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(54) **ENGINEERED CASCADE COMPONENTS AND CASCADE COMPLEXES**

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(58) **Field of Classification Search**
None
See application file for complete search history.

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(57) **ABSTRACT**

The present disclosure provides engineered Class 1 Type I CRISPR-Cas (Cascade) systems that comprise multi-protein effector complexes, nucleoprotein complexes comprising Type I CRISPR-Cas subunit proteins and nucleic acid guides, polynucleotides encoding Type I CRISPR-Cas subunit proteins, and guide polynucleotides. Also, disclosed are methods for making and using the engineered Class 1 Type I CRISPR-Cas systems of the present invention.

20 Claims, 48 Drawing Sheets

Specification includes a Sequence Listing.