United States Patent [19]

Kilk et al.

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[54] **COMMUNICATION PACING METHOD**

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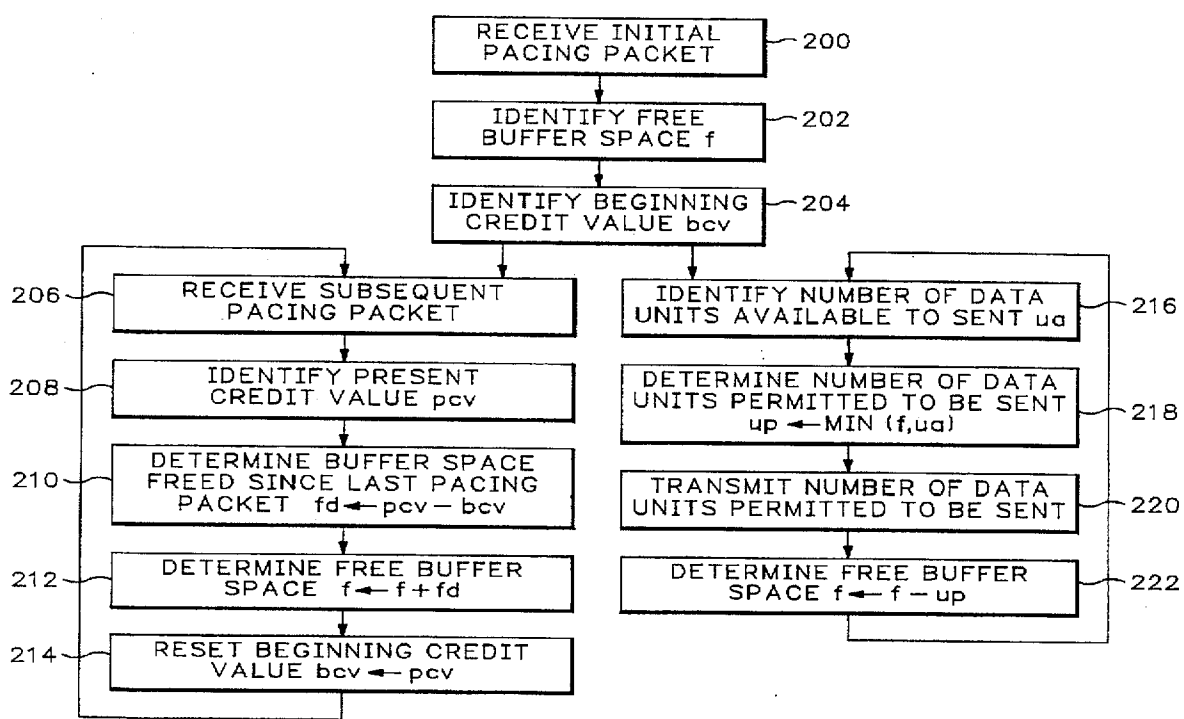### FOREIGN PATENT DOCUMENTS

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Primary Examiner—Hassan Kizou

[57]   **ABSTRACT**

The present invention provides a method of pacing a stream of data transmitted from a data source to a buffered data destination with a determined number of available storage units, the data destinations being configured to consume data and thereby to free storage units for receipt of additional data. The pacing of data communication includes: (1) identifying a beginning credit value; (2) incrementing the beginning credit value with each storage unit freed to identify an present credit value; (3) transmitting units of data in accordance with determined limits, the number of data units sent providing a transmission count; (4) selectively updating the determined number of available storage units by determining the difference between the beginning credit value and the present credit value, and determining the sum of the result and the previously determined number of available storage units to provide an updated determined number of available storage units; and (5) selectively updating the determined number of available storage units by determining the difference between the transmission count and the previously determined number of available storage units to provide an updated determined number of available storage units.
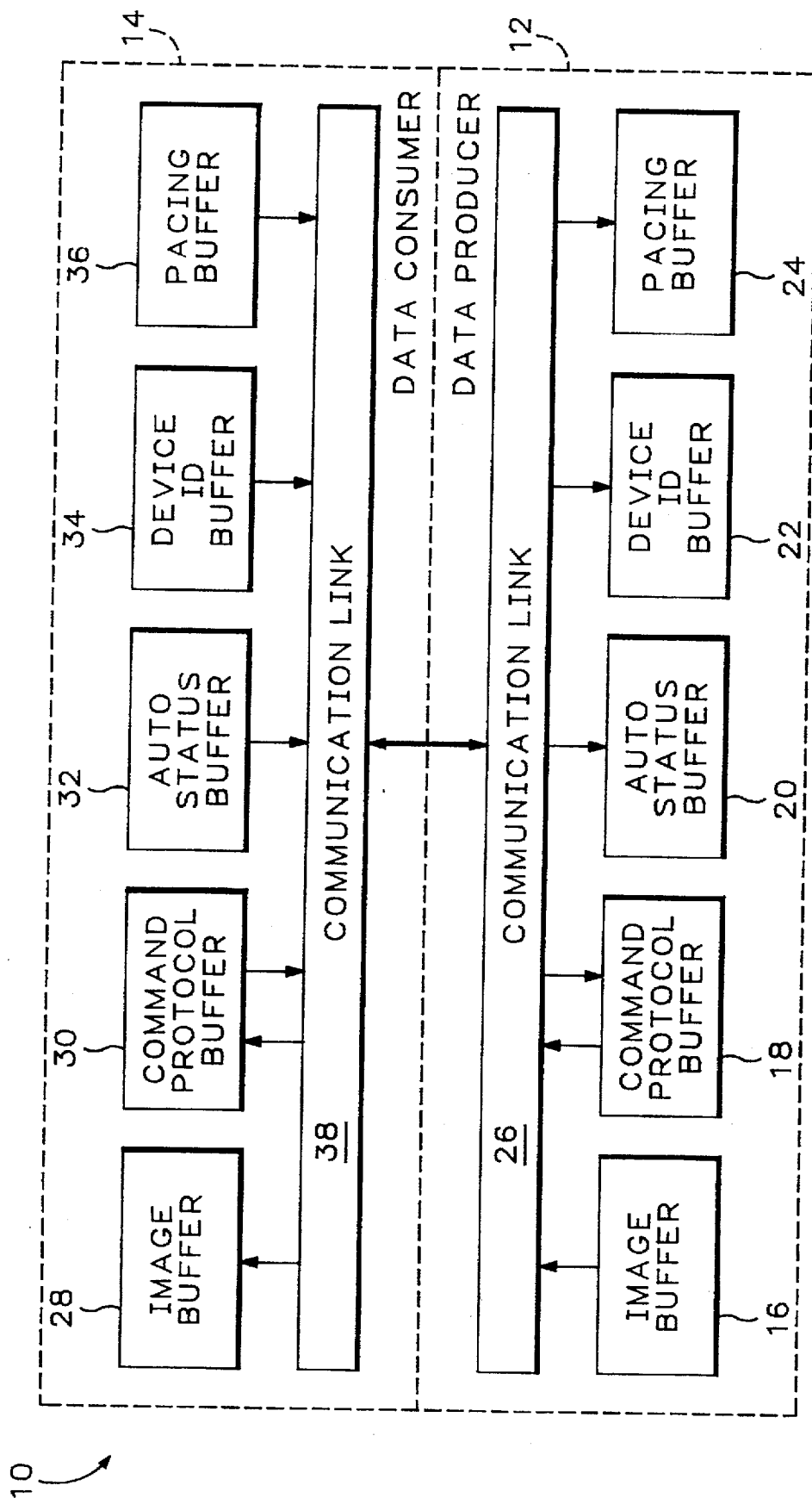
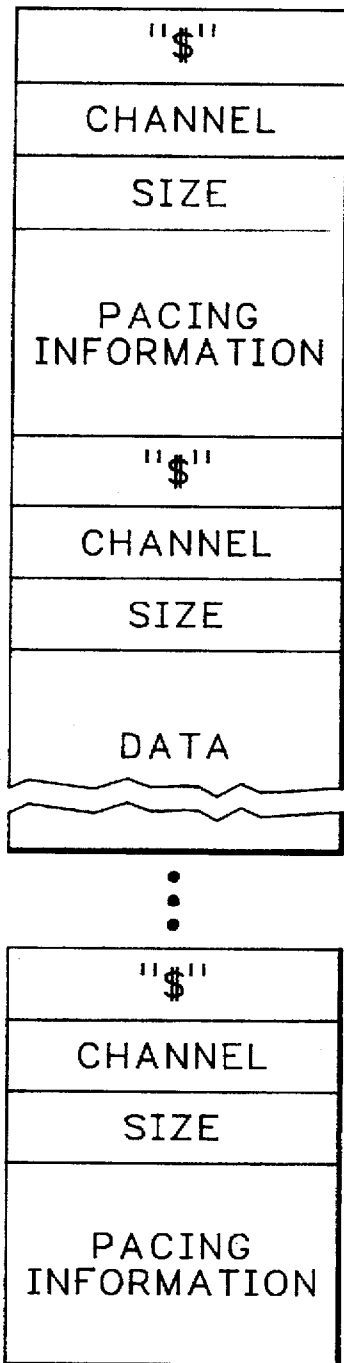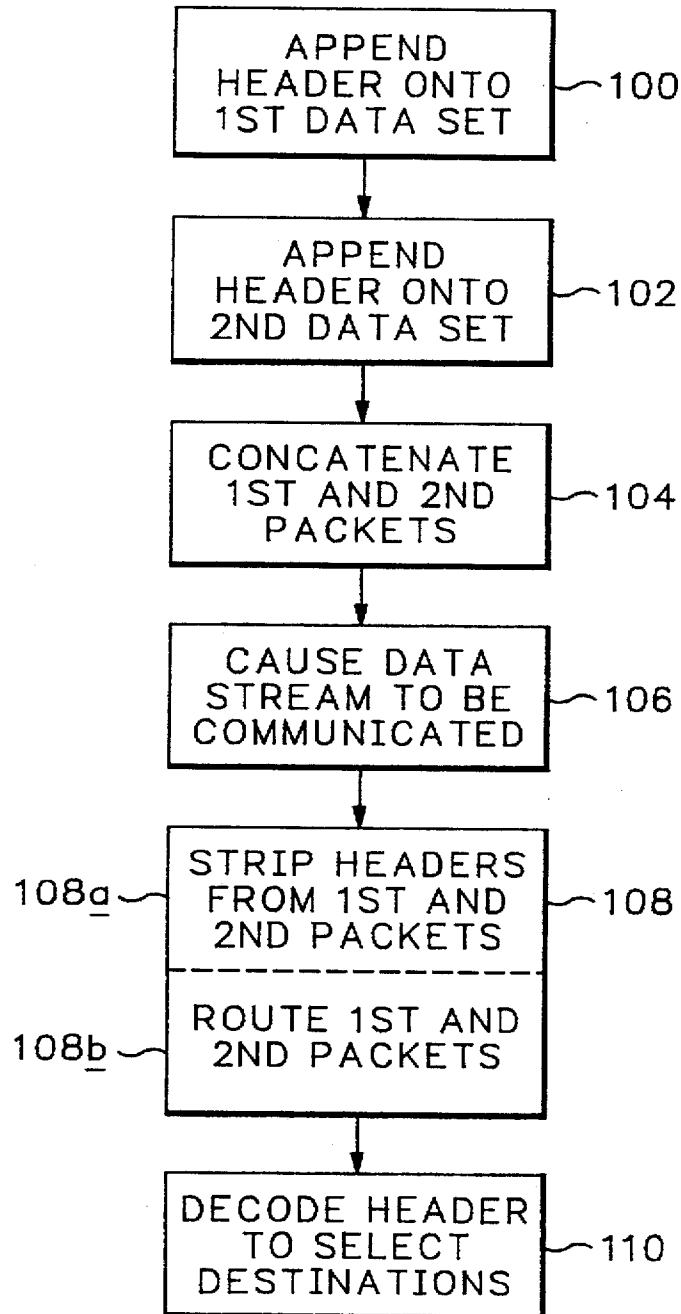**18 Claims, 4 Drawing Sheets**

FIG.1

"$"

CHANNEL

SIZE

PACING
INFORMATION

"$"

CHANNEL

SIZE

DATA

"$"

CHANNEL

SIZE

PACING
INFORMATION

FIG.2

APPEND
HEADER ONTO
1ST DATA SET — 100

APPEND
HEADER ONTO
2ND DATA SET — 102

CONCATENATE
1ST AND 2ND
PACKETS — 104

CAUSE DATA
STREAM TO BE
COMMUNICATED — 106

108a — STRIP HEADERS
FROM 1ST AND
2ND PACKETS — 108

108b — ROUTE 1ST AND
2ND PACKETS

DECODE HEADER
TO SELECT
DESTINATIONS — 110

FIG.6

FIG.3

DATA CHANNEL
FILLER
CURRENT CREDIT
REVOLVING CREDIT
FILLER

FIG.5

RECEIVE INITIAL PACING PACKET — 200

IDENTIFY FREE BUFFER SPACE f — 202

IDENTIFY BEGINNING CREDIT VALUE bcv — 204

216 — IDENTIFY NUMBER OF DATA UNITS AVAILABLE TO SENT ua

218 — DETERMINE NUMBER OF DATA UNITS PERMITTED TO BE SENT $up \leftarrow MIN (f, ua)$

220 — TRANSMIT NUMBER OF DATA UNITS PERMITTED TO BE SENT

222 — DETERMINE FREE BUFFER SPACE $f \leftarrow f - up$

206 — RECEIVE SUBSEQUENT PACING PACKET

208 — IDENTIFY PRESENT CREDIT VALUE pcv

210 — DETERMINE BUFFER SPACE FREED SINCE LAST PACING PACKET $fd \leftarrow pcv - bcv$

212 — DETERMINE FREE BUFFER SPACE $f \leftarrow f + fd$

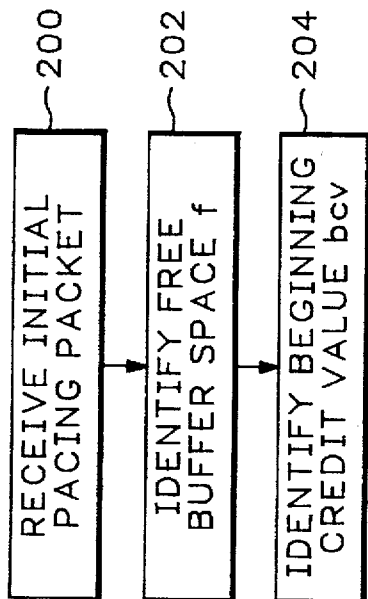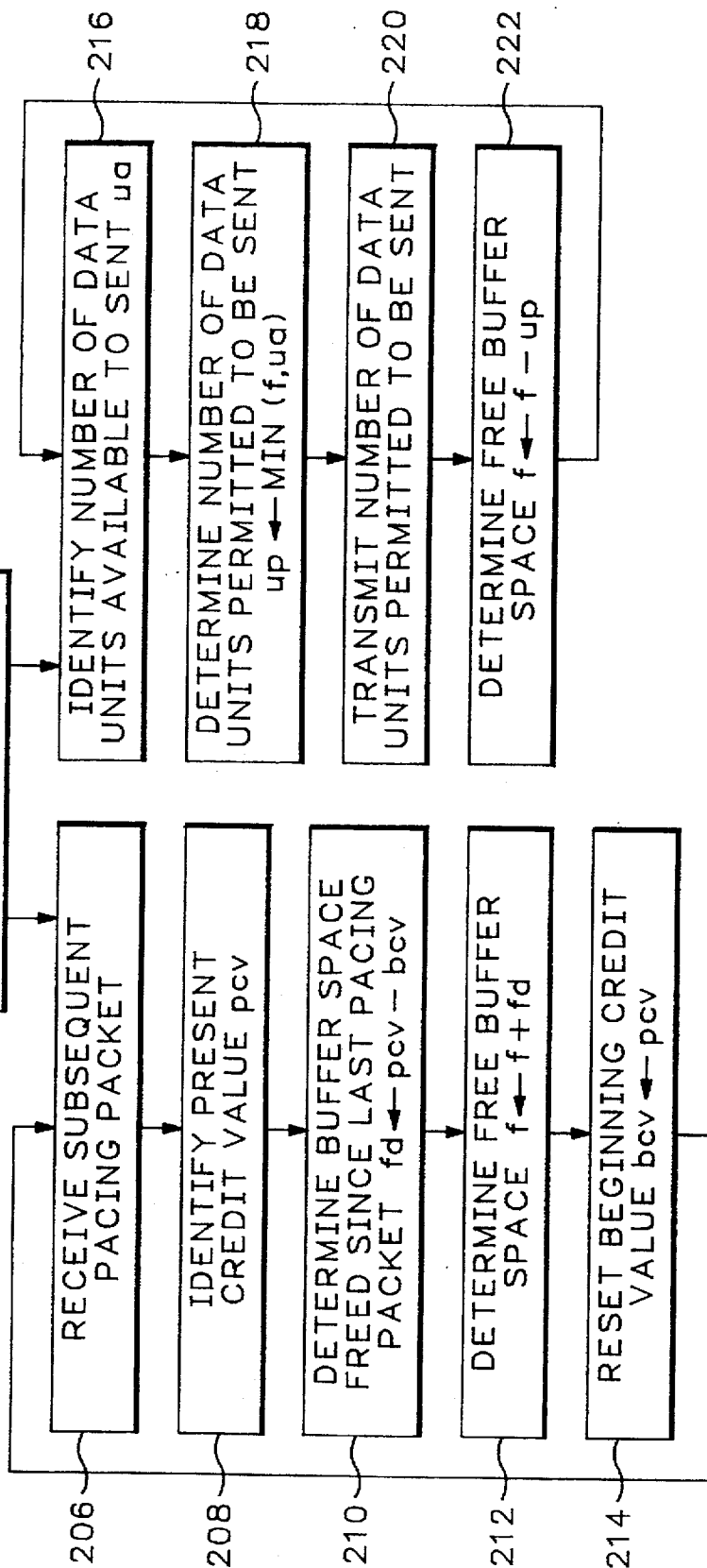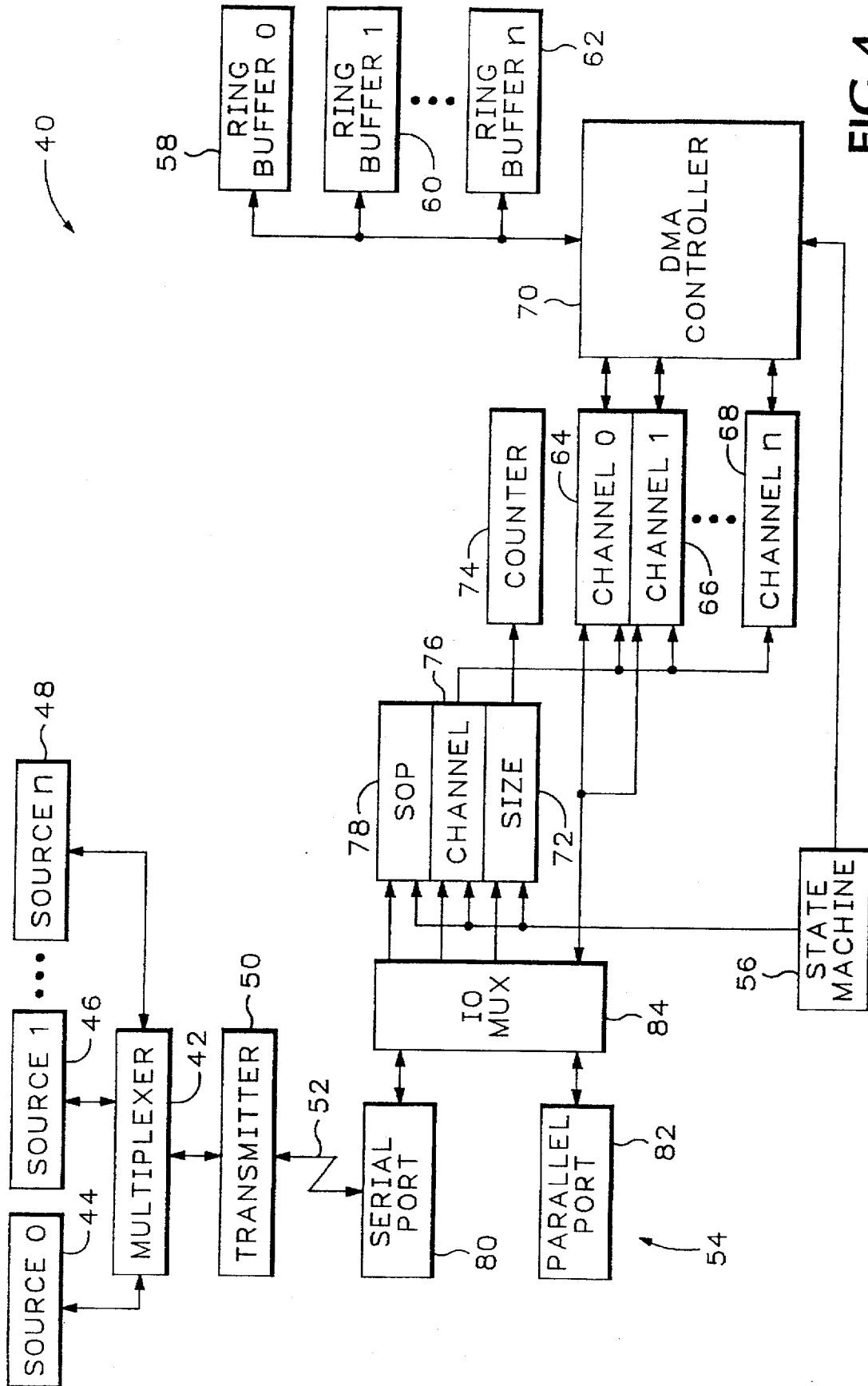214 — RESET BEGINNING CREDIT VALUE $bcv \leftarrow pcv$

FIG.4

DOCKET ALARM

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