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(71) Applicant: **CODEX DNA, INC.** [US/US]; 9535 Waples Street, Suite 100, San Diego, California 92121 (US).

(72) Inventors: **GILL, John E.**; c/o CODEX DNA, INC., 9535 Waples Street, Suite 100, San Diego, California

92121 (US). **FU, Lixia**; c/o CODEX DNA, INC., 9535 Waples Street, Suite 100, San Diego, California 92121 (US). **GIBSON, Daniel G.**; c/o CODEX DNA, INC., 9535 Waples Street, Suite 100, San Diego, California 92121 (US).

(74) Agent: **HAILE, Lisa A.**; DLA Piper LLP US, 4365 Executive Drive, Suite 1100, San Diego, California 92121-2133 (US).

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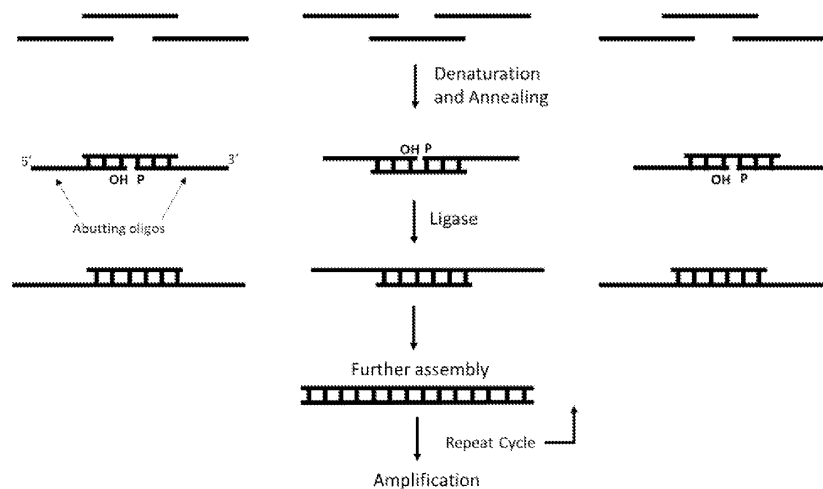


FIGURE 1

(57) Abstract: The invention provides methods of assembling a DNA molecule having a desired sequence. The methods involve contacting a DNA ligase with a plurality of short oligonucleotides to be assembled and performing the ligase chain reaction to thereby generate a set of polynucleotides. Oligonucleotides in the plurality overlap with and are complementary to a sequence of at least one other oligonucleotide in the plurality, and at least 50% of the oligonucleotides in the plurality are 6-30 nucleotides in length. The set of polynucleotides produced are contacted with a DNA polymerase and dNTPs in a mixture to join the set of polynucleotides and thereby create a DNA molecule having a desired sequence by polymerase chain assembly. The method allows for production of oligonucleotides of any length having very high sequence fidelity to a desired sequence.

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