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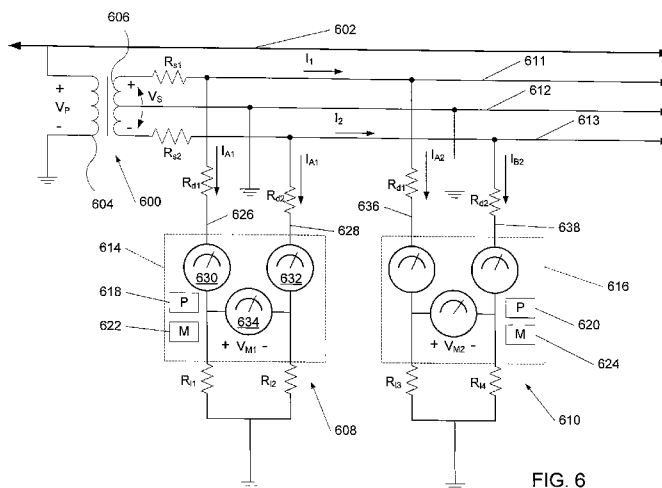
(54) **Title:** DISTRIBUTION SYSTEM ANALYSIS USING METER DATA

FIG. 6

(57) **Abstract:** A monitoring system includes a first sensor (112, 200) positioned at a first location along a phase conductor line (104, 602) and a second sensor (112, 200) position at a second location along the phase conductor line. The first sensor is comprising means for generating a first set of synchrophasor data. The second sensor is comprising means for generating a second set of synchrophasor data. The monitoring system includes a processor comprising means for receiving the first and second sets of synchrophasor data. The processor is further comprising means for determining a primary side voltage (V_p) of at least one distribution transformer (110, 600) electrically connected to the phase conductor line based on a secondary side voltage (V_s) of the at least one distribution transformer. The primary side voltage is determined based on meter data from a plurality of metered loads (608, 610) electrically coupled to a secondary side of the at least one distribution transformer. The processor is further comprising means for determining at least one phase conductor line condition based on the first and second sets of synchrophasor data and the primary side voltage.