FLUID COOLED COUPLING ASSEMBLY

BACKGROUND OF THE DISCLOSURE

[0001] The present disclosure relates to a new and improved coupling assembly which may be a clutch and/or brake.

[0002] A coupling assembly which is utilized as a brake is disclosed in U.S. Patent No. 4,262,789. This coupling assembly utilizes a flow of cooling fluid (water) to cool copper wear plates which engage a rotor to retard relative rotation between the rotor and a housing. Other coupling assemblies are disclosed in U.S. Patent Nos. 3,530,965 and 5,577,581

[0003] During use of these coupling assemblies, heat is generated upon operation of the coupling assembly from a disengaged condition to an engaged condition. It has been suggested that components of the coupling assembly may be exposed to a flow of cooling fluid (water) to transfer heat from components of the coupling assembly to the cooling fluid. Even though the components of these coupling assemblies are exposed to a flow of cooling fluid, there tends to be a build up of heat in the components of the coupling assemblies. Under very severe operating conditions, the build up of heat may tend to become excessive at hot spots on components of the coupling assembly.

BRIEF SUMMARY OF THE DISCLOSURE

[0003a] According to an aspect of the present invention, there is provided a coupling assembly for use in transmitting force, said coupling assembly comprising a rotatable disc, and a housing which at least partially encloses said rotatable disc, said housing having a plate portion with a force transmitting surface which is engagable by a circular side surface area on said rotatable disc to retard relative rotation between said housing and said disc, a cooling fluid channel which is at least partially defined by a side of said plate portion opposite from said force transmitting surface, an inlet through which fluid is conducted into said cooling fluid channel, an outlet through which cooling fluid is conducted from said cooling fluid channel, an inner side surface of said force transmitting surface of said plate portion including a plurality of indentations for creating turbulence into a path of flow of cooling fluid through said cooling fluid channel to improve heat transfer between said plate portion of said housing and cooling fluid flowing through said cooling fluid channel, wherein said indentations have a hemispherical shape.

[0004] The present disclosure provides a new and improved fluid cooled coupling assembly having an improved flow of cooling fluid to promote the transfer of heat from components of the coupling assembly. Convective heat transfer from components of the coupling assembly to the flow of cooling fluid may be promoted by creating turbulent and secondary flow of the cooling fluid by providing indentations on a surface of a copper wear plate to improve heat transfer coefficient.

[0005] The coupling assembly may include the rotatable disc which is at least partially enclosed by a housing. The housing may have a plate portion with a force transmitting surface which is engagable with a side surface area on the rotatable disc to retard relative rotation between the housing and the disc. The housing may