ABSTRACT

DIVIDE BY THREE QUADRATURE FREQUENCY DIVIDER

A local oscillator circuit, comprising a timing circuit configured to provide an in phase signal and a quadrature phase signal, a delay circuit configured to delay the in phase signal, thereby producing a delayed in phase signal and a feedback circuit configured to receive the delayed in-phase and quadrature signals and provide a bias adjustment signal to the delay circuit to control a delay time of the delay circuit.

Fig: 10

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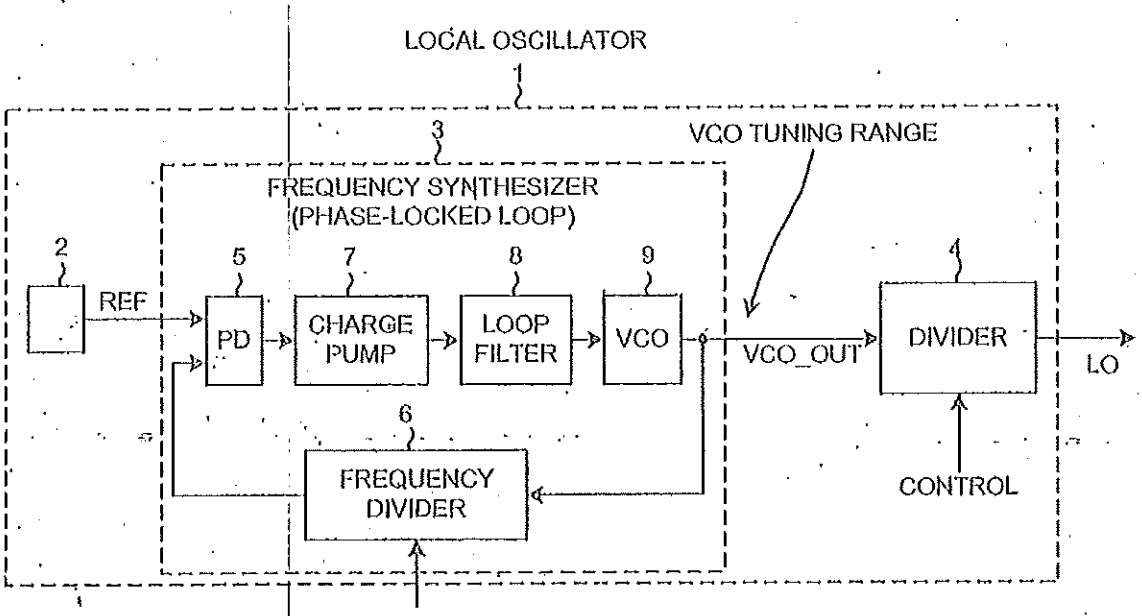

(PRIOR ART)

FIG. 1

FREQUENCY BAND	UNIT	VCO OUTPUT MIN	VCO OUTPUT MAX	LO DIVIDER	LO MIN	LO MAX
900 MHZ	MHZ	3660	3840	4	915	960
→ PDC	MHZ	2950	3002	2	1475	1501
ATC-MSS L BAND	MHZ	3252	3320	2	1626	1660
UMTS1700/1800 AND KPCS	MHZ	3610	3760	2	1805	1880
US PCS	MHZ	3860	3990	2	1930	1995
IMT/AWS	MHZ	4220	4340	2	2110	2170
ATC-MSS S BAND	MHZ	4360	4400	2	2180	2200
→ IMT EXT/BRS-TDD	MHZ	5000	5380	2	2500	2690

WIDE VCO TUNING RANGE REQUIRED

(2950 TO 5380 MHZ)

(PRIOR ART)

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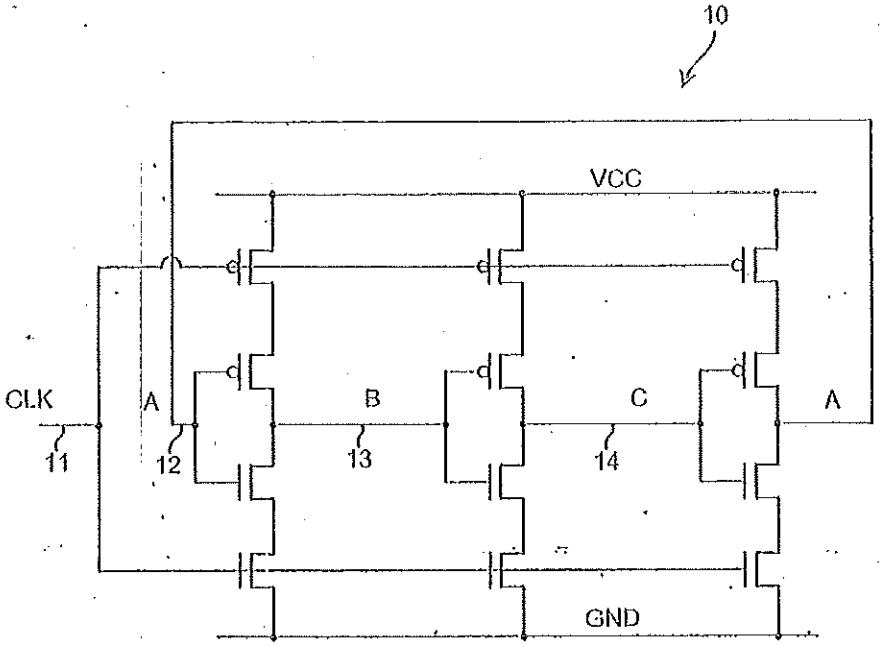
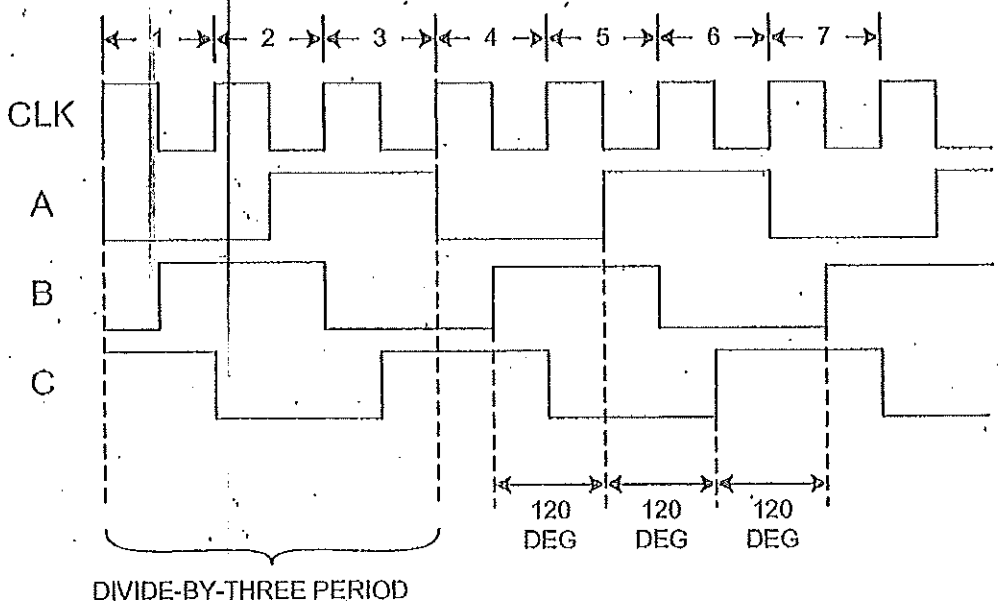
FIG. 2



DIVIDE-BY-3 CIRCUIT

(PRIOR ART)

FIG. 3



(PRIOR ART)

FIG. 4

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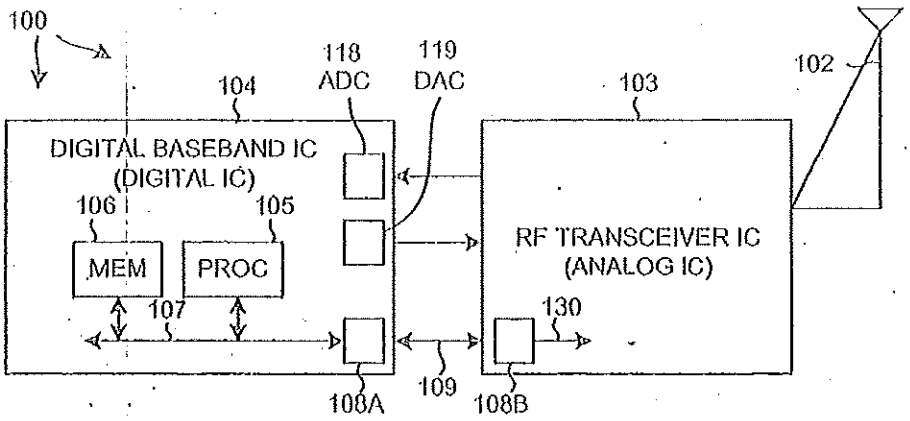

FIG. 5

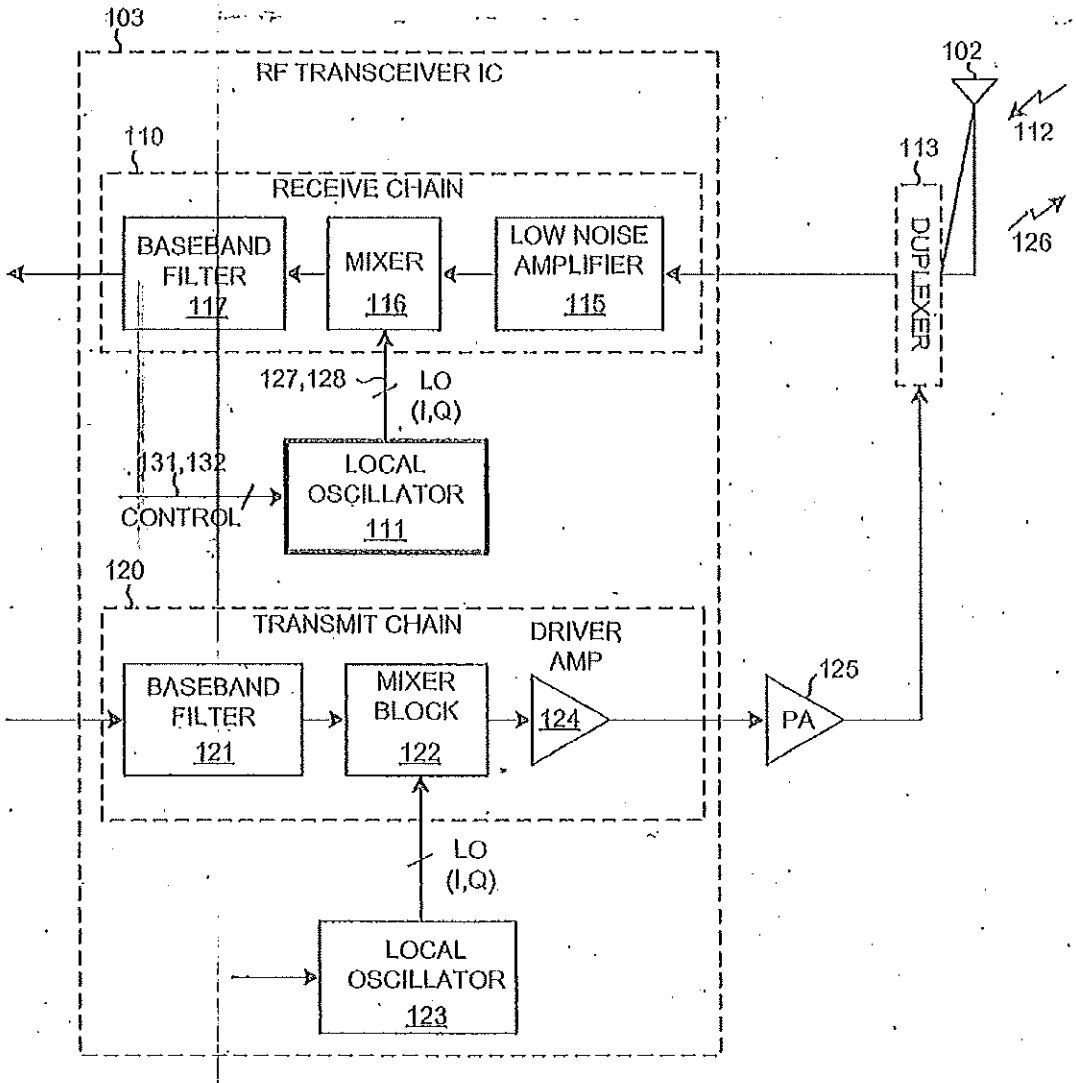

FIG. 6

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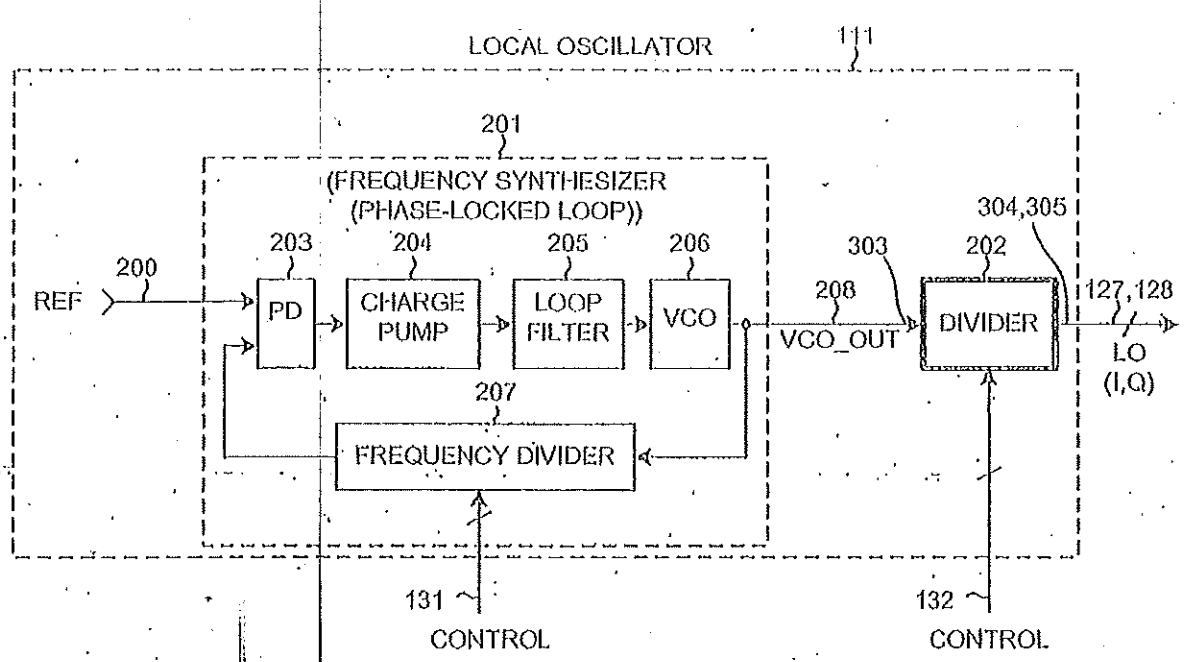

NARROWER VCO TUNING RANGE

FIG. 7

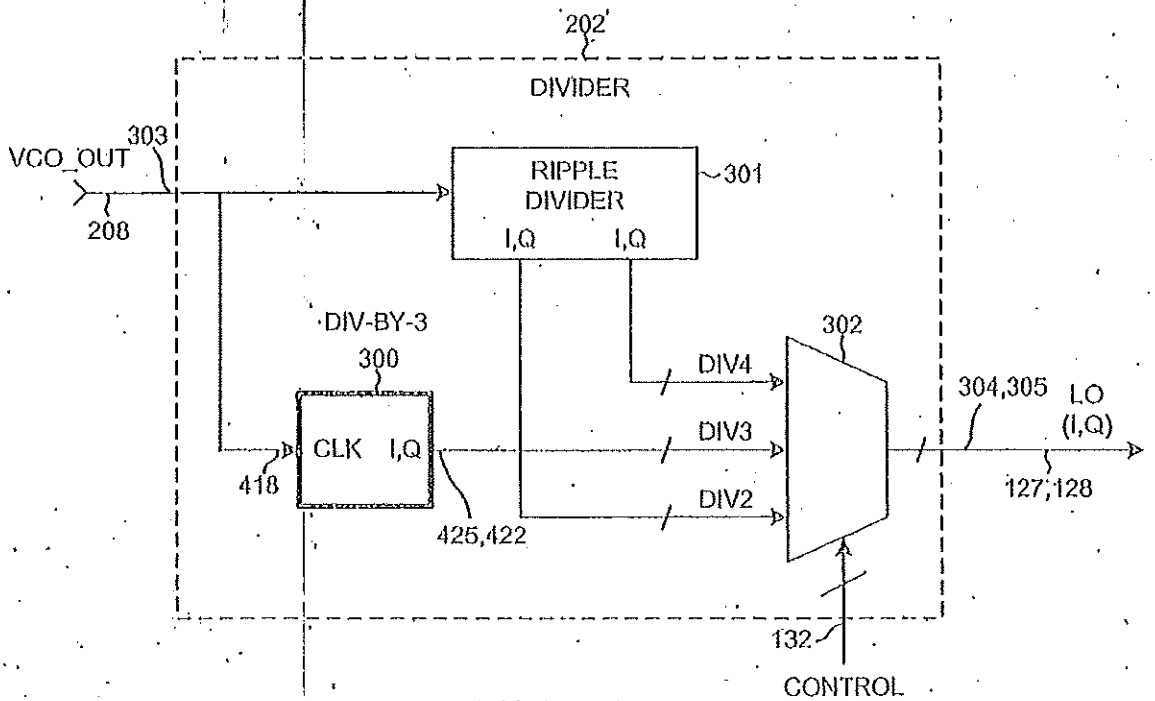

FIG. 8

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FREQUENCY BAND	UNIT	VCO OUTPUT MIN	VCO OUTPUT MAX	LO DIVIDER	LO MIN	LO MAX
900 MHZ	MHZ	3660	3840	4	915	960
PDC	MHZ	4425	4503	3	1475	1501
ATC-MSS L BAND	MHZ	4878	4980	3	1626	1660
→ UMTS1700/1800 AND KPCS	MHZ	3610	3760	2	1805	1880
US PCS	MHZ	3860	3990	2	1930	1995
IMT/AWS	MHZ	4220	4340	2	2110	2170
ATC-MSS S BAND	MHZ	4360	4400	2	2180	2200
→ IMT EXT/BRS-TDD	MHZ	5000	5380	2	2500	2690

WITH DIVIDE-BY-3 DIVIDER LESS VCO TUNING RANGE IS REQUIRED

(3610 TO 5380 MHZ)

FIG. 9

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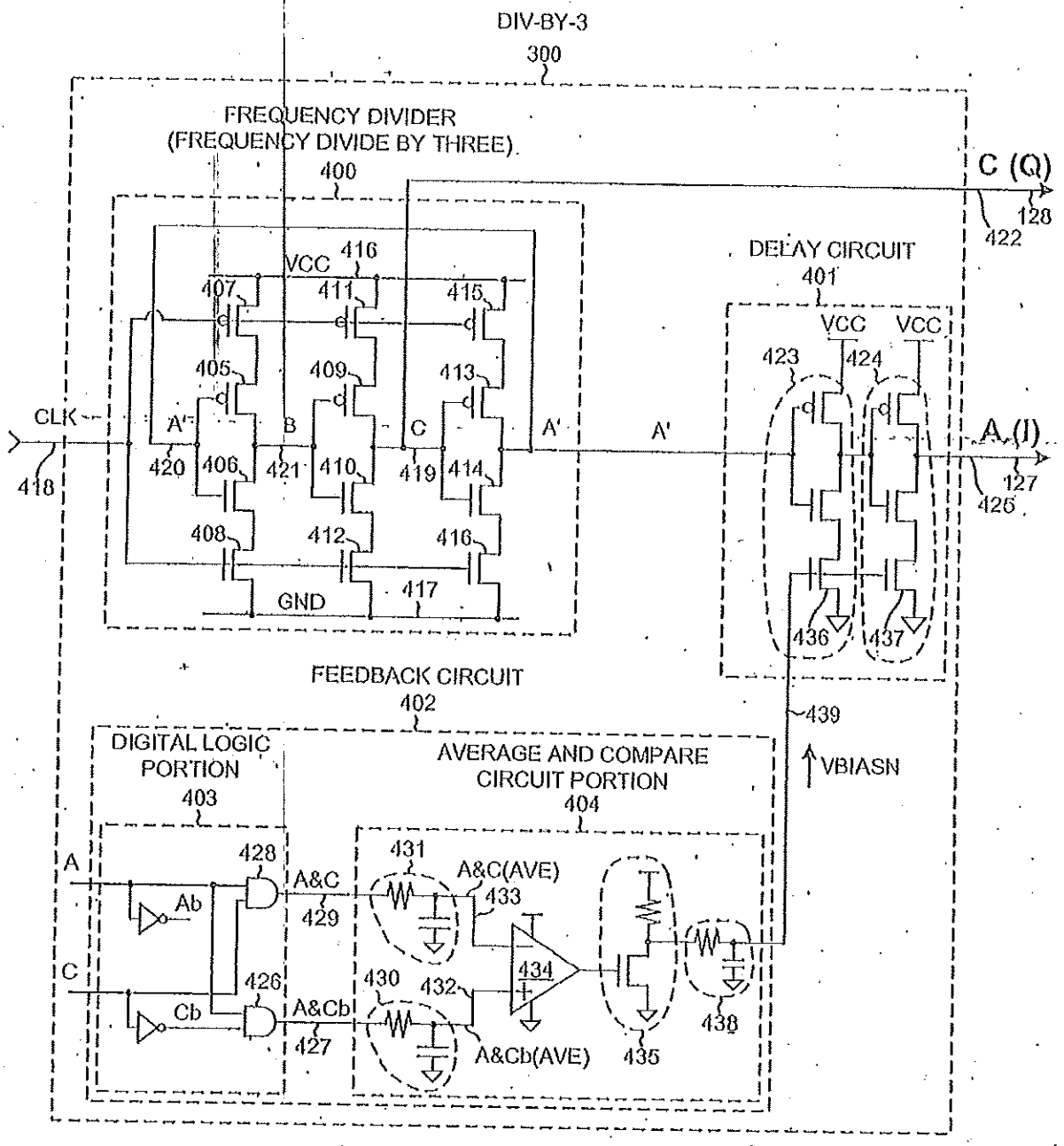

FEEDBACK CONTROLS DELAY CIRCUIT SUCH THAT A IS 90 DEGREES OUT OF PHASE WITH RESPECT TO C

A = I

C = Q

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FIG. 10

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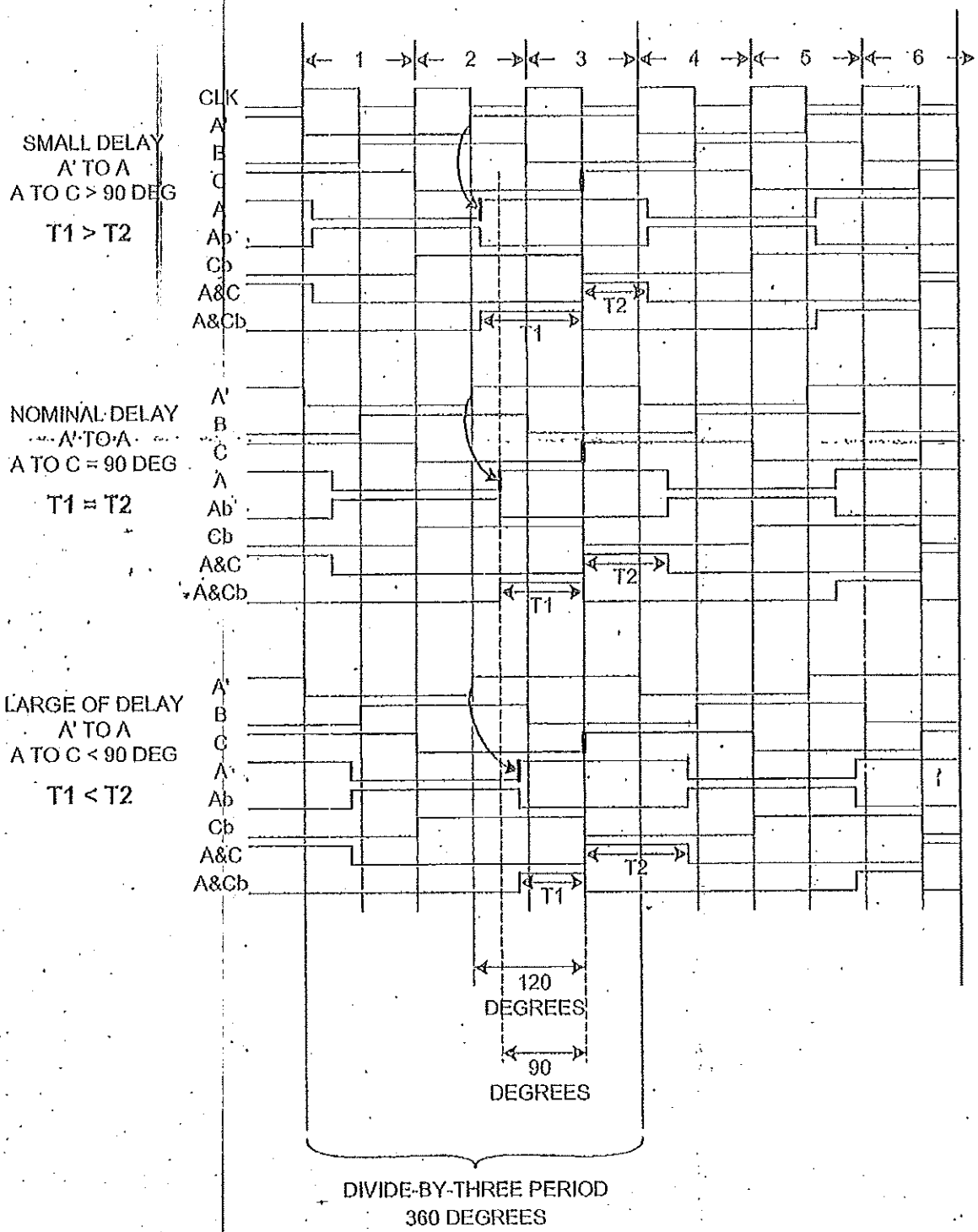

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FIG. 11

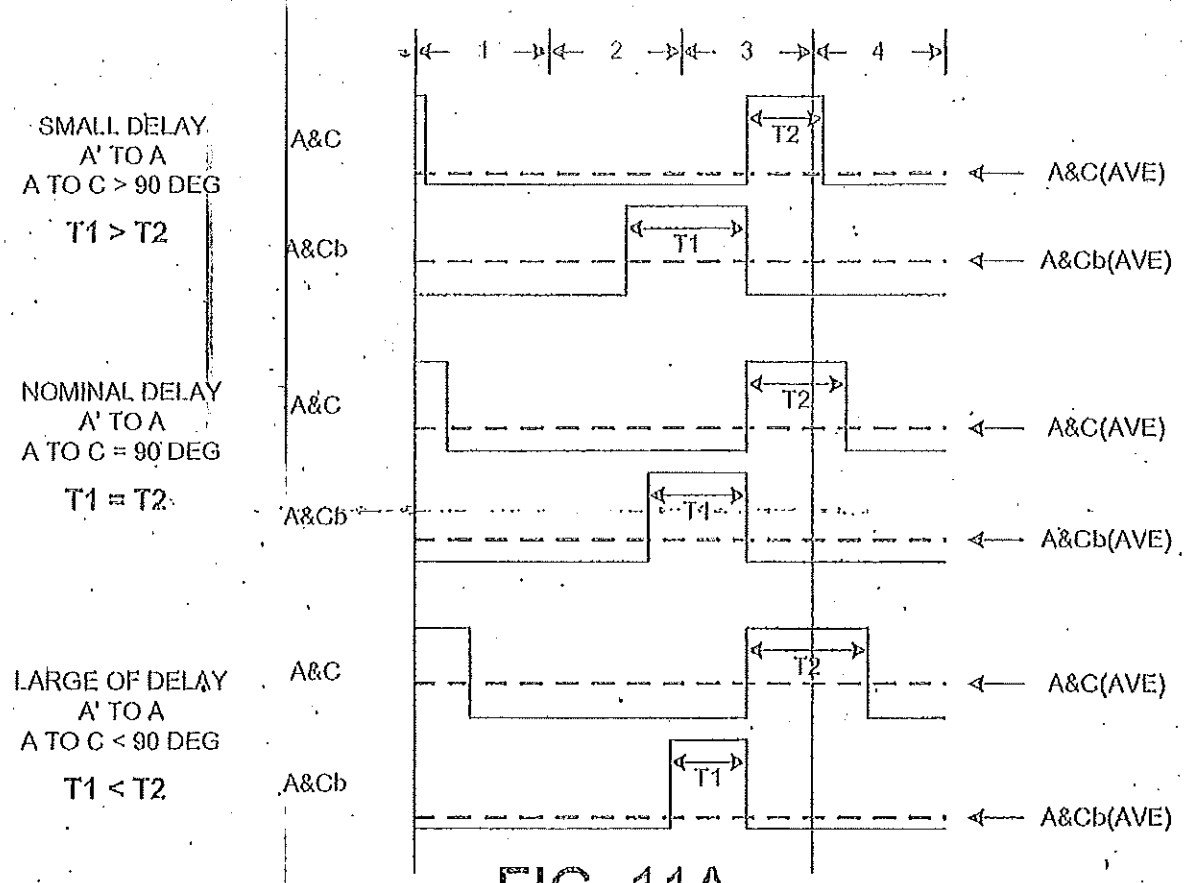

FIG. 11A

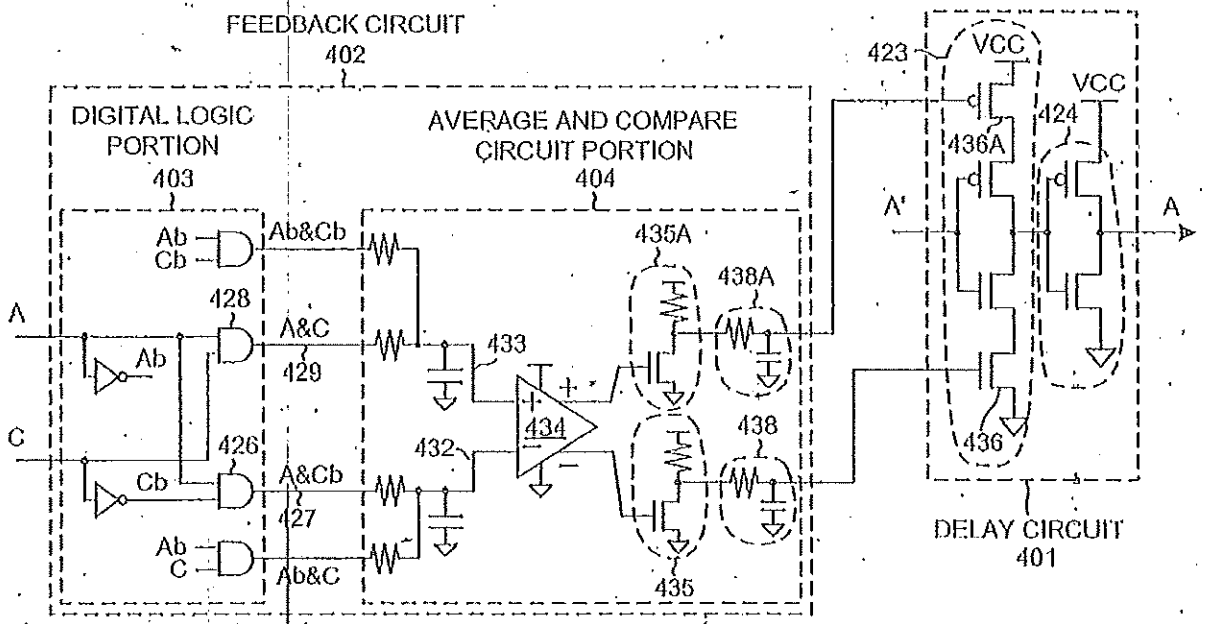

FIG. 12

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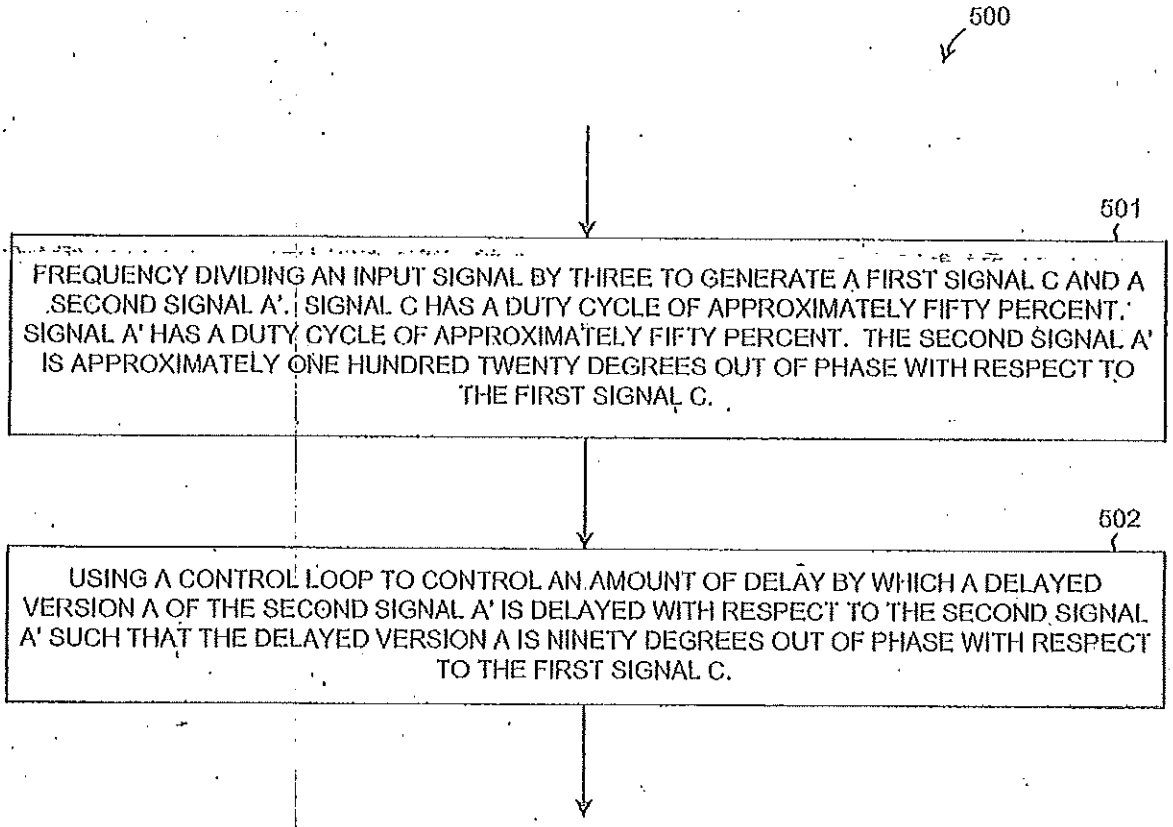

FIG. 13

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