

ABSTRACT

METHODS AND APPARATUS FOR ATTENUATING DRILLSTRING VIBRATIONS

Apparatus and methods are described for highly attenuating vibrations of a drillstring assembly while drilling. In one embodiment, vibrations are attenuated by introducing one or more vibration attenuation modules at appropriate assembly locations. For example, vibration attenuation modules may be inserted at locations where vibration energy is expected to be maximal. In one embodiment the vibration attenuation modules include cavities loosely packed with particles of solid material such as sand or metallic powder. In one embodiment, the cavity walls are rough and/or include geometric features that enhance vibration energy transfer to the loosely packed particles in the cavity(ies). The vibration energy is dissipated via friction and inelastic particle-particle and particle-wall collisions that occur as a result of drillstring motion.

Figure 1.