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(54) **Title:** METHOD AND APPARATUS FOR IMPLEMENTING FINITE IMPULSE RESPONSE HLTERS WITHOUT THE USE OF MULTIPLIERS

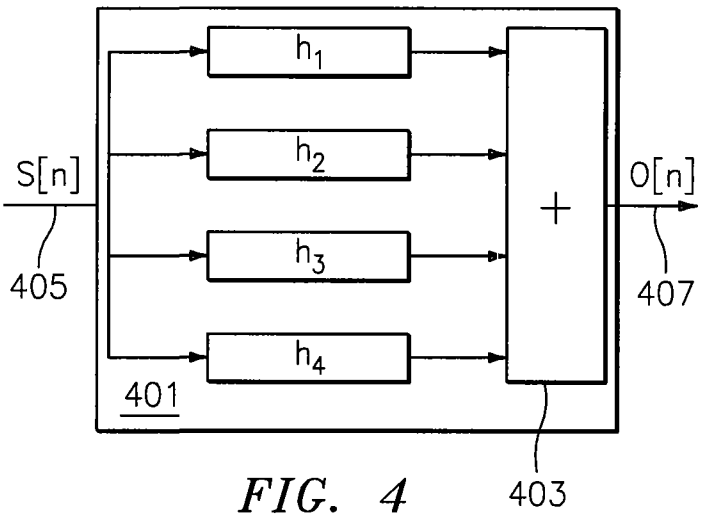

FIG. 4

(57) Abstract: A finite impulse response filter is implemented as a sum of individual component, running-sum Filters. The sum of all of the component niters required for a desired filter response is calculated in an accumulator and only the update terms are calculated for each componen filter. A desired impulse response is decomposed into a sum of rectangular impulse responses of equal height, each of which is implemented as a running sum requiring a subtraction and an addition. Using circuits running at a multiple of the sampling clock, multiple running sums may be implemented on the same hardware. A whole filter of arbitrary impulse response shapes and lengths ma be implemented using memory and two arithmetic units. Two or more such filters may be cascaded to obtain a better approximation of the desired frequency characteristic. The invention saves chip resources and manufacturing costs.

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INTERNATIONAL SEARCH REPORT

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PCT/US 07/86346

A CLASSIFICATION OF SUBJECT MATTER
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B FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC - 324/76.28

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 324/76.28, 76.11, 375/316, 350 - text search, see search terms below

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PUbWEST(PGPB,USPT,USOCEPAB,JPAB), DialogPRO (Engineering), Google Scholar
Search Terms Used decompos, impulse, response, filter, sum, accumul, individual, component, rectang, convol, step, rectangular, function, step function, impulse response, adder, subtractor, subtracter, accumulator, input (-- cont'd on p 8 --)

C DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
Y	US 2004/0243258 A1 (SHATTIL) 02 December 2004 (02.12.2004), especially Figs 11, 12A, 12B, 13A$_1$-13B, 13C$_1$-15C, 17, 19, para [0008]-[0009], [0067]-[0068], [0091], [0093], [0107], [0124], [0127], [0129], [0131], [0135], [0139]-[0140], [0215]-[0216]	1-36
Y	US 5,212,659 A (SCOTT et al.) 18 May 1993 (18.05.1993), especially Figs 6, 8, Table I, col 2, ln 10-12, 31-34, 59, col 3, ln 12-14, col 6, ln 10-15, 36-40, 42-46, 49-50, col 8, ln 5, 44, col 9, ln 21-54, 60-68, col 10, ln 1, col 11, ln 40-54	1-36
Y	US 2006/0092058 A1 (SLAVIN) 04 May 2006 (04.05.2006), especially para [0026], [0064]-[0065]	7-11
Y	US 5,623,621 A (GARDE) 22 April 1997 (22.04.1997), especially Fig 2, col 2, ln 24-26, 36-39, 44, 50-57, col 3, ln 28-32, col 4, ln 31-33, 35-37, 61-67, col 5, ln 1-9, 55-58	13-16, 19-36
Y	US 5,757,683 A (DECZKY) 26 May 1998 (26.05.1998), especially Fig 4, col 1, ln 59-61, col 6, ln 16-31	32-36

J I Further documents are listed in the continuation of Box C

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Continuation of B. FIELDS SEARCHED:

Search Terms Used (cont'd): positive, negative, register, difference, control, lookup, address, rate, clock, sample, diverg, converg, iterat, rβfin, power of two, multipl, frequency, 2.sup.n, seal, weight, two, differen, refine, refining

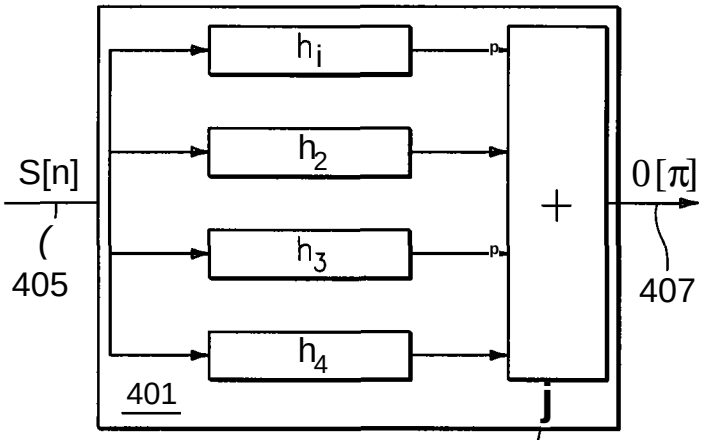

FIG. 4