take up the high force of attraction which is developed between them. The spacers **29** may be of magnetic or non-magnetic material.

In order to reduce the magnitude of the magnetic field strength in regions where the magnetic field is not usefully employed, a superconducting screening coil or coils may be used. FIG. 2 shows, for example, a super-conducting screening coil **30**, within a cryostat **31** which serves to reduce the effect of the magnetic field of the super-conducting coil **26** external to the machine. Such a screening coil may be required to diminish interference with any equipment situated in the vicinity of the machine.

The super-conducting screen coil or coils may be completely sealed with no external connections and receive current through the medium of the mutual inductance with the main field coil.

In another embodiment the disc or discs may be of non-electrically-conducting material and have current-carrying members formed thereon or attached thereto.

Instead of a rotor comprising one or more discs a drum-type rotor may be used and the rotor may be cylindrical in form or have other shapes such as a conical or truncated conical shape.

In the case of the disc type rotor the discs may be flat or dish-shaped.

The current supply for the machine when used as a motor may be derived from a similar machine operated as a generator.

Alternatively, the current supply for the machine when used as a motor may be derived from a magnetohydrodynamic generator.

We claim:

1. A homopolar electrical machine including a rotor having at least one conducting path for electric current, a stator having superconducting coils providing a magnetic field which is cut by the conducting path upon rotation of the rotor, said stator having a cryostat enclosing said super-conducting coils to maintain them in super-conducting state, and means for transferring current between the conducting path and an external circuit.

2. A machine as claimed in claim **1** including bodies of magnetic material interposed in the magnetic field produced by the super-conducting coil to concentrate said field in selected regions.

3. A machine as claimed in claim **1** in which the means for transferring current comprises solid brushes in contact with slip rings connected to the conducting path.

4. A machine as claimed in claim **1** comprising super-conducting screening coils arranged to reduce the magnetic field in selected regions and cryostat means enclosing said screening coils to maintain them in super-conducting state.

5. A homopolar electrical machine as claimed in claim **1** in which the rotor comprises at least one disc of electrically-conducting material.

6. A machine as claimed in claim **5**, including a support disc on which the disc of electrically-conducting material is mounted.

7. A machine as claimed in claim **6** including a second electrically-conducting disc mounted on said support disc on the opposite side thereof to the first said disc.

8. A machine as claimed in claim **6** in which the disc of electrically-conducting material is mounted on the support disc by way of electrically-insulating spacing members.

9. A machine as claimed in claim **8** in which the spacing members are shaped to assist circulation of cooling gas over the surface of the discs.

10. A machine as claimed in claim **5** including bodies of magnetic material disposed in planes substantially parallel to the plane of said electrically-conducting disc to concentrate the magnetic field of the super-conducting coil in the region of said disc.

11. A machine as claimed in claim **5** in which the electrically-conducting disc has an axially-extending peripheral flange and the means for transferring current comprise solid conducting brushes in contact with the inner face of the said flange.

12. A homopolar electrical machine including a rotor in the form of at least one pair of discs of electrically-conducting material mounted for rotation on a common shaft, each disc of a pair being insulatedly mounted on a common support disc but spaced therefrom, there being a disc on each side of the support disc, spacing members in the spaces between each disc and its support member, a super-conducting coil disposed around the periphery of the rotor, discs of magnetic material disposed on the side of each electrically-conducting disc remote from the support disc, further spacing members located between the discs of magnetic material to hold them apart axially, a further super-conducting coil acting as a screening coil surrounding the first-mentioned coil, and cryostat means enclosing said super-conducting coils to maintain them in super-conducting state.

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MILTON O. HIRSHFIELD, *Primary Examiner.*

L. L. SMITH, *Assistant Examiner.*

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