



(12) **United States Patent**
Allen, Jr. et al.

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(54) ATM-BASED DISTRIBUTED VIRTUAL TANDEM SWITCHING SYSTEM	5,638,365 5,703,876 5,710,769 5,719,863 5,757,783 5,867,571 5,883,893 5,914,956 5,943,321 5,953,316 5,956,334 5,991,301 6,009,100	6/1997 12/1997 1/1998 2/1998 5/1998 2/1999 3/1999 6/1999 8/1999 9/1999 9/1999 11/1999 * 12/1999	Duault et al. . Christie 370/395 Anderson et al. . Hummel 370/392 Eng et al. . Borchering . Rumer et al. . Williams 370/395 St-Hilaire et al. 370/259 Lazar et al. 370/230 Chu et al. 370/352 Christie 370/395 Gausmann et al. 370/397
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(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.			

(21) Appl. No.: **09/287,092**
(22) Filed: **Apr. 7, 1999**

Related U.S. Application Data

- (60) Provisional application No. 60/083,640, filed on Apr. 30, 1998.
- (51) **Int. Cl.⁷** **H04M 7/00**; H04L 12/66; H04L 12/28; H04L 12/56
- (52) **U.S. Cl.** **370/352**; 370/410; 370/395; 379/220; 379/230
- (58) **Field of Search** 370/352, 353, 370/389, 396, 409, 524, 354, 385, 384, 395, 410; 379/230, 219, 220

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Primary Examiner—Huy D. Vu

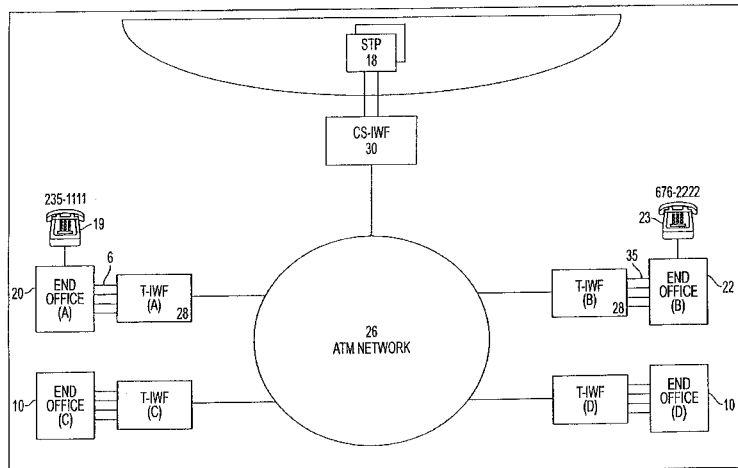
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ABSTRACT

(57) An Asynchronous Transfer Mode (ATM)-based distributed virtual tandem switching system is provided in which a network of ATM-based devices is combined to create a distributed virtual tandem switch. The system includes an ATM switching network that dynamically sets up individual switched virtual connections. The system also includes a trunk interworking function (T-IWF) device and a centralized control and signaling interworking function (CS-IWF) device. The trunk interworking function device converts end office voice trunks from TDM channels to ATM cells by employing a structured circuit emulation service. The centralized control and signaling interworking function device performs call control functions and interfaces narrowband signaling and broadband signaling for call processing and control within the ATM switching network. Consequently, the ATM based distributed virtual tandem switching system replaces a standard tandem switch in the PSTN.

48 Claims, 7 Drawing Sheets



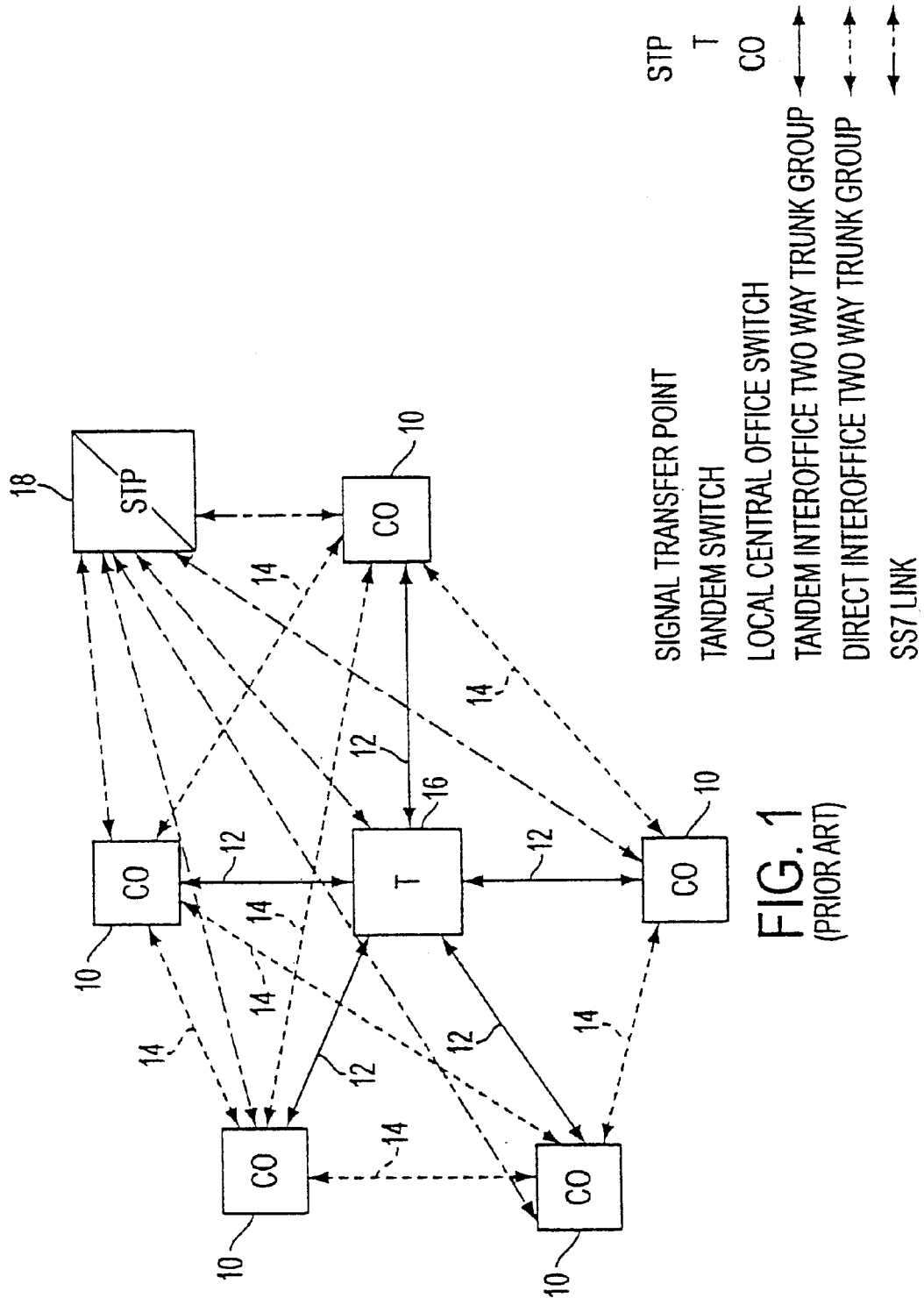


FIG. 1
(PRIOR ART)

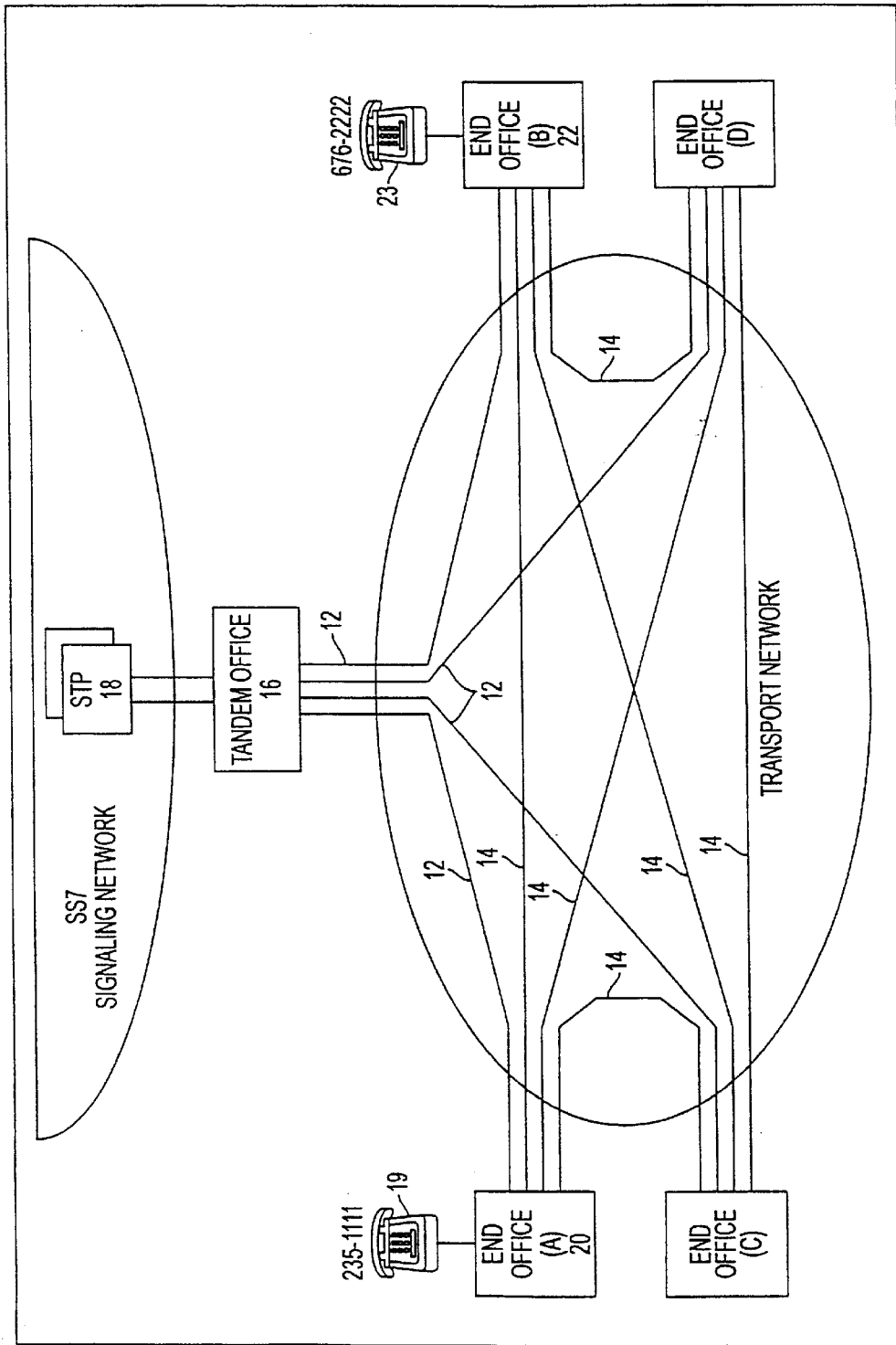


FIG. 2
(PRIOR ART)

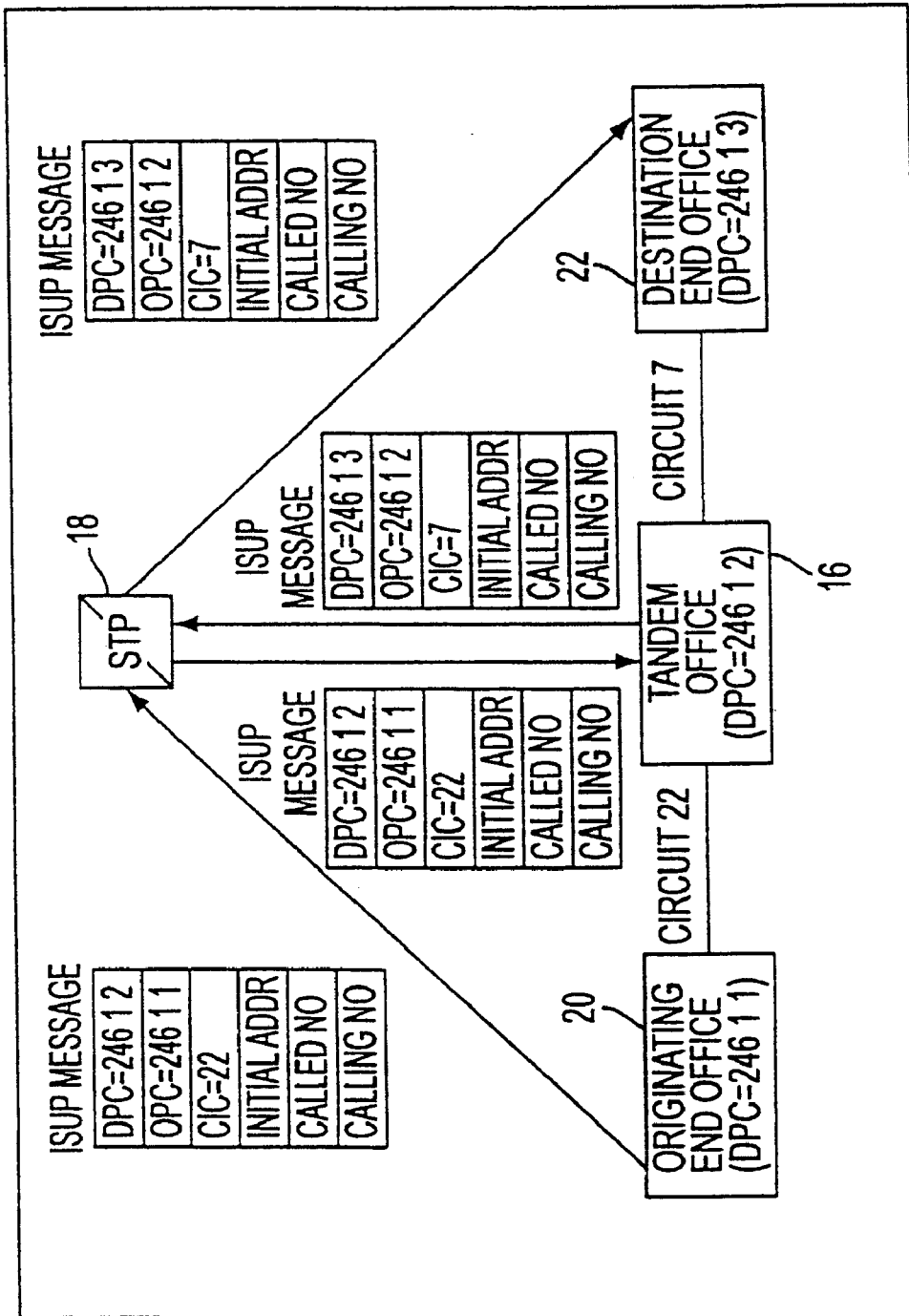


FIG. 3
(PRIOR ART)

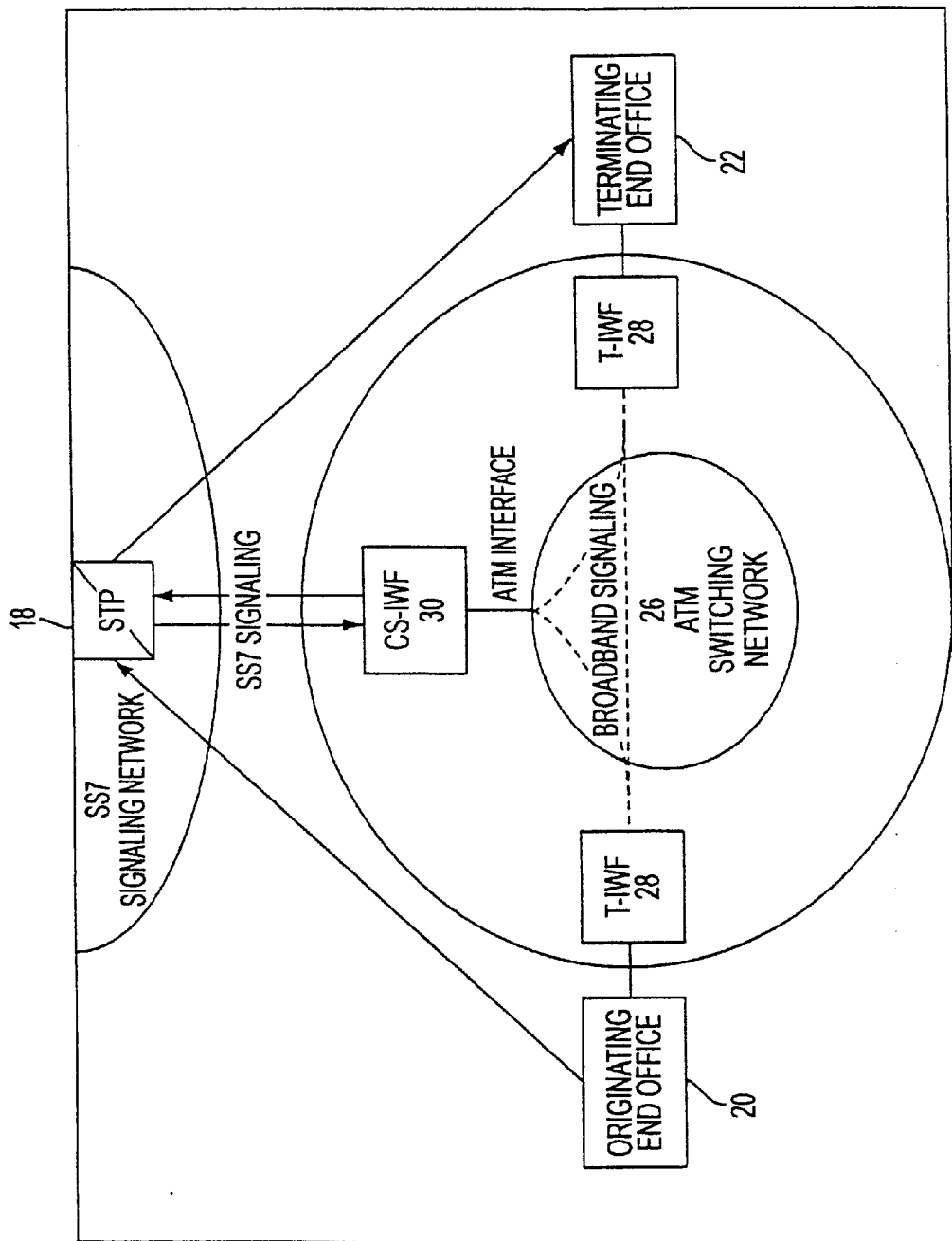


FIG. 4

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