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Hendel et al.

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[54] **MULTI-LAYER DISTRIBUTED NETWORK ELEMENT**

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[51] **Int. Cl.**[7] **H04J 3/02**; H04L 12/02

[52] **U.S. Cl.** **370/392**; 370/400

[58] **Field of Search** 370/400, 401, 370/402, 403, 404, 405, 389, 392, 351, 410, 466, 467, 469, 409; 395/200.68, 200.72, 200.73, 200.74, 200.79, 200.8, 200.5

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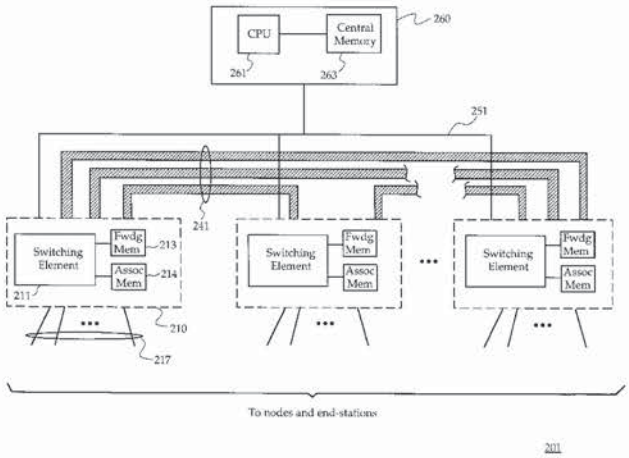
[57] **ABSTRACT**

A distributed multi-layer network element delivering Layer 2 (data link layer) wire-speed performance within and across subnetworks, allowing queuing decisions to be based on Layer 3 (network layer) protocol and endstation information combined with Layer 2 topology information. The network element performs packet relay functions using multiple switching subsystems as building blocks coupled to each other to form a larger switch that acts as both a router and a bridge. Each switching subsystem includes a hardware forwarding search engine having a switching element coupled to a forwarding memory and an associated memory. The switching subsystems and their fully meshed interconnection allow the network element to scale easily without compromising packet forwarding speed and without significantly increasing the storage requirements of each forwarding memory.

25 Claims, 4 Drawing Sheets



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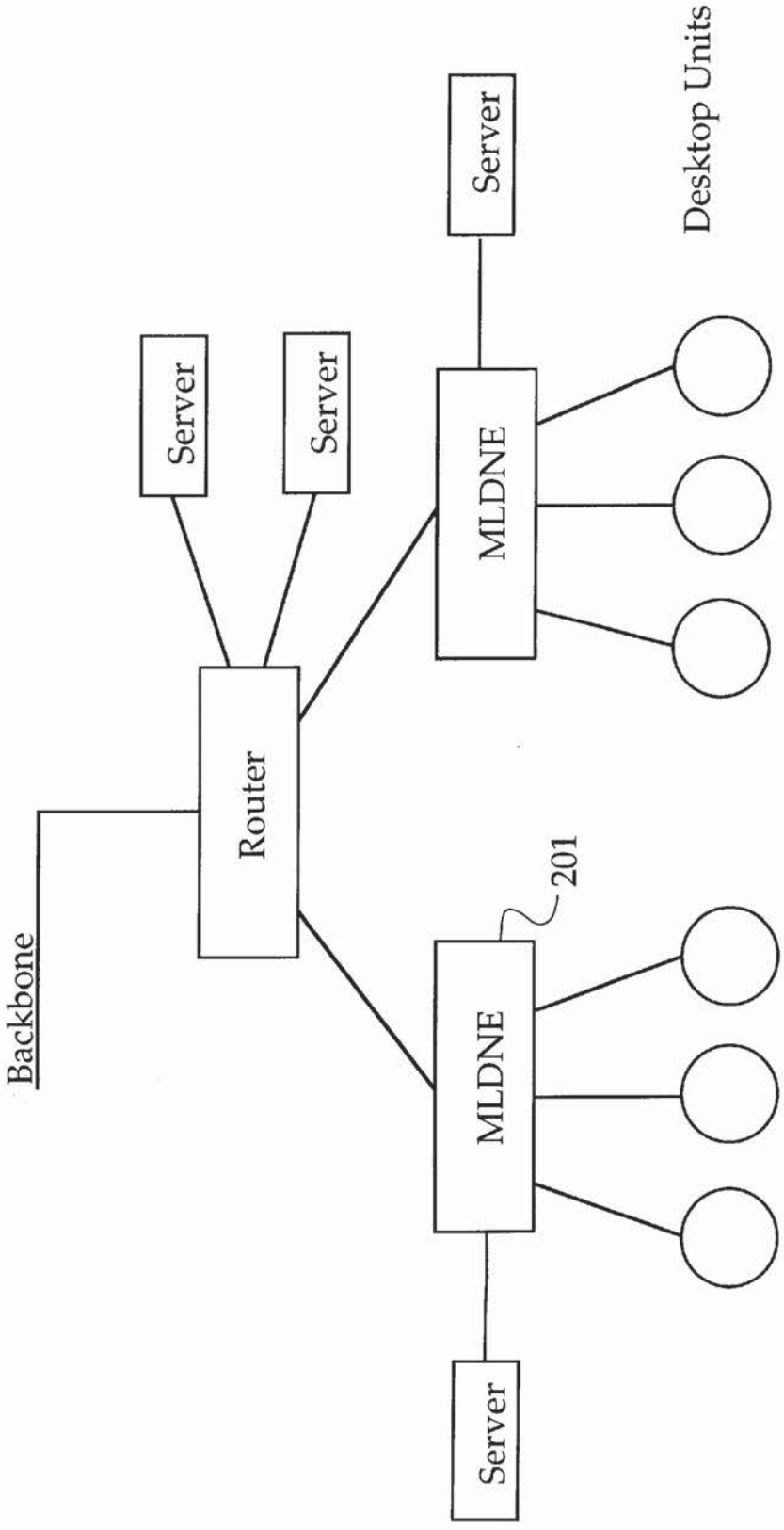

FIGURE 1

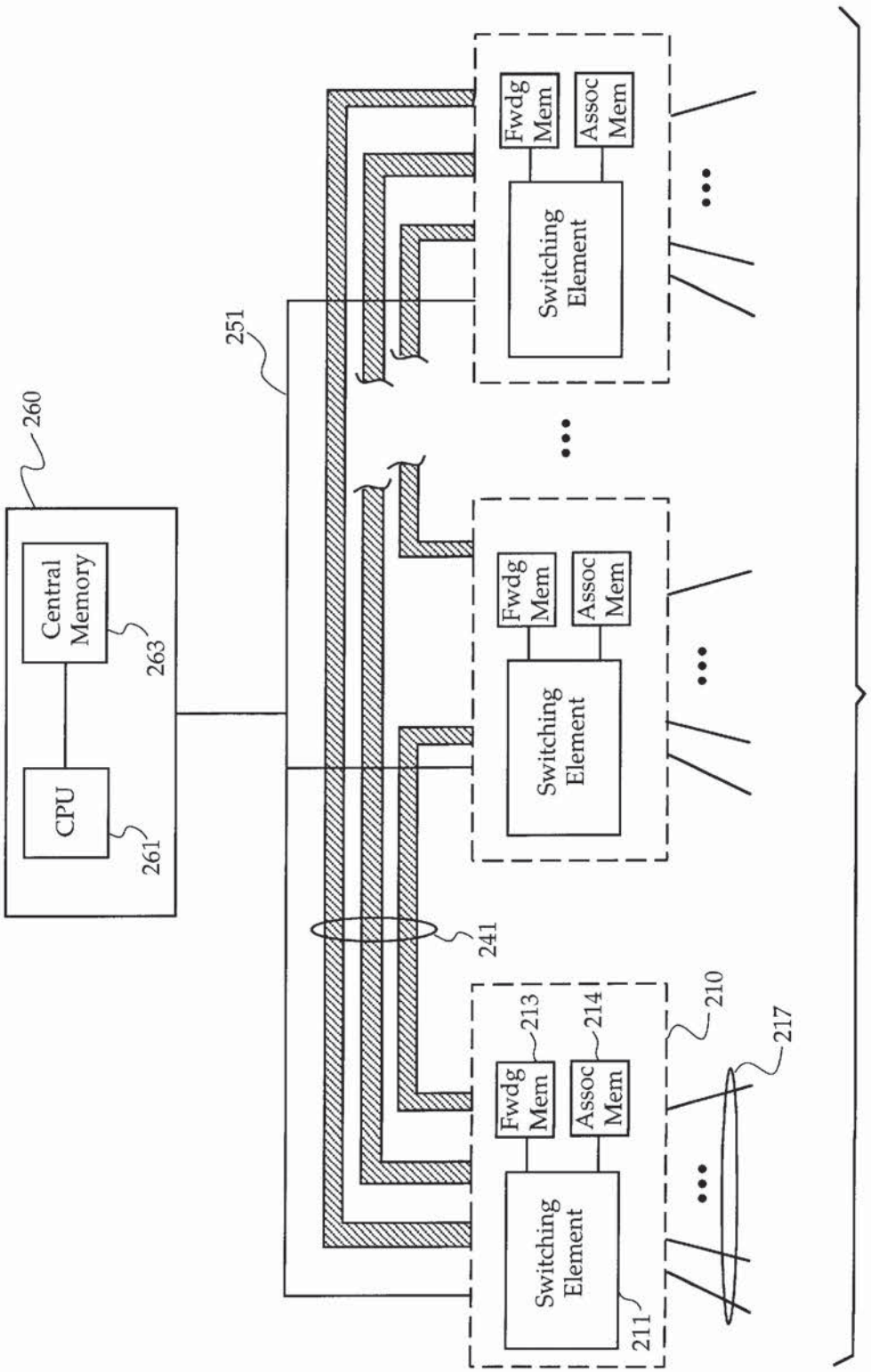

FIGURE 2

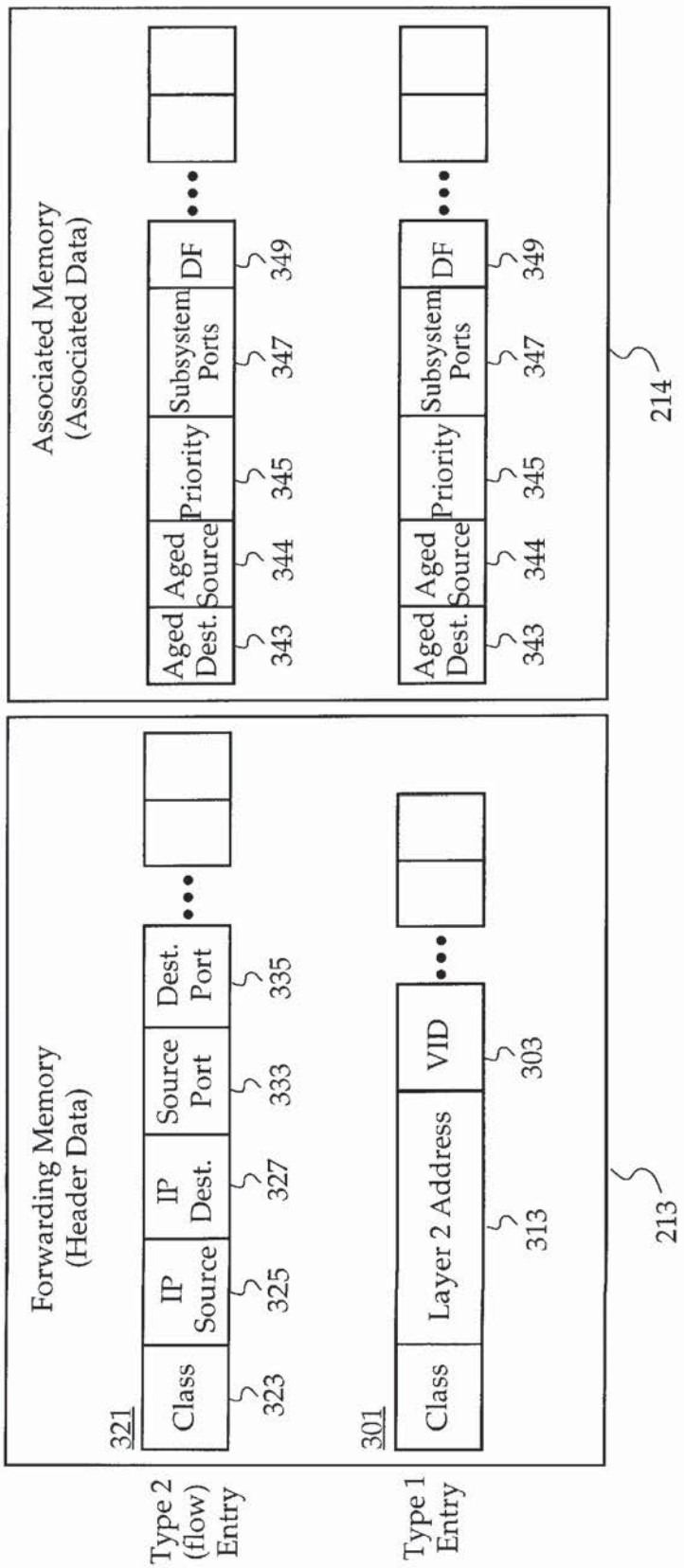

FIGURE 3

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