CLAIMS

What is claimed is:

1. A liquid-cooled high torque and high-power apparatus for transferring torque magnetically comprising:

a primary torque driving rotary member and a secondary driven rotary member; the primary rotary member axially overlapping said secondary rotary member; the secondary rotary member being surrounded by said primary member; the primary rotary member having permanent magnets mounted on it; the secondary rotary member having electro-conductive elements and magnetically permeable materials, and not having permanent magnets; said electro-conductive elements being cooled by liquid coolant running in axial channels immediately adjacent to, and parallel to, the electro-conductive bars of the electro-conductive rotor, said cooling liquid being delivered to the apparatus by a closed loop liquid cooling system with an external storage tank, external pump, and external heat exchanger in order to reject the heat generated in the electro-conductive bars, said secondary rotary member axially overlapped by said primary rotating member wherein a means for varying said primary rotary member's axial position relative to said secondary rotating member is provided; and said primary rotating member being connected to and driven by a torque producing device and said secondary rotating member being connected to a torque utilizing device whereby rotation of the primary rotary member causes rotation of said secondary rotating member by some or all of the magnetic flux lines emanating from said permanent magnets mounted on said primary rotating member cutting through the electro-

conductive material on said secondary rotary member thereby generating torque and rotation in said secondary rotary member in relation to the percentage of the total area that said secondary rotary member is axially overlapped by said primary rotary member, and said permanent magnets being cooled by direct liquid coolant impingement emanating from the ends of the cooling channels located immediately adjacent to the electro-conductive rotor bars.

2. The apparatus in claim 1, wherein said liquid coolant flow being further adjustable to optimize the required liquid flow for best apparatus efficiency.

What is claimed is:

1. A liquid-cooled high torque and high-power apparatus for transferring torque magnetically comprising:

a primary rotary member and a secondary rotary member;
the primary rotary member axially overlapping said secondary rotary member; the secondary rotary member being surrounded by said primary member; the primary rotary member having permanent magnets mounted on it; the secondary rotary member having electro-conductive elements and magnetically permeable materials, and not having permanent magnets; said electro-conductive elements being cooled by liquid coolant running in axial liquid cooling channels immediately adjacent to, and parallel to, the electro-conductive bars of the electro-conductive rotor, said liquid coolant flow being further adjustable to optimize the required liquid flow for best apparatus efficiency, said cooling liquid being delivered to the apparatus by a closed liquid cooling system with an external storage tank, external pump, external heat exchanger to reject the heat generated in the electro-conductive bars, said secondary rotary member axially overlapped by said primary rotating member wherein a means for varying said primary rotary member's axial position relative to said secondary rotating member is provided; and said primary rotating member being connected to and driven by a torque producing device and said secondary rotating member being connected to a torque utilizing device whereby rotation of the primary rotary member causes rotation of said secondary rotating member by some or all of the magnetic flux emanating from said permanent magnets mounted on said primary rotating member cutting through the electro-conductive material on said secondary rotary member thereby generating torque and rotation in said secondary rotary member in relation to the percentage of the total area that said secondary rotary member is axially overlapped by said primary rotary member, and said permanent magnets being cooled by direct liquid coolant impingement emanating from the ends of the liquid cooling channels located immediately adjacent to the secondary rotary member rotor bars.