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(54) **SOLENOID-BASED VOLTAGE IMBALANCE PROTECTION**

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(57) **ABSTRACT**

Apparatuses and methods herein provide a voltage imbalance detector that employs two solenoid coils, each coil coaxially arranged around a slidable metal plunger on opposite sides thereof. One coil is electrically connected to one line of a 120 V/240 V power supply and to neutral, while the other coil is electrically connected to the other line of the 120 V/240 V power supply and to neutral. When the coils are energized by current from the power supply, each coil induces an equal but opposite electromagnetic force acting on the metal plunger if the power supply voltages are balanced, thereby maintaining the plunger stationary relative to the coils. But if the voltages are not balanced, then one coil will induce a greater (or lesser) electromagnetic force than the other coil, resulting in the plunger moving toward (or away from) the first coil, thereby sensing the voltage imbalance.