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(72) Inventors:

• **IKEDA, Takeshi**
Ohta-ku, Tokyo 143-0023 (JP)

• **MIYAGI, Hiroshi**
Yokohama-shi,
Kanagawa 223-0058 (JP)

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(71) Applicants:

• **Niigata Seimitsu Co., Ltd.**
Jyoetsu-shi, Niigata 943-0834 (JP)
• **RICOH Co., Ltd.**
Tokyo
143-8555 (JP)

(74) Representative: **Vossius & Partner**

Siebertstrasse 4
81675 München (DE)

(54) **FREQUENCY SYNTHESIZER AND CHARGE PUMP CIRCUIT USED THEREIN**

(57) There are included a signal generating circuit (8) that generates, based on a comparison signal outputted from a phase comparator (3) and a clock signal outputted from a crystal oscillation circuit (1) and having a shorter pulse width than the comparison signal, a control signal obtained from a logical product of the two signals; and a charge pump circuit that performs, based on the control signal from the signal generating circuit (8), a

charging or discharging operation of a capacitor. The charging or discharging operation of the capacitor is gradually performed little by little based on the control signal having the shorter pulse width than the conventional comparison signal, whereby even if the capacitance value of the capacitor is reduced, the substantial time constant can be enlarged, resulting in a stable operation of a frequency synthesizer.

F i g . 3

