SELF-CENTERING POLYCRYSTALLINE DIAMOND DRILL BIT

Abstract

A self-centering drill bit includes a head portion having a plurality of polycrystalline diamond compact cutting elements arranged in blades that extend outwardly away from a surface of the bit. A cavity is centrally located on the head portion and is formed between adjacent blade ends. The cavity includes wall portions defined by the blade end portions. The cavity serves to house a core portion that is formed during drilling operation of the bit. The head portion is balanced to form and transmit a force from a designated wall portion to the core portion within the cavity. At least the designated wall portion includes a low friction abrasion resistant surface. The cavity includes a rigid element extending outwardly away from the head portion to reduce the core within the cavity upon contact. The force transmitted to the core portion causes a countering force to be imposed by the core to the wall portion that keeps the bit aligned with its rotational axis and, thus prevents whirling.

Figure 1

This Sheet Has Been Replaced

