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(54) **HIGH GAIN LOW POWER PHASE
DETECTOR AND LOOP FILTER FOR PHASE
LOCK LOOP (PLL)**

(52) **U.S. Cl.**
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(57) **ABSTRACT**

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An apparatus including: a phase lock loop (PLL), including: a phase detector and loop pass filter (PD/LF), including: a phase/frequency detector including a first input configured to receive a reference signal, and a second input configured to receive a feedback signal, and an output configured to produce an output signal based on the reference and feedback signals; a first capacitor; and a charge pump, including: a charging path configured to generate a charging current to charge the first capacitor based on the output signal; and a discharging path including a first resistor configured to discharge the first capacitor.

