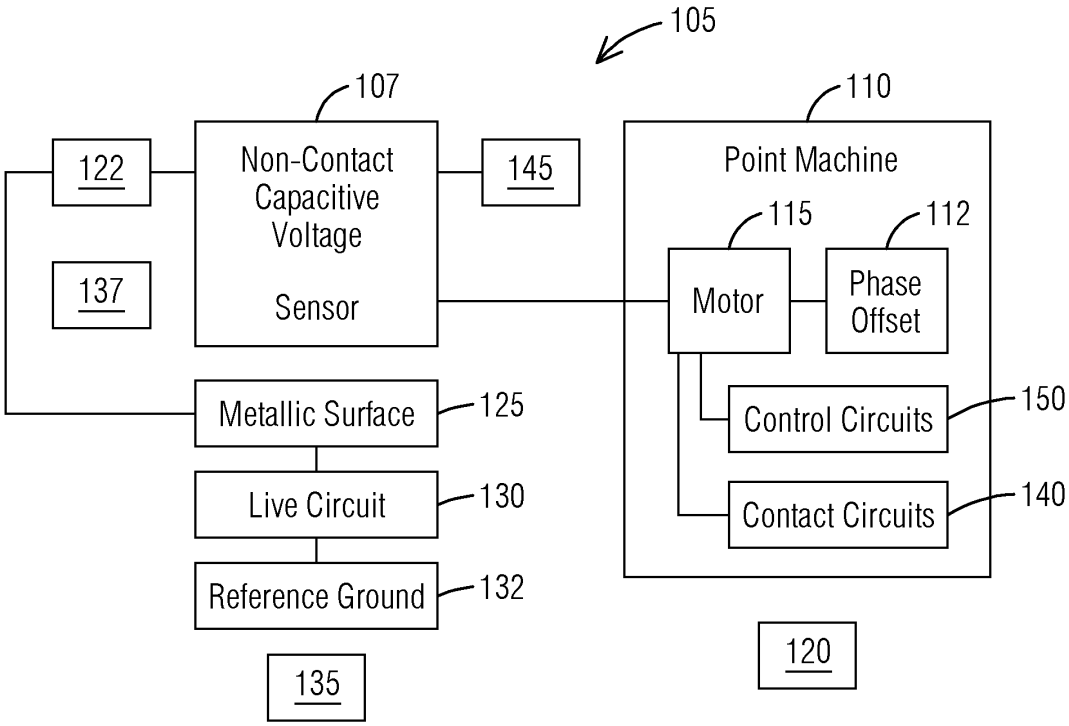

105
107
110
122
Non-Contact
Capacitive
Voltage
Sensor
145
Point Machine
115
112
137
Motor
Phase
Offset
Metallic Surface
125
Control Circuits
150
Live Circuit
130
Contact Circuits
140
Reference Ground
132
120
135

FIG. 1

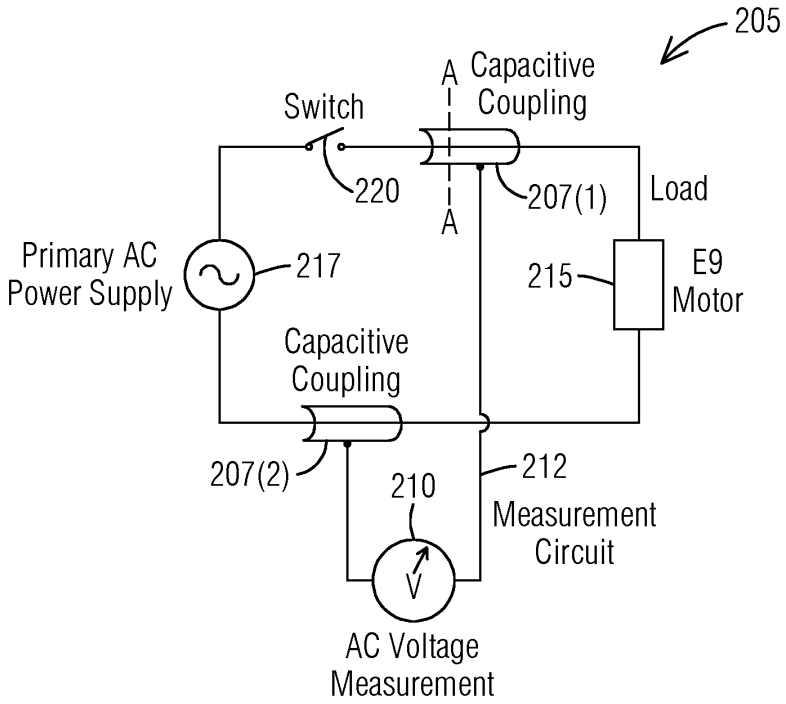

205
A
Capacitive
Coupling
Switch
220
207(1)
Load
A
Primary AC
Power Supply
217
215
E9
Motor
Capacitive
Coupling
207(2)
210
212
Measurement
Circuit
V
AC Voltage
Measurement

FIG. 2

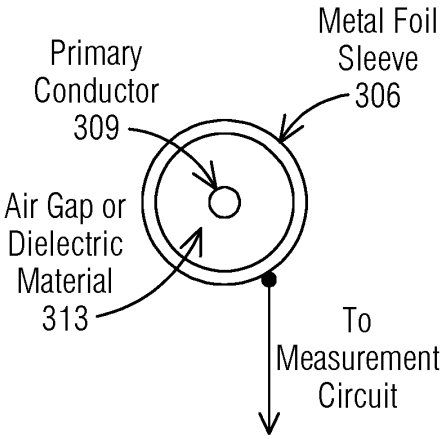


FIG. 3
Section A-A

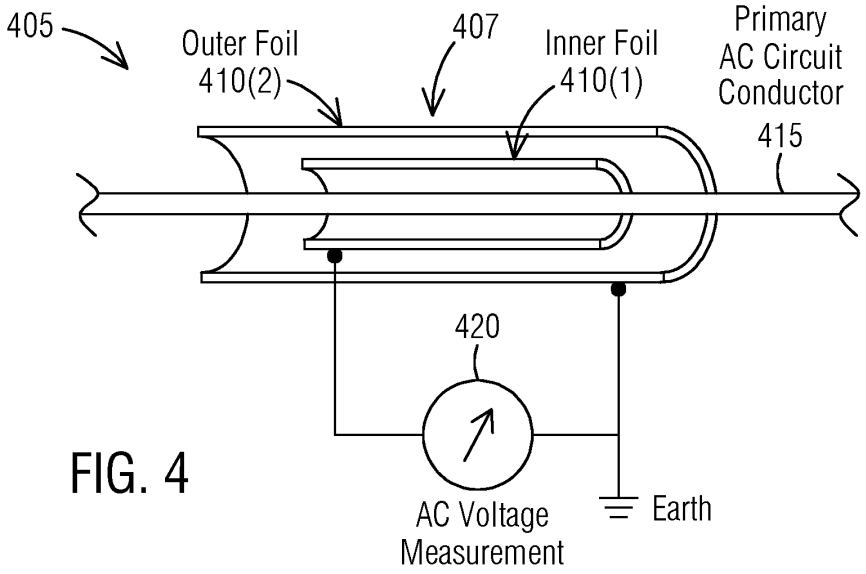


FIG. 4

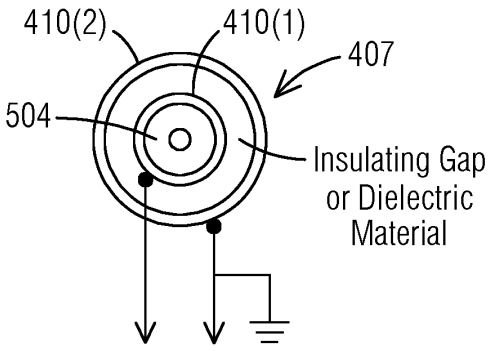


FIG. 5

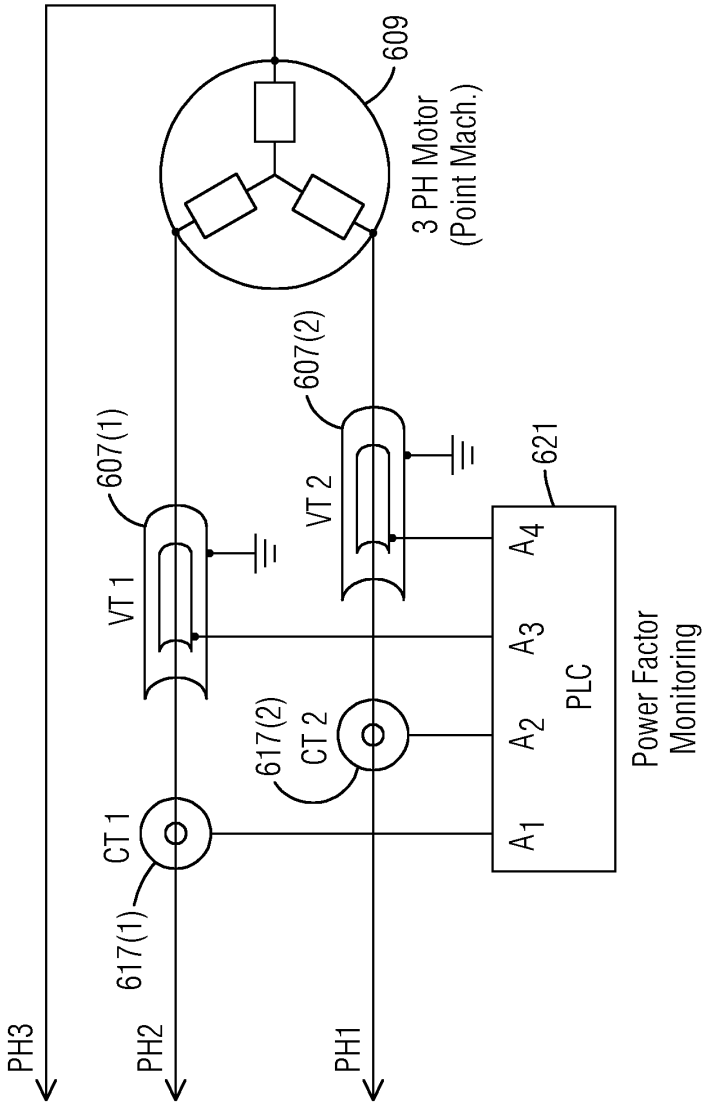

609
3 PH Motor
(Point Mach.)
607(2)
607(1)
VT 2
VT 1
621
A4
A3
A2
A1
PLC
Power Factor
Monitoring
617(2)
CT 2
CT 1
617(1)
PH3
PH2
PH1

FIG. 6

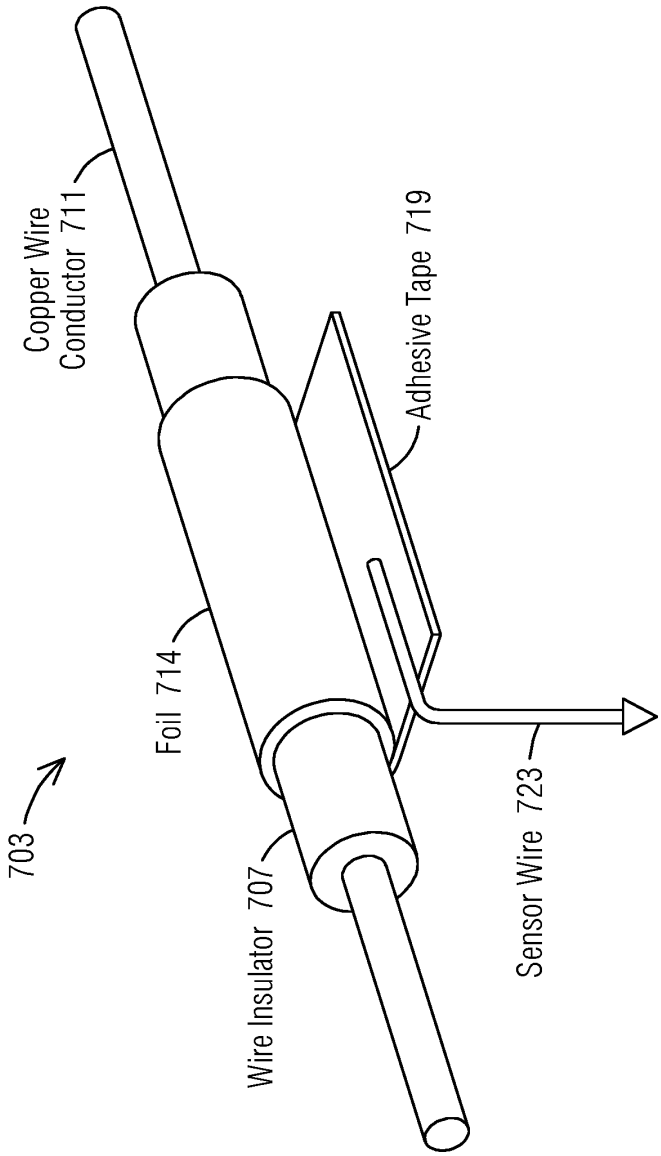

Copper Wire Conductor 711
Adhesive Tape 719
Foil 714
703
Wire Insulator 707
Sensor Wire 723

FIG. 7

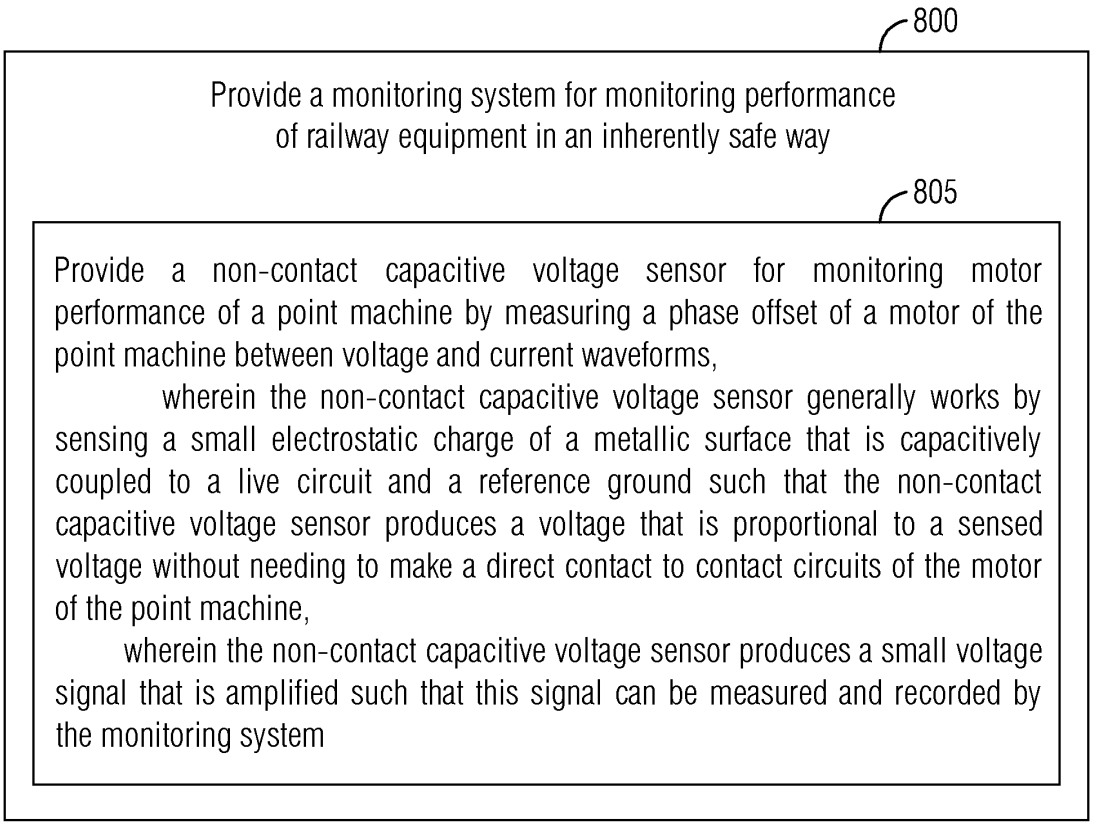

800
Provide a monitoring system for monitoring performance of railway equipment in an inherently safe way
805
Provide a non-contact capacitive voltage sensor for monitoring motor performance of a point machine by measuring a phase offset of a motor of the point machine between voltage and current waveforms,
wherein the non-contact capacitive voltage sensor generally works by sensing a small electrostatic charge of a metallic surface that is capacitively coupled to a live circuit and a reference ground such that the non-contact capacitive voltage sensor produces a voltage that is proportional to a sensed voltage without needing to make a direct contact to contact circuits of the motor of the point machine,
wherein the non-contact capacitive voltage sensor produces a small voltage signal that is amplified such that this signal can be measured and recorded by the monitoring system

FIG. 8