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United States Patent [19]

Cheng

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[54] **DYNAMIC CHANNEL MANAGEMENT AND SIGNALLING METHOD AND APPARATUS**

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[21] Appl. No.: **276,534**

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[51] Int. Cl.^{6} **H04H 1/04**

[52] U.S. Cl. **370/73**; 348/12; 370/85.7; 370/85.8; 455/4.2; 455/5.1

[58] **Field of Search** 348/6, 9, 12, 13; 455/3.1, 4.2, 5.1, 6.1, 34.1; 379/71, 73, 76, 80, 85.3, 85.7, 85.8, 95.1, 95.2

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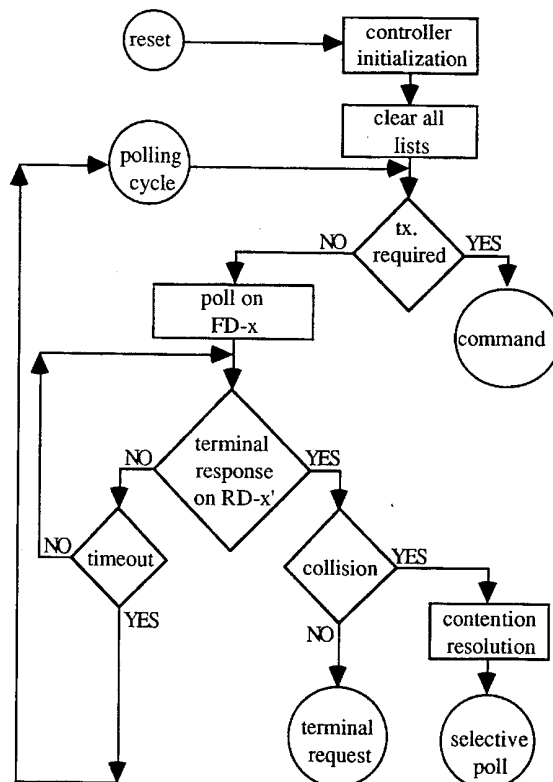|			
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Primary Examiner—Benedict V. Safourek

[57] **ABSTRACT**

There is provided a dynamic and adaptable method and apparatus to support two-way multi-media communication services on a multiple access communication system, which comprises a central controller, a shared transmission media and a plurality of remote terminals dispersed throughout the network. The central controller comprises switch and control apparatus and a pool of transmitters and receivers. The communication channels between the central controller and remote terminals are arranged for signalling data and traffic bearer channels in the forward and reverse directions. The number of signalling data channels is adjusted to satisfy the traffic requirements and for redundancy purposes. The forward and reverse signalling data channels are coupled in different mappings to support terminal grouping. Multiple access of the remote terminals for the upstream traffic are mitigated by separating remote terminals in groups via the channel allocation and the terminal assignment process. Communication between the central controller and the remote terminals follows a multiple access scheme controlled by the central controller via polling procedure on each of the forward signalling data channels independently. In case of collision, the central controller engages the remote terminals in a selective polling process to resolve the contention. The overlapping polling method of the controlled access scheme increases the utilization of the signalling channel and reduces the time required to gain access to the shared transmission media. By dynamically adjusting the load on signalling data channels, the signalling process is greatly improved for efficiency and redundancy against anomalies with the added benefit of improved flexibility and extensibility. The system is especially useful in a two-way CATV network.

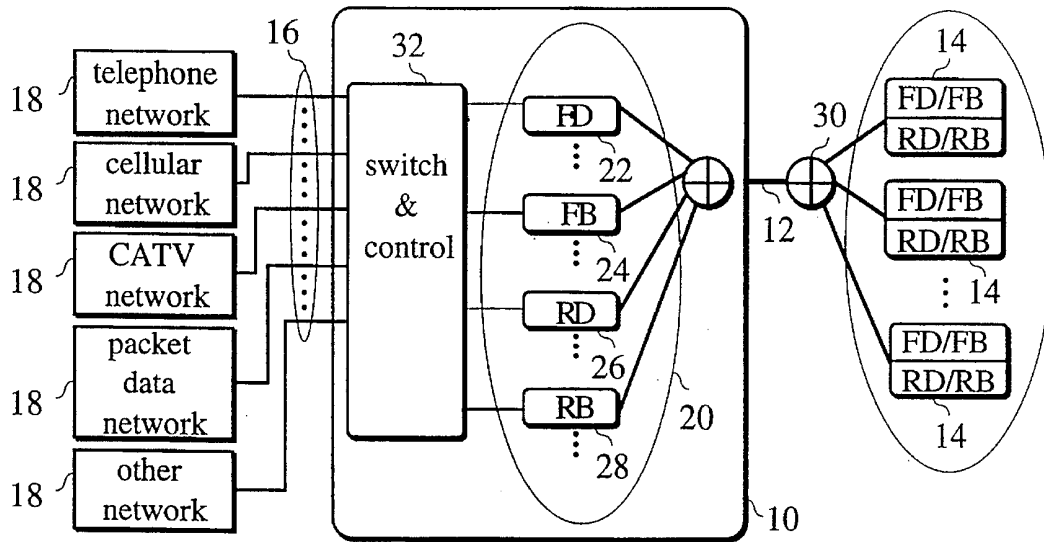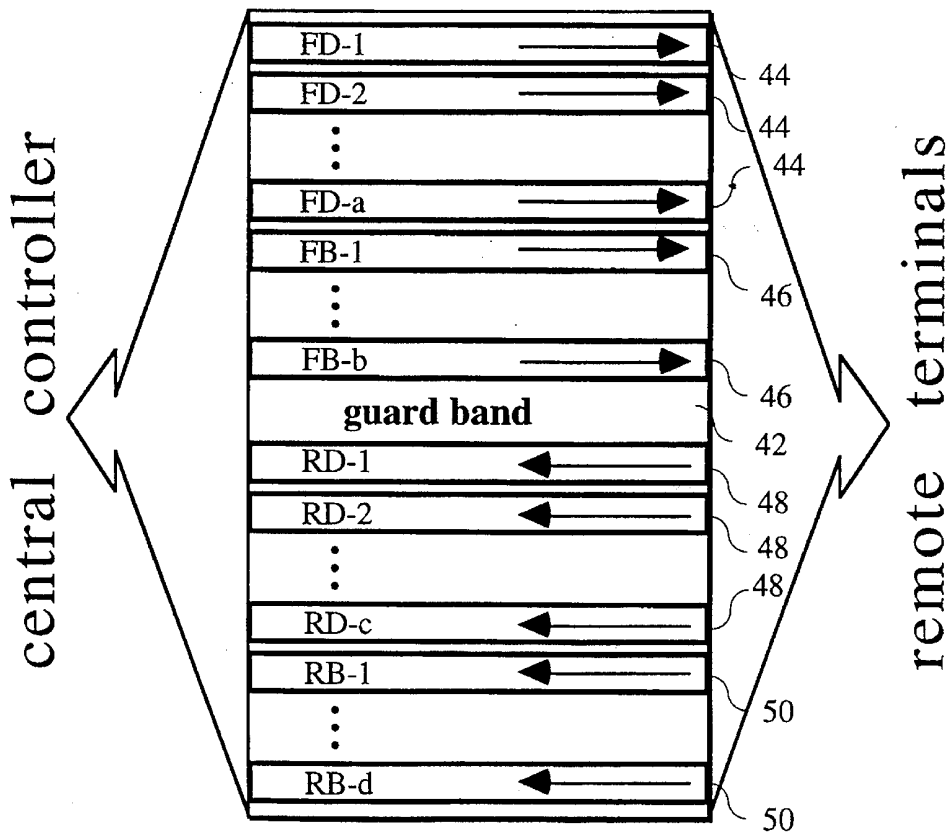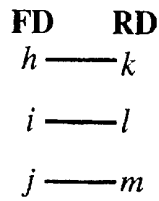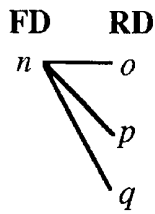**20 Claims, 16 Drawing Sheets**

Figure 1

Figure 2

FD   RD
h ——— k

i ——— l

j ——— m

Figure   3a

FD   RD
n   o

         p

         q

Figure   3b

FD   RD
r   u

s

t

Figure   3c

reset → controller initialization

controller initialization → clear all lists

clear all lists → tx. required

polling cycle → clear all lists

tx. required — NO → poll on FD-x

tx. required — YES → command

poll on FD-x → terminal response on RD-x'

terminal response on RD-x' — NO → timeout

terminal response on RD-x' — YES → collision

timeout — NO → poll on FD-x

timeout — YES → polling cycle

collision — YES → contention resolution

collision — NO → terminal request

contention resolution → selective poll

Figure   4

command

command
on FD-x

terminal
response
on RD-x'

NO   YES

timeout

NO

collision

YES

YES

NO

retry
count
exceeded

NO   YES

successful
transmission

terminal
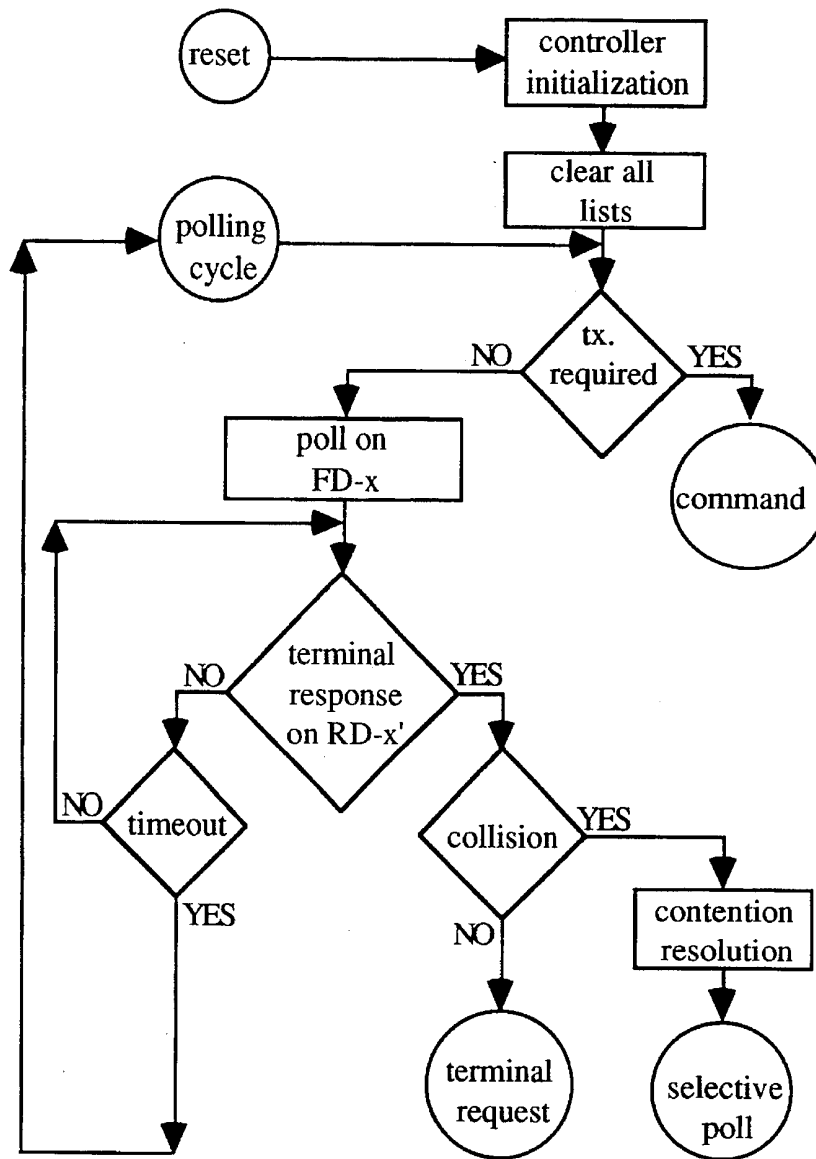failure
processing

polling
cycle

Figure   5

Figure   6

DOCKET ALARM
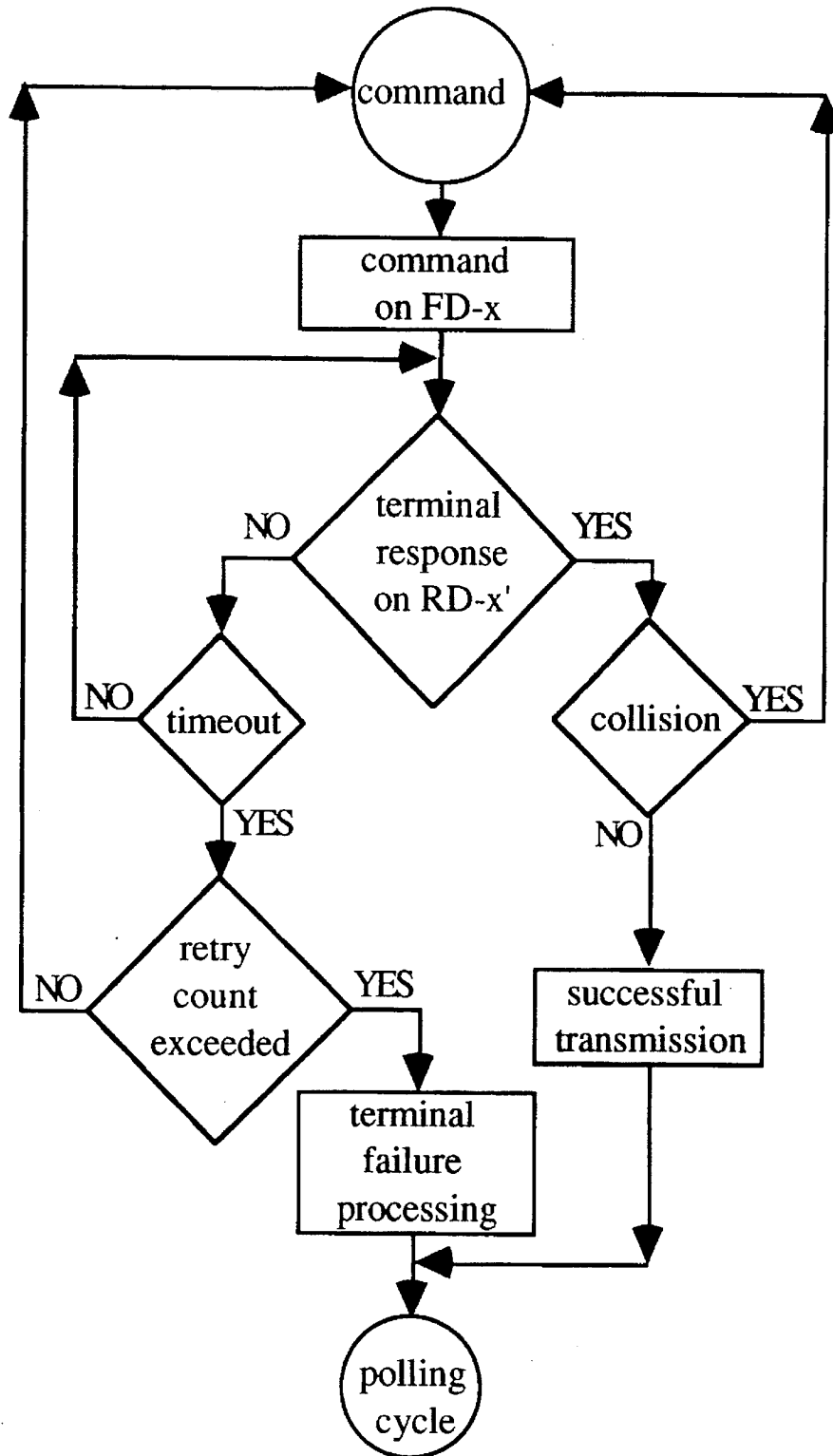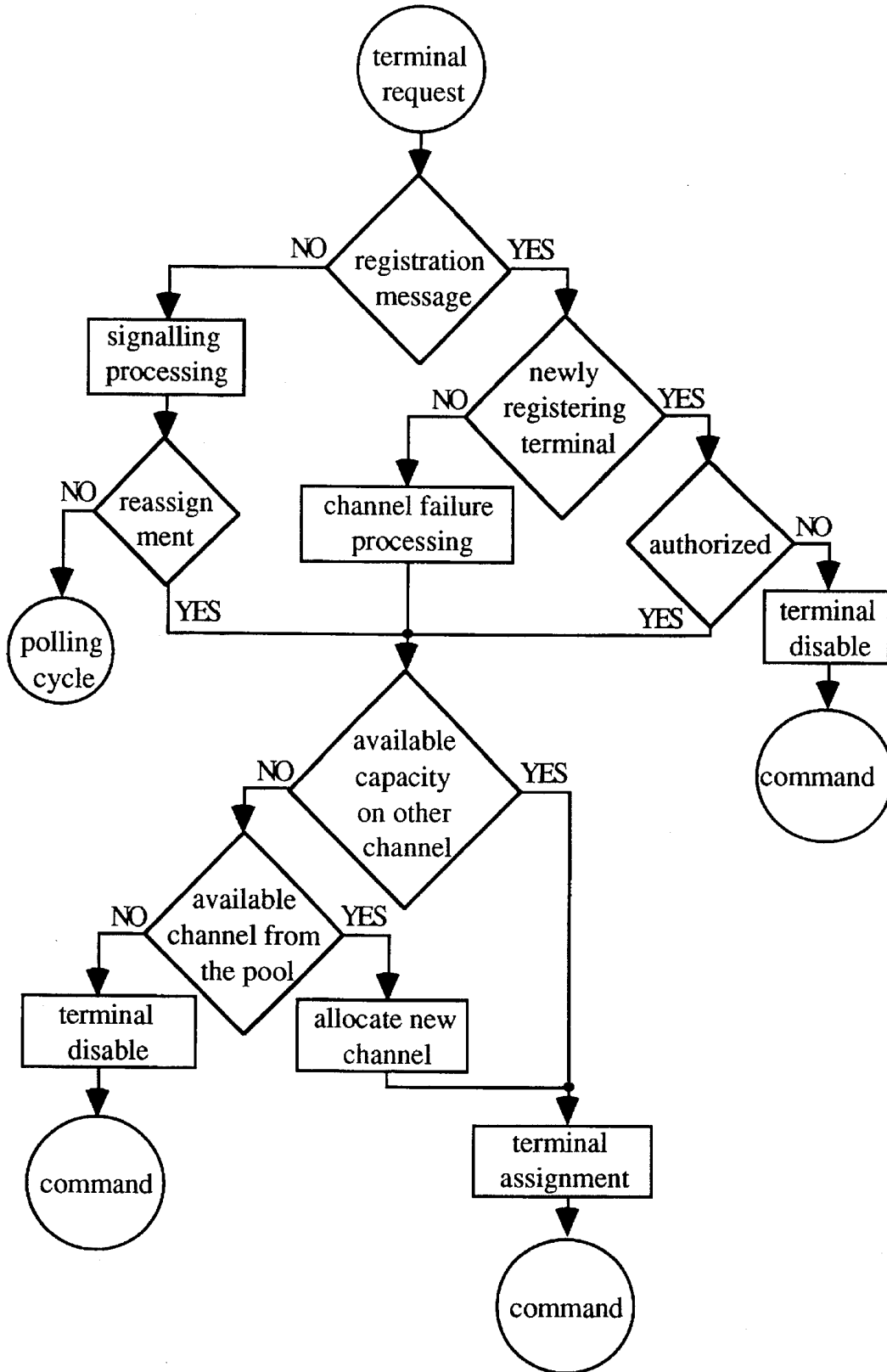
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