246	11/1987	Kume	370/89
4,763,319	8/1988	Rozenblit	370/89
4,764,921	8/1988	Graves et al.	370/110.1
4,771,425	9/1988	Baran et al.	370/110.1

OTHER PUBLICATIONS

R. W. Muise, et al., "Experiments in Wideband Packet Technology", Proc. 1986, International Zurich Seminar on Digital Communications, pp. 136–138.

W. W. Chu, "A Study of Asynchronous Time Division Multiplexing for Time Sharing Computer Systems", Proc. AFIPS, vol. 35, pp. 669–678, 1969.

A. Thomas, et al., "Asynchronous Time Division Techniques: An Experimental Packet Network Integrating Video Communication", Proc. International Switching Symposium, May 1984.

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Assistant Examiner—Min Jung
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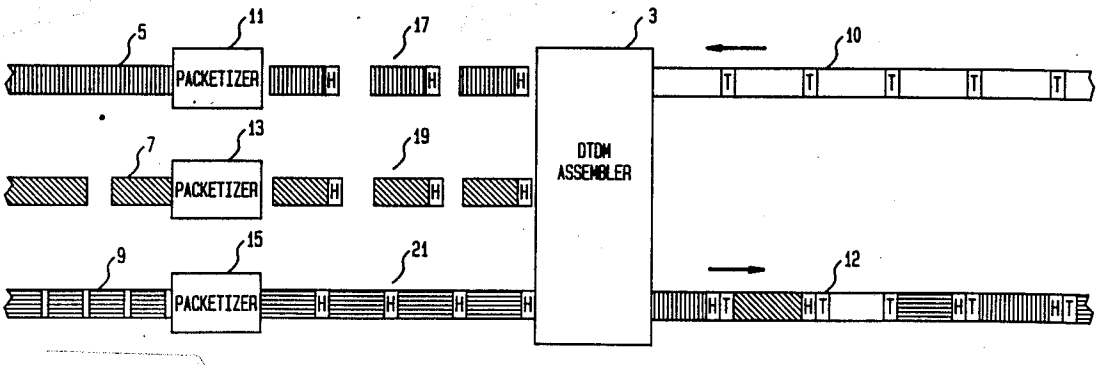
[57] **ABSTRACT**

A data transmission technique referred to herein as Dynamic Time Division Multiplexing (DTDM) is disclosed along with a set of multiplexers and demultiplexers required to apply DTDM in an actual telecommunications network. The DTDM technique uses a transmission format which is compatible with the existing digital circuit transmission format and the packet transmission format so that DTDM is able to handle the transmission of circuit and packet traffic. Thus, DTDM provides a flexible migration strategy between present circuit networks and future broadband packet networks.

7 Claims, 10 Drawing Sheets



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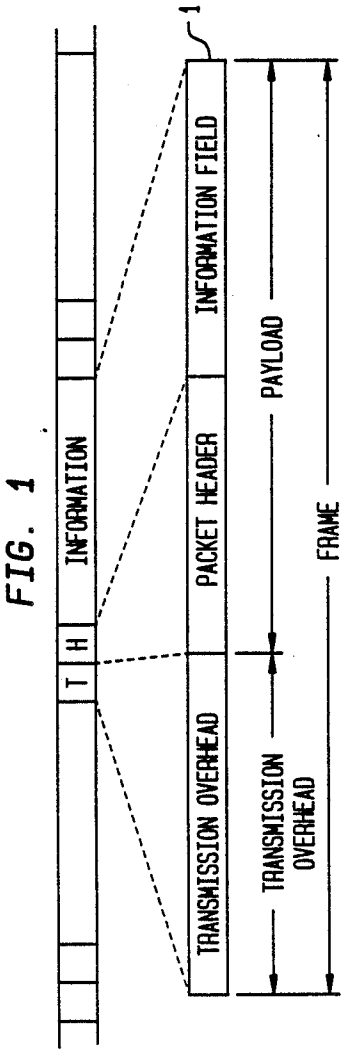

FIG. 1

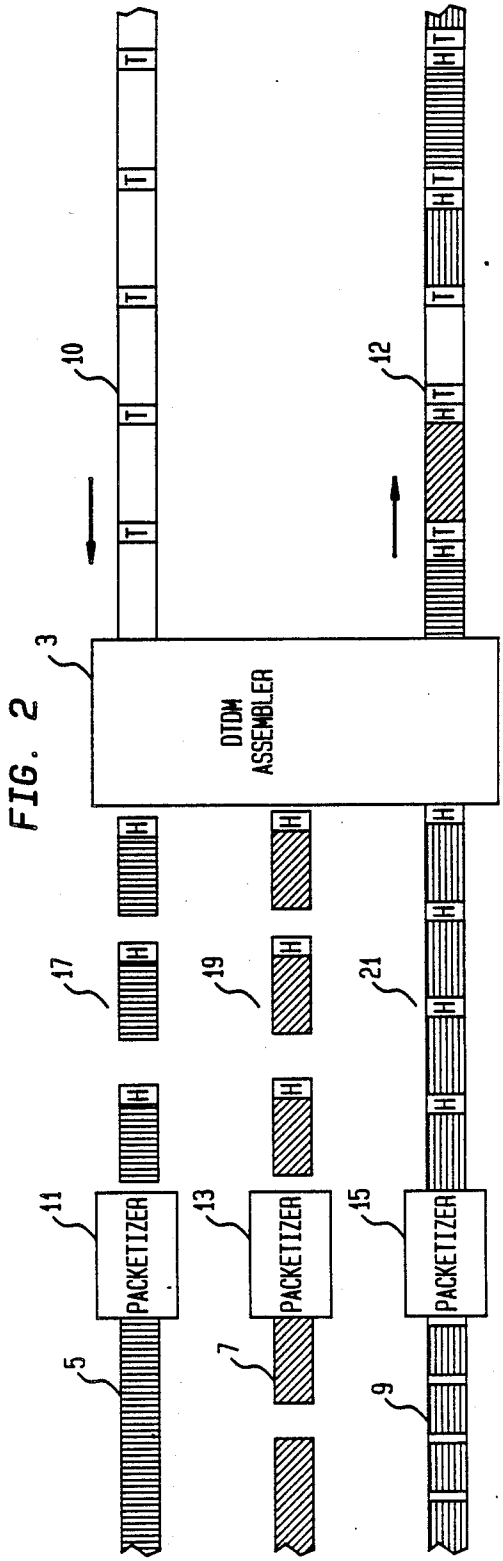

FIG. 2

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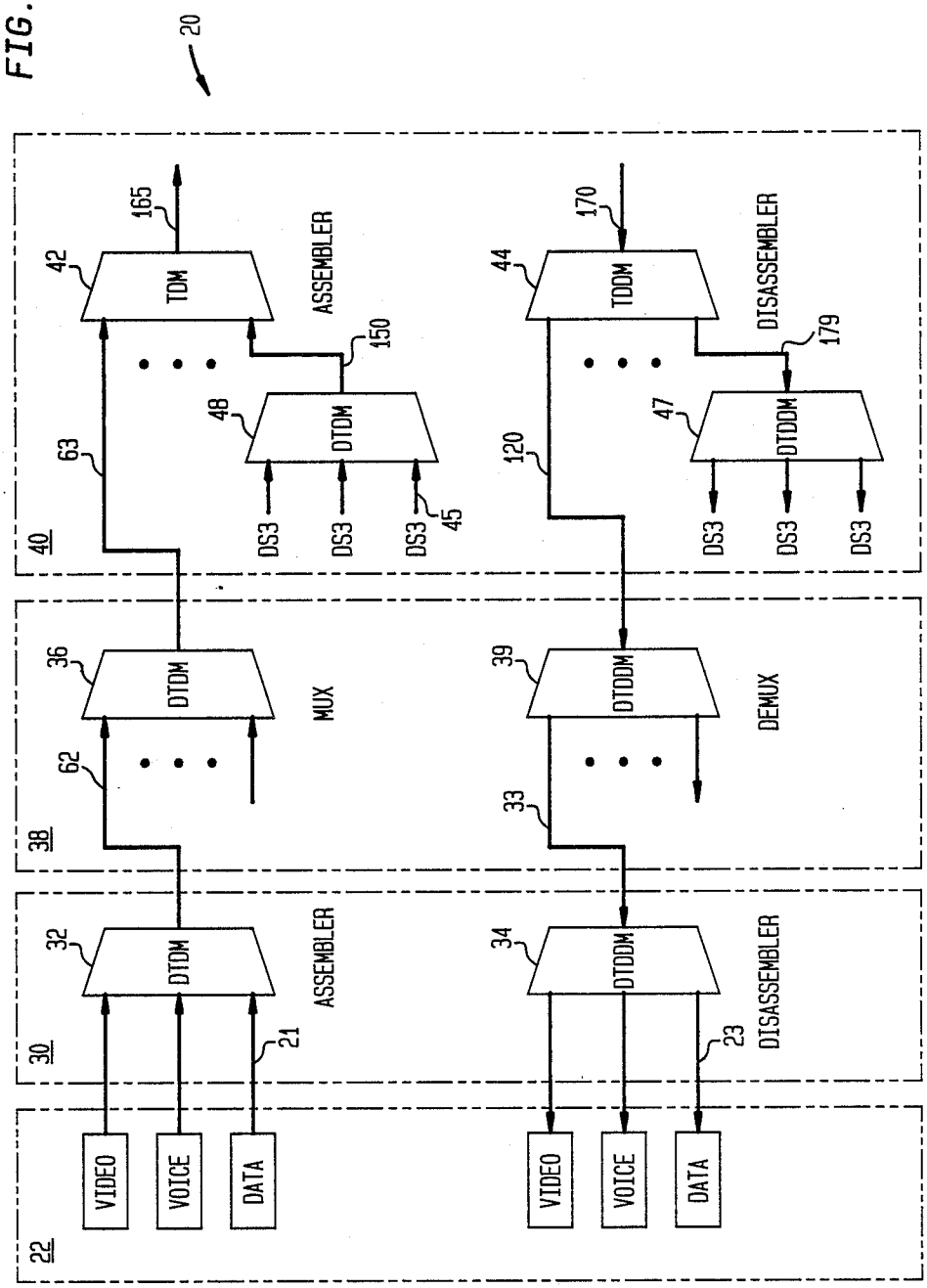
FIG. 3



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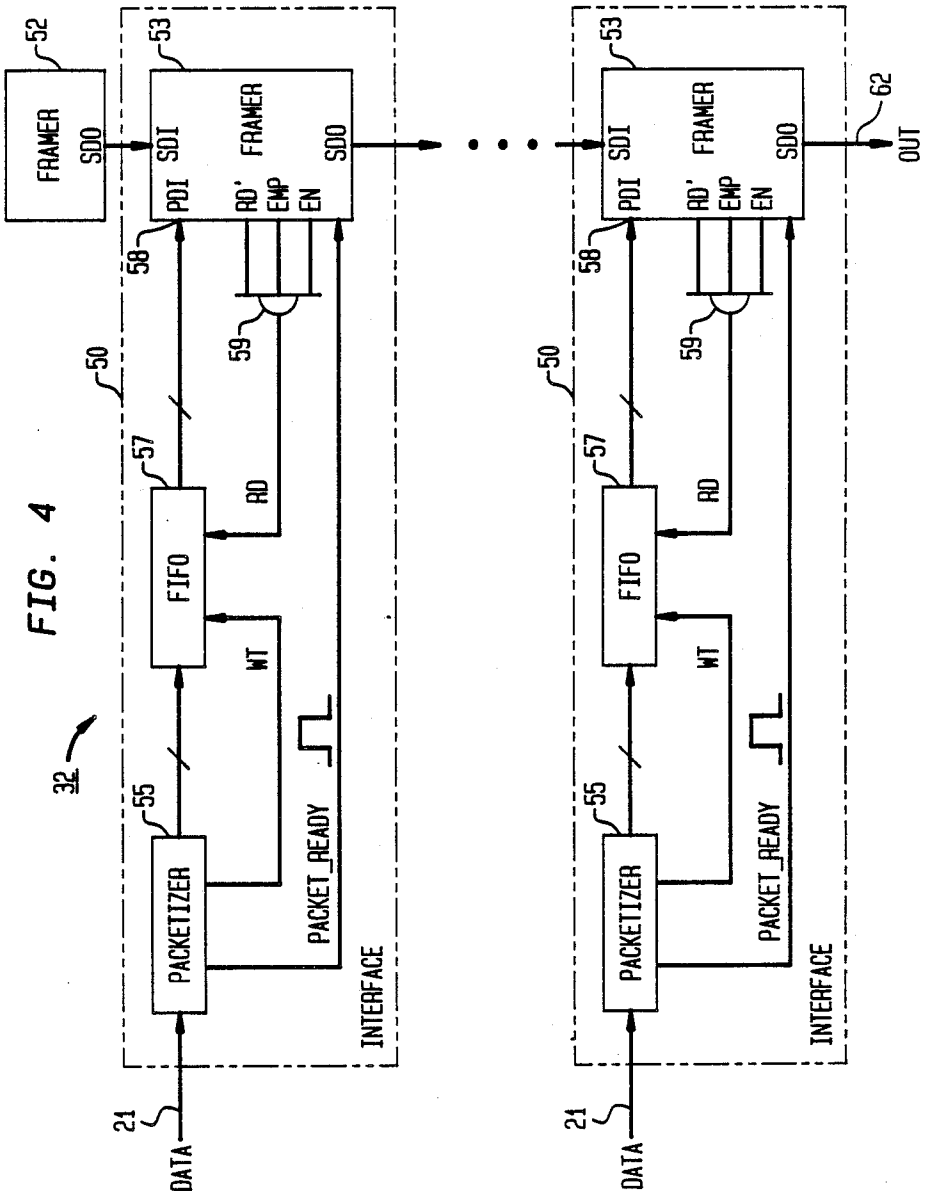

FIG. 4

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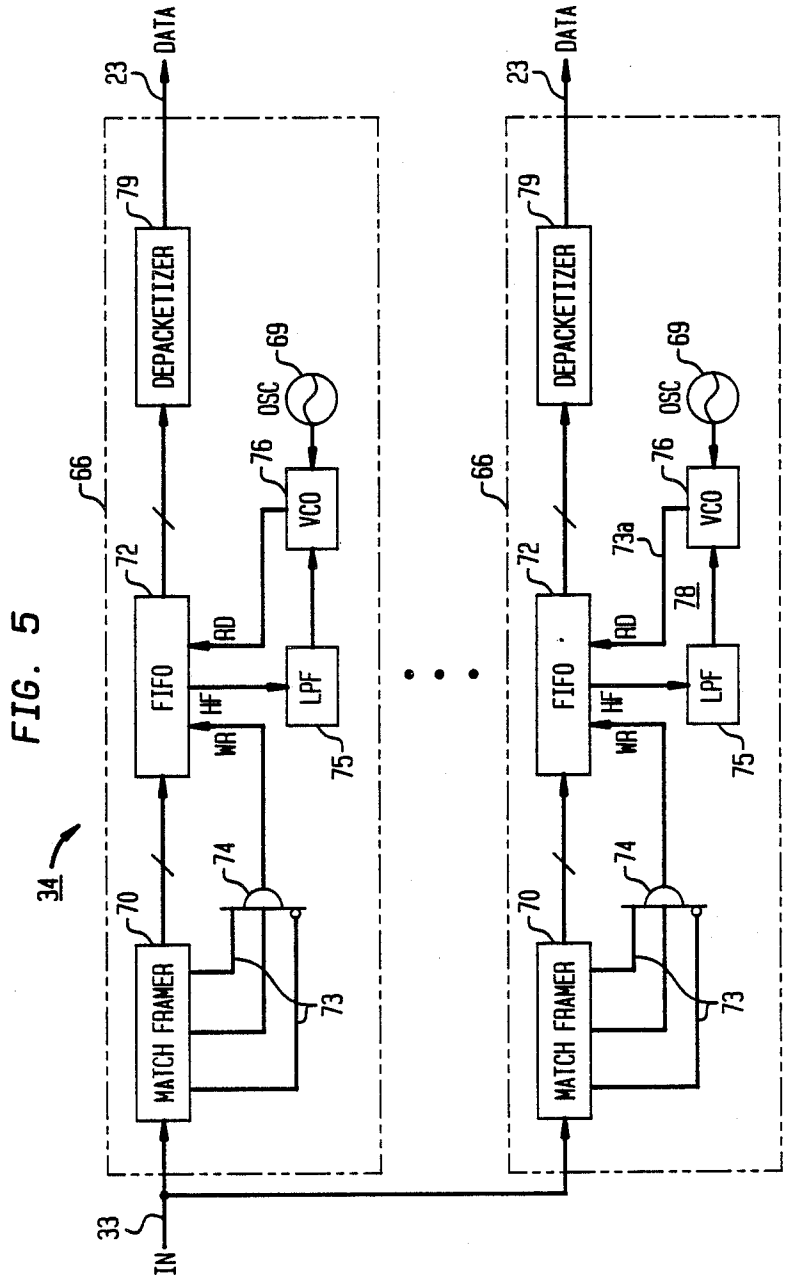

FIG. 5

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