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SYSTEMS AND METHODS FOR MONITORING IMPLANTABLE DEVICES FOR DETECTION OF IMPLANT FAILURE UTILIZING WIRELESS IN VIVO MICRO SENSORS

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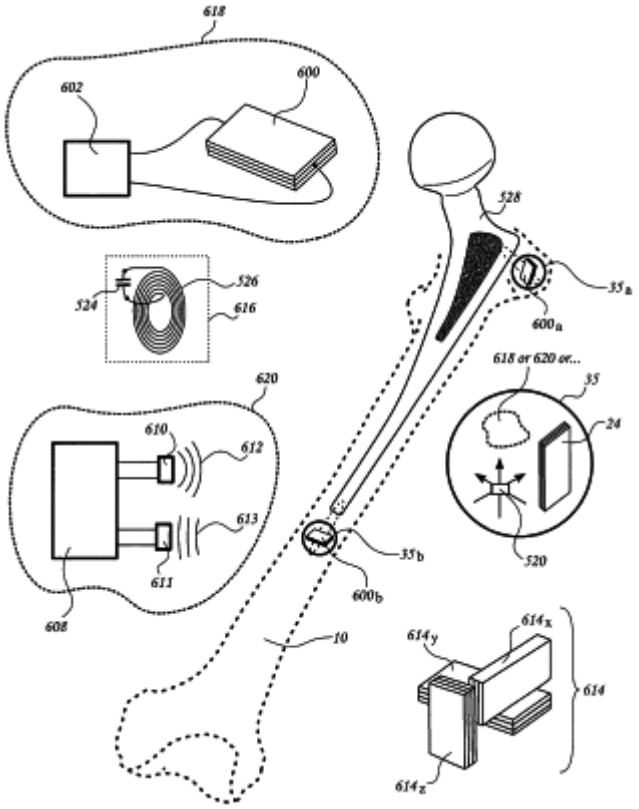
19 Claims



1. A method of monitoring a position of an implantable device with an implantable position detecting system, the implantable position detecting system configured to detect a position of an implantable device with respect to a body structure, the method comprising:

(a) providing at least one proximity measuring transducer configured to be implanted on the body structure a distance from the implantable device;

(b) transmitting energy from an external electromagnetic field generated by an external sensing interface to the at least one proximity measuring transducer;

(c) emitting, by the at least one proximity measuring transducer, an emitted signal responsive to electromagnetic energy,

(d) receiving distance information at the at least one proximity measuring transducer, the distance information comprising a sensing signal that is responsive to the distance from the at least one proximity measuring transducer implanted on the body structure to the implantable device; and

(e) determining the implantable device is properly positioned based on the electromagnetic field indicating the distance information between the at least one proximity measuring transducer on the body structure and the implantable device, wherein the at least one proximity measuring transducer comprises a magnetoelectric transducer having a resonant frequency, and the external sensing interface is configured to transmit energy to the magnetoelectric transducer to drive the magnetoelectric transducer at the resonant frequency in an activation period, and the magnetoelectric transducer is configured to emit the emitted signal as an electromagnetic field and then to sense the electromagnetic field post activation in a sensing period, wherein the external sensing interface or the at least one proximity measuring transducer is further configured to determine a distance from the proximity measuring transducer to the implantable device based on variations in the sensed electromagnetic field due to electromagnetic field interactions with the implantable device.