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[54] **METHOD AND APPARATUS FOR PRECISION TIME DISTRIBUTION IN TELECOMMUNICATION NETWORKS**

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[51] **Int. Cl.**[5] **H04L 7/10**

[52] **U.S. Cl.** **375/109**; 455/69; 455/5; 370/103; 370/104.1

[58] **Field of Search** 375/107, 109; 370/86, 370/89, 90, 103, 104.1; 340/825.14, 825.54; 455/69, 51

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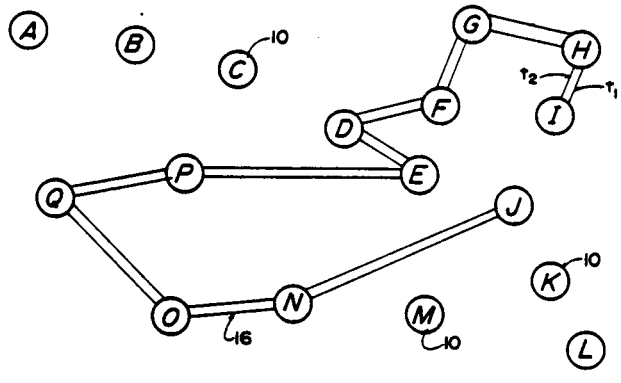
[57] **ABSTRACT**

A series of nodes in a telecommunications network are connected by a bi-directional transmission path. An outgoing signal passes each of the intermediate nodes in the path and sets a counter timing at each intermediate node. The outgoing signal then returns from the loop node with time information attached to it. As the returning trigger signal passes the intermediate nodes, the intermediate nodes stop counting the elapsed time since the trigger signal passed the intermediate node, and latches the time information. Precision time synchronization information is then determined for each intermediate node by halfing the two way travel time from the intermediate node to the loop node, adjusting for propagation and processing delays, and adding it to the time information from the loop node.

17 Claims, 4 Drawing Sheets