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United States Patent [19]

Engel et al.

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[54] **NETWORK MONITORING**

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Related U.S. Application Data

[60] Division of application No. 07/761,269, Sep. 17, 1991, abandoned, which is a continuation-in-part of application No. 07/684,695, Apr. 12, 1991, abandoned.

[51] **Int. Cl.**[7] **H04J 3/16**; H04J 3/22
[52] **U.S. Cl.** **370/469**
[58] **Field of Search** 370/94.1, 85.13, 370/85.14, 94.2, 110.1, 79, 241, 252, 254, 465, 464, 466, 467, 469; 395/200, 183.15, 189.01, 189.04, 200.54, 285, 831; 371/20.1
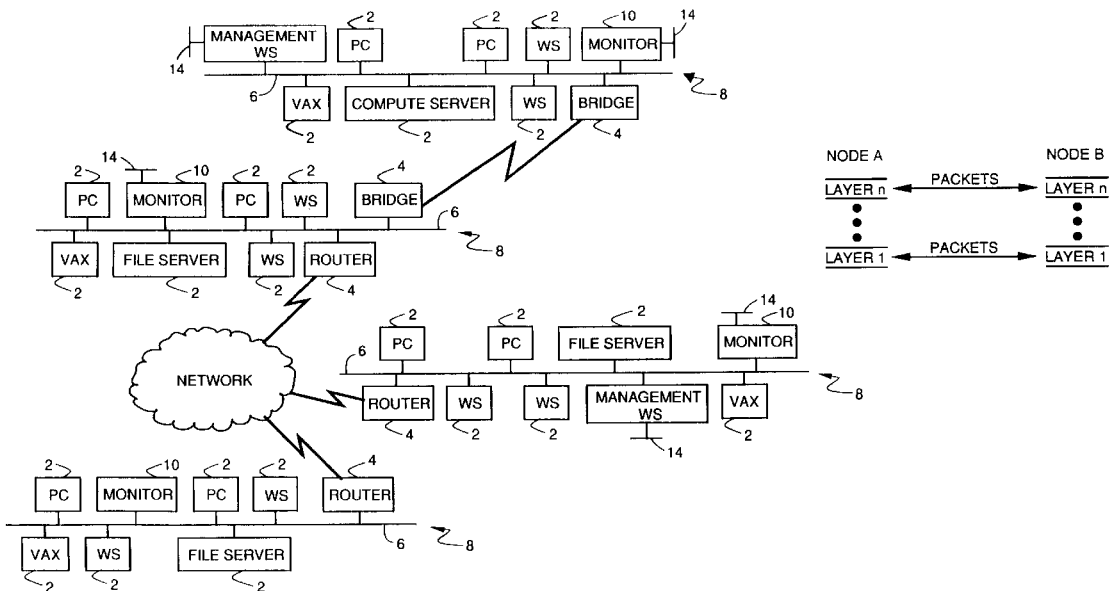
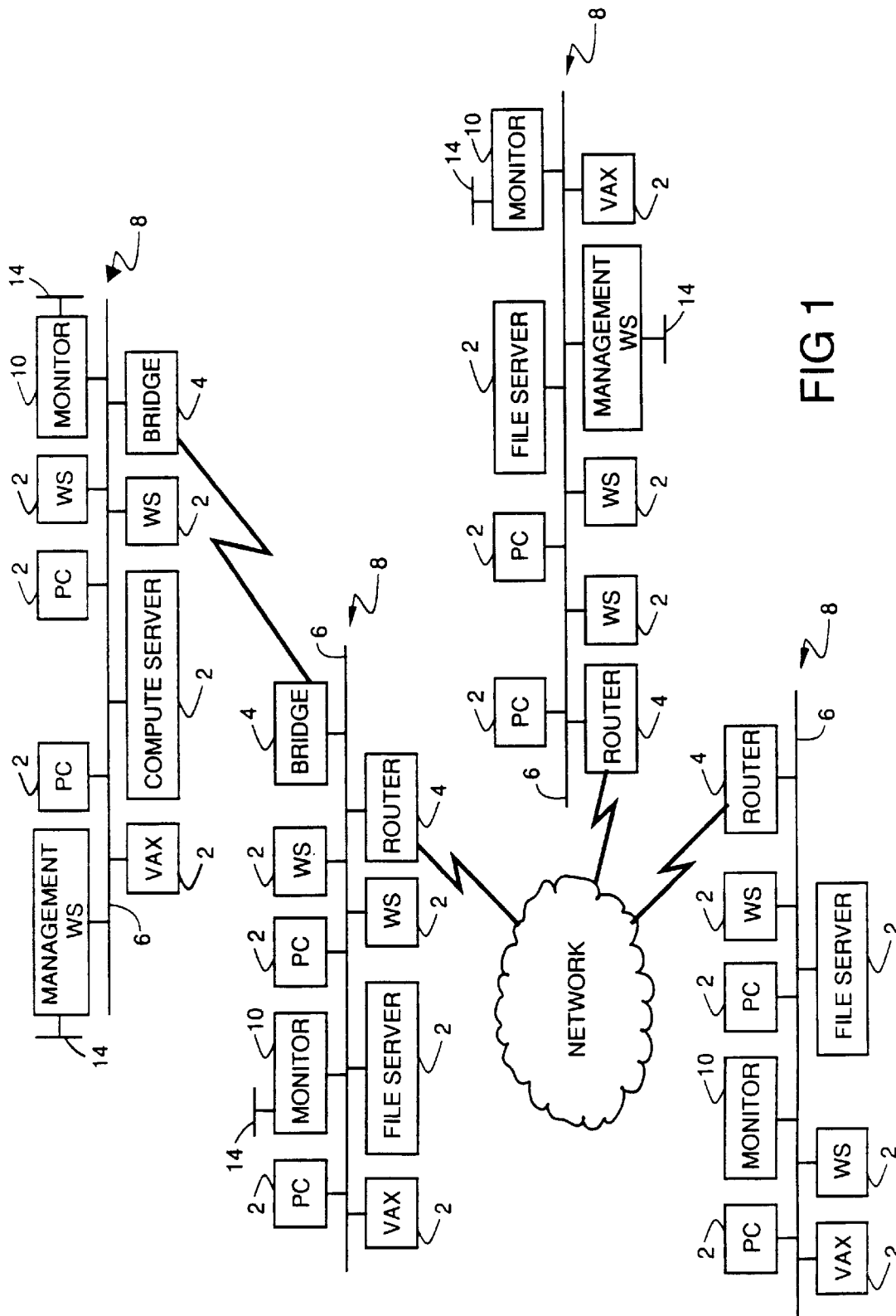[56] **References Cited**

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[57] **ABSTRACT**

Monitoring is done of communications which occur in a network of nodes, each communication being effected by a transmission of one or more packets among two or more communicating nodes, each communication complying with a predefined communication protocol selected from among protocols available in the network. The contents of packets are detected passively and in real time, communication information associated with multiple protocols is derived from the packet contents.
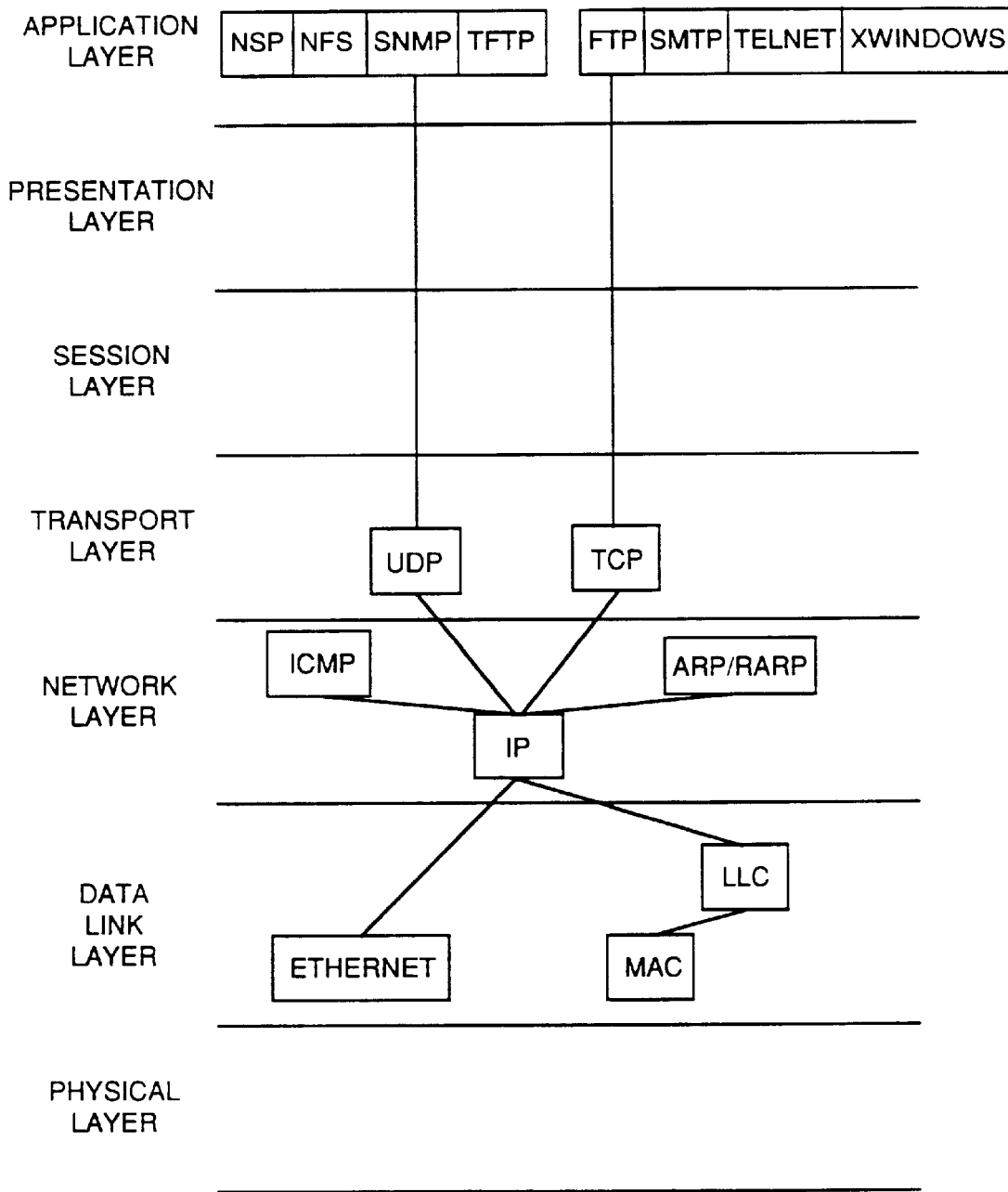
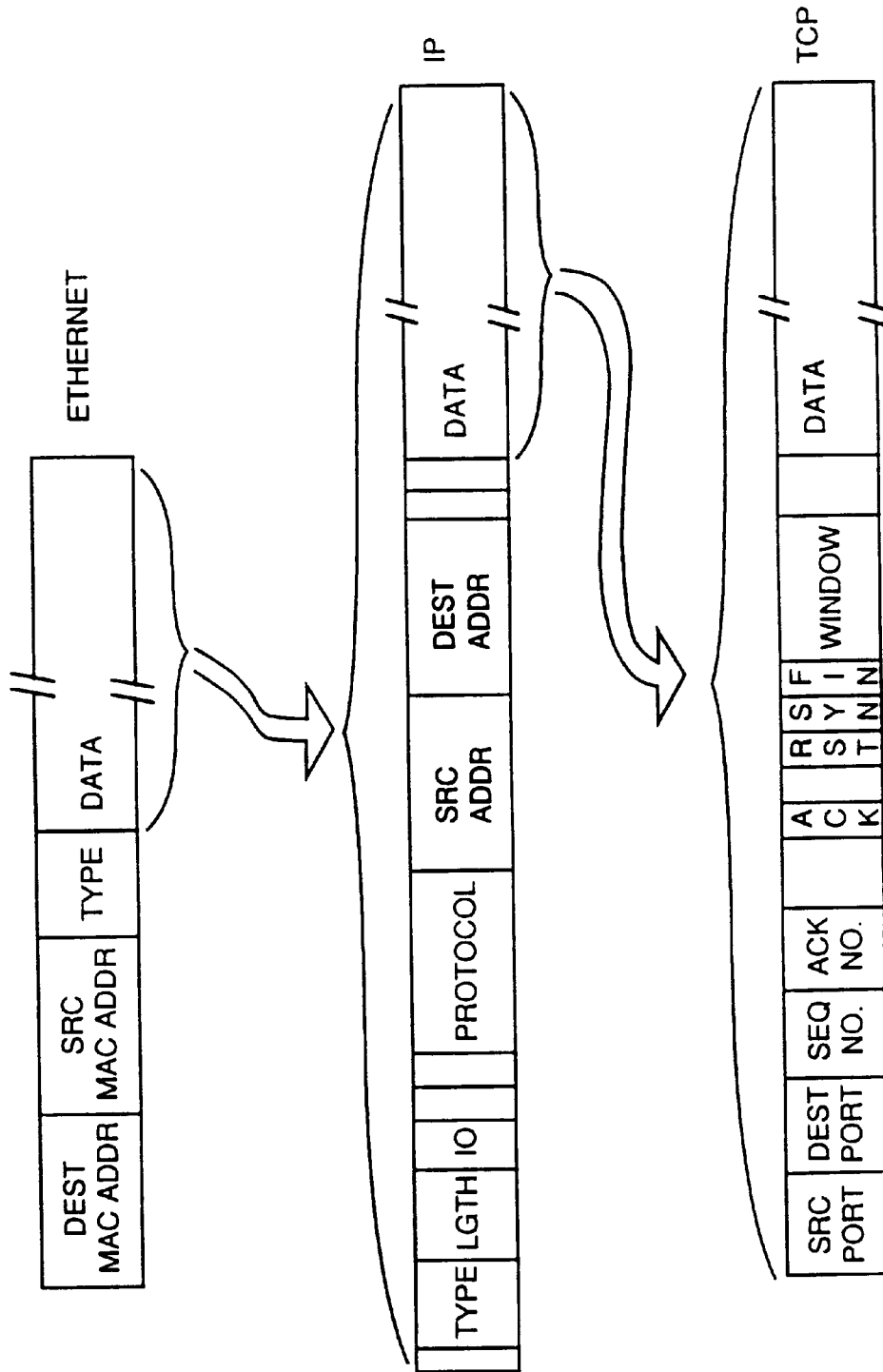**25 Claims, 38 Drawing Sheets**

FIG 1

APPLICATION LAYER

NSP	NFS	SNMP	TFTP		FTP	SMTP	TELNET	XWINDOWS

PRESENTATION LAYER

SESSION LAYER

TRANSPORT LAYER

UDP

TCP

NETWORK LAYER

ICMP

ARP/RARP

IP

DATA LINK LAYER

LLC

ETHERNET
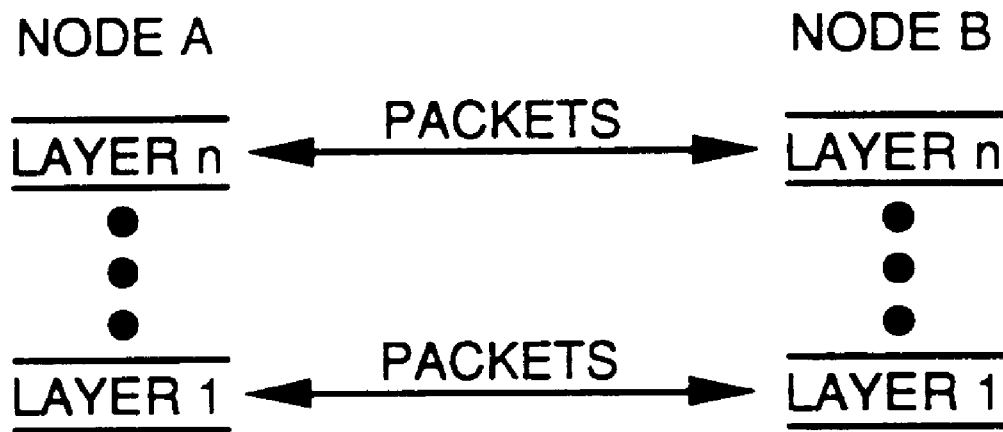
MAC

PHYSICAL LAYER

FIG 2

FIG 3

FIG 4

DOCKET ALARM

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