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(54) **METASTABILITY-FREE CLOCKLESS SINGLE FLUX QUANTUM LOGIC CIRCUITRY**

(71) Applicant: **International Business Machines Corporation**, Armonk, NY (US)

(72) Inventors: **Sergey Rylov**, White Plains, NY (US); **John Francis Bulzacchelli**, Somers, NY (US); **Matthew Beck**, Danbury, CT (US)

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(57) **ABSTRACT**

A device includes a logic circuit comprising a clockless single flux quantum logic gate which comprises a plurality of input ports, an output port, an output Josephson junction, and a plurality of dynamic storage loop circuits and isolation buffer circuits. The output Josephson junction is coupled to an output of each dynamic storage loop circuit and configured to drive the output port. Each isolation buffer circuit is coupled to a respective input port, and a respective dynamic storage loop circuit and configured to absorb a circulating current of an antifluxon which is injected into the respective dynamic storage loop circuit to prevent the antifluxon from being output from the respective input port, and to inject a fluxon into the respective dynamic storage loop circuit in response to a single flux quantum pulse applied to the respective input port, and annihilate an antifluxon present in the respective dynamic storage loop circuit.