schematically represented at **121** may be mounted on member **119** to detect relative rotation of disk **117**.

[**0042**] In the embodiment of **FIG. 3**, the seal **132** required to prevent migration of material **135** from the first chamber **113** to the second chamber **111** is shown seated in bearing support plate **116**. Such a suitable seal may comprise the seal disclosed in the description of first and second embodiment brakes. The suitable conventional seal may be supported in the bearing support plate **116** or within bearings **133**. An annular shroud **120** is located between plates **114** and **116**. Shroud **120**, in combination with plates **114** and **116** encloses the sensing means **115** within chamber **111**.

[**0043**] Returning again to the rotor **107** of the third embodiment brake **101**, rotor **107** is not substantially disk-shaped like disks **21** and **71** previously described. As shown in **FIG. 3**, rotor enlarged peripheral portion **108** is located proximate electromagnetic coil **125** of field generator generally identified at **123**. As shown by the stippling representing field responsive material **135**, an annular gap **122** separates the portion **108** and field generator and the gap **122** is substantially filled with a volume of the field controllable material **135**. The magnetic field produced by field generator **123** extends through material **135** and the portion of the rotor identified at **108**. The magnetic field is illustrated by magnetic field **129** represented as dashed in **FIG. 3**.

[**0044**] The magnetic field generator **123** generally comprises an electromagnetic coil **125** and pole pieces **127** which in combination generate an electromagnetic flux represented by dashed field lines **129** which extend through the material **135** in a direction that is substantially perpendicular to shaft **105** and to the periphery of the rotor **107**. As shown in **FIG. 3** the field generator is located radially outwardly from the rotor **107**.

[**0045**] The third embodiment brake **101** comprises a return-to-center acting device, such as a torsion or torsional center-return spring **131** which is mounted within first housing chamber **113**. Other center return devices may comprise bungee cords or other type elastic components. Generally the suitable center return device is any device that stores energy as the rotor and/or shaft are/is displaced from a center or start position or orientation and then at a particular displacement releases the stored energy to return the rotor and shaft to the start orientation. The particular displacement that results in a release of the stored energy may comprise for example, the operator releasing the shaft or rotor or the shaft or rotor reaching a maximum angular displacement. The torsion return spring **131** typically assumes a torque free condition at the center position of a device with which brake **101** may be associated, such as a steering wheel at the center position of the device. The return to center member is conventionally fixed at its ends to both the rotor **107**, and end plate **109** so as to exert a progressively increasing return torque to center position upon the turning of the device with which the brake is associated, for example, a wheel. The return-to-center device may comprise a number of devices and attachment configurations.

[**0046**] **FIG. 4** illustrates a fourth embodiment brake **201** similar to the first embodiment brake **11**. In the fourth embodiment brake, the brake housing **203** includes a first chamber **215** wherein rotor **219** is located for rotation therein and the rotor is fixed to one end of shaft **209**. The chamber **215** includes a volume of a field responsive material **217** therein. Conventional seal **213** seals the chamber **215** by preventing the field controllable material from migrating out of the chamber **215**. Plate **207** closes the chamber **215** after the brake **201** is fully assembled. Bearings **211** support shaft **209** away from the shaft end supporting the rotor **219**. The housing **203** also defines a second chamber **205** for housing the monitoring and control electronics and devices. The control means is represented schematically and referenced at **229** in **FIG. 4**. A torsion return spring **231** may be provided within the second chamber **205**, fixedly secured at the spring ends to an internal wall of the second chamber **205**, and to a sleeve **232** upon which portions of the control means **229** may be also mounted for rotation therewith. The sleeve is made integral with the shaft **209** for rotation therewith.

[**0047**] In the embodiment of the invention illustrated **FIG. 4**, the magnetic field generator **221** comprises an annular pole piece **225** having a U-shaped cross section and an electromagnetic coil **223** located within the open portion of the pole piece and radially outwardly from and adjacent to the outer periphery of the disk-shaped rotor **219**. The pole piece **225** could be comprised of separate pole pieces for ease of assembly and manufacture. As shown in **FIG. 4**, the legs or side portions of the poles **225*a*** and **225*b*** extend toward the central longitudinal axis of rotation of shaft **209** and adjacent the rotor working surfaces **219*a*** and **219*b***. Gaps separate the pole piece legs **225*a***, **225*b*** and electromagnet **223** from the rotor **219** and field controllable material **217** substantially fills the gaps. The magnetic flux line **227** represented as dashed in **FIG. 4**, causes the rheology of material **217** to change thereby producing a torque dissipating force that acts on the working surfaces **219*a***, **219*b*** of the rotor **219** to impede rotation thereof.

[**0048**] A fifth embodiment brake **301** is disclosed in **FIG. 5** and the fifth embodiment brake is similar to the embodiment of **FIG. 3**.

[**0049**] The fifth embodiment brake comprises a housing **303** having a chamber **305** for housing control means such as integrated control electronics or control devices and such is identified schematically at **311**. Shaft **309** extends through second chamber **305** and into a first chamber **307** and the rotor **315** is supported on the shaft end in the first chamber **307**. The chamber **307** is closed and sealed at the axial ends by plates **351** and **371**. In the fifth embodiment of the invention the rotor **315**, is a "drum-style" rotor similar to the rotor illustrated in the third embodiment of **FIG. 3**. The rotor comprises a wide annular outer periphery joined by a relatively narrow web. The shaft **309** is supported for rotation away from the rotor by two bearings **313**, which for purposes of the present invention are conventional "dry shaft" bearings which are a suitable alternative to the roller bearings illustrated in the previous embodiments. In this fifth embodiment of the invention, the shaft **309** is suitably supported to sustain axial loading and to prevent axial movement of the loaded shaft. A conventional thrust bearing thrust bearing **317** of conventional construction is provided along shaft **309** between rotor **315** and bearing **313** to support the axial shaft loads.

[**0050**] The magnetic field generator **350** is located radially outwardly from the outer periphery of the rotor **315**. The field generator comprises annular pole pieces **327** that enclose an electromagnetic coil **325** which in combination