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(54) **Title:** METHODS AND SYSTEMS FOR IDENTIFYING GENE VARIANTS

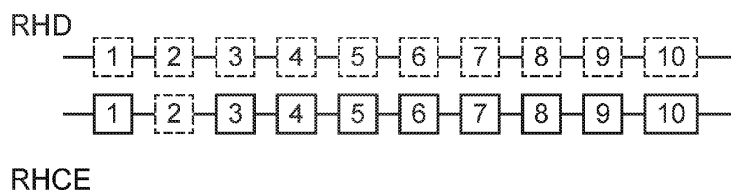


FIG. 1A

(57) **Abstract:** Disclosed herein are systems, devices, and methods for identifying recombinant variants (such as gene conversion variants) of genes such as *RHD* gene and *RHCE* gene, the copy numbers of recombinant variants, and gene variant status (for example, heterozygous or homozygous). In some embodiments, the disclosed systems, devices, and methods include steps of receiving sequence reads which align to a *RHD* gene or a *RHCE* gene, estimating a combined copy number of a *RHD* gene and a *RHCE* gene, estimating copy numbers of a *RHD*-specific base and a *RHCE*-specific base at each of a plurality of pre-determined differentiating sites of the *RHD* gene and the *RHCE* gene, and calculating a probability of a *RHCE***CE*-D(2)-*CE* gene conversion in the nucleic acid sample.

