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(54) Title: TOTAL INTERNAL REFLECTION DISPLACEMENT SCALE

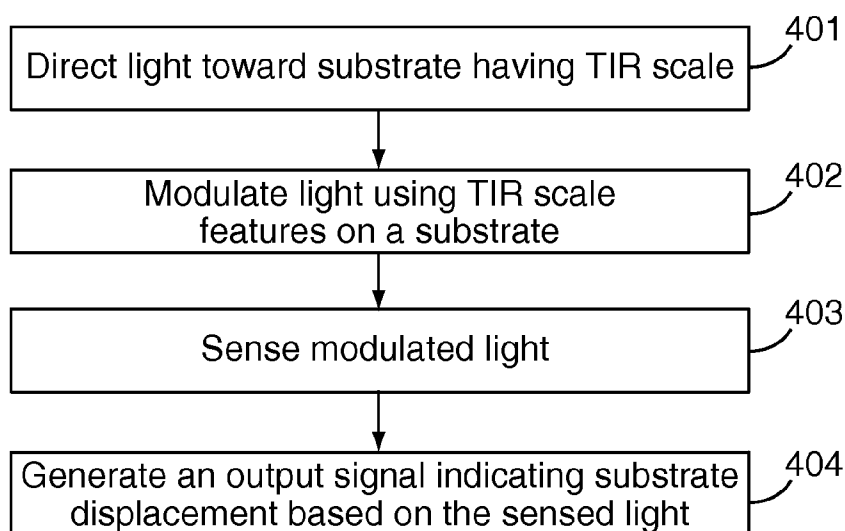


Figure 4A

(57) Abstract: Methods and systems for determining the displacement of a substrate using a scale comprising TIR scale features are described. A scale that includes a number of total internal reflection (TIR) prisms as scale elements is disposed on the substrate. Light directed towards the scale is modulated by the TIR prisms. A signal indicating a displacement of the substrate is generated based on the modulated light. The signal 10 may be used to determine the web position, to control web movement, and/or to measure various web parameters.

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