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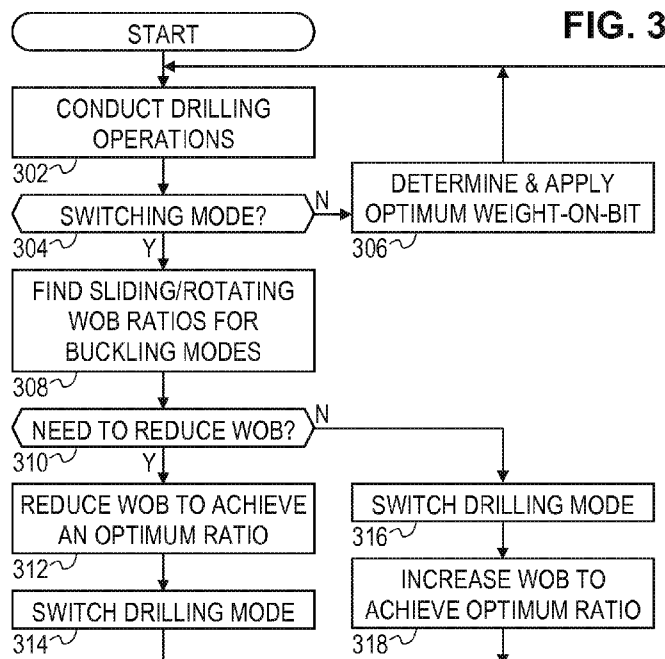
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(54) Title: RATIO-BASED MODE SWITCHING FOR OPTIMIZING WEIGHT-ON-BIT



(57) Abstract: Drilling system and methods may employ a weight-on-bit optimization for an existing drilling mode and, upon transitioning to a different drilling mode, determine an initial weight-on-bit within a range derived from: a sinusoidal buckling ratio, a helical buckling ratio, and the weight-on-bit value for the prior drilling mode. The sinusoidal buckling ratio is the ratio of a minimum weight-on-bit to induce sinusoidal buckling in a sliding mode to a minimum weight-on-bit to induce sinusoidal buckling in a rotating mode, and the helical buckling ratio is the ratio of a minimum weight-on-bit to induce helical buckling in the sliding mode to a minimum weight-on-bit to induce helical buckling in the rotating mode. The ratios are a function of the length of the drill string and hence vary with the position of the drill bit along the borehole.