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The Secret of the Faraday Disc

In December of 1831, over 152 years ago, it was Michael Faraday who first interposed a copper disc which could be rotated between the poles of a magnet with the field lines perpendicular to the rotating disc. Faraday discovered a voltage which could be generated between the center and the outer edge of the rotating conducting disc. This voltage which was the output of the then to become known Faraday Homopolar Disc generator is extracted by sliding contacts or brushs, one on the axle and the other on the outer periphery of the rotated conducting disc. Figure (1).

The Faraday disc generator was developed in the late 1890s and the early part of this century to be a high power, low voltage d.c. machine suitable for industrial applications. The behavior of the machine thus constructed was totally in line with the behavior of other electrical machinery in the sense the generation of power by the machine was accompanied always by a commensurate drag to insure the idea of a conversion from mechanical to electrical energy was supported. Implicit in this was the unstated support of the religious belief that no work could be obtained without the expenditure of an 'equivalent' amount of mechanical energy.

Of course there are other religious beliefs which say that energy is an inexhaustable resource, but until the invention of a practical free-energy machine this point stays moot.

A long history of the development of electrical machinery starting with the Faraday disc of figure one lead me to construct the combination, figure (2). Here, instead of the magnetic flux path being closed in a yoke around the disc, the magnetic flux path is closed symmetrically through the disc with the flux linkages traveling N-S through the radially symmetrical central portion of the path through the center of the disc; while the return path travels S-N symmetrically through the outer periphery of the disc.

A plot of the voltage profile in the disc, figure (3), shows a curve typical of currently encountered flux densities and rotational speeds. The voltages are nominal values measured with one sliding contact on the axle and the other exploring the voltage profile on the surface of the rotating conducting disc. Several things are apparent. The voltage present at any radius of the rotating disc depends only on the flux density and tangential velocity of the disc <u>at that point</u>. Thus it is clear from this that the voltage obtainable from a sliding contact at the edge of the rotating disc with respect of the central axis is <u>not the sum</u> of the voltages appearing in the disc.

We can conceive electricity as a source-sink phenomenon. That is, electrons can appear at a negative pole and be absorbed at the positive pole. In terms of the operation of the Faraday disc with the magnetic field closed through the disc, this means the current flow with a load interposed between brushs placed on the outer edge and central axis of the disc, will be as shown by the arrows on figure (3).

When the flux path is closed through the disc, the electrical pole normally residing on the axis or center of the disc is displaced radially.

The radial displacement of the positive pole to the radius r_1 means that with the indicated current flow the inner portion of the machine may be made to motor against the drag created by the extraction of electricity from the edge of the machine vs the center.

The torque (or drag) created by the motoring action of a Faraday disc is proportional to the total flux linkages passing through the area of the disc illuminated by the magnetic field. In the example shown the central area is πr_1^2, and the area of the peripheral annular ring is $\pi(r_3^2 - r_2^2)$. With a machine operated at magnetic saturation it is easy to see that with the above areas made equal drag from the machine will disappear.

The Faraday disc uses inertial (centrifugal) and magnetic forces to elicit the pattern of electrical potential on the rotating disc. The production of electrical energy from a Faraday disc with the flux path closed through the disc, an N machine, without drag is just a violation of a completely unsubstantiated supposition that mechanical work input to the machine must be provided when electrical power is withdrawn.

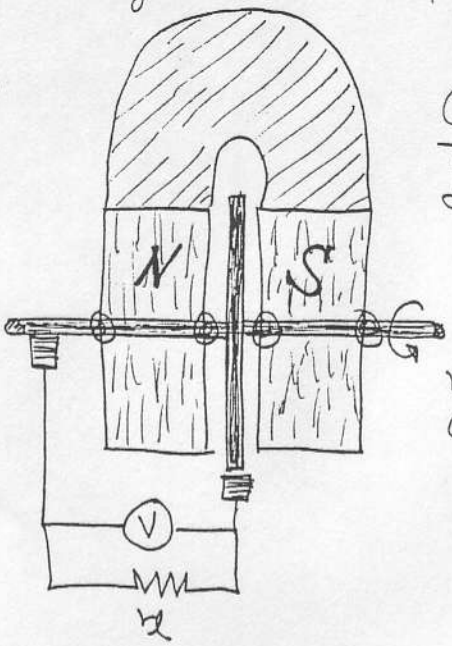
On the practical side the operation of the machine is unaffected whether the magnets are rotated with disc or not and the machine may be made self exciting by cutting a spiral into the portion of the disc covering the central pole face. Rotation of the magnets and disc together facilitates the seriesing of machines to provide higher output voltages while retaining input and output poles on the axles of the machine.

The secret of the Faraday disc thus simply becomes: the Faraday disc is a free-energy machine. The anti-torques experienced in the early use of the machine supported a work-ethic paradigm which was not questioned. When the magnetic flux path is closed symmetrically through the disc instead of around the disc as in the early machines the drag associated with the flow of current disappears.

An interesting thought is the drag is really an anti-torque created by something which passes through the disc and motors it in the opposite direction to the direction which would be created when it was electron current which was flowing through the disc. An interpretation consistant with the Lenz Law interpretation of the drag against a current carrying wire moving with linear velocity perpendicular to lines of magnetic flux linkage can be developed out of this. It may well be that when electrons are liberated from the edge of a Faraday disc with the circuit completed to the center; what flows through the disc may not be electrons. It may well be that a hole current completes the path through the disc. When current carrying conductors are moving through magnetic fields it may well be that electrons are not flowing through those portions of the moving conductors in which electricity is being 'generated'. Consideration will show that electron flow through a wire moving perpendicular to a magnetic field should assist the motion of the wire.

The centrifugal extraction of energy from the inertial field of space was first demonstrated by Faraday in 1831. The proper interpretation of the experiment as a free energy machine has taken some time since the other possibility, of closing the flux path through the disc had never been thought of.

figure (1)



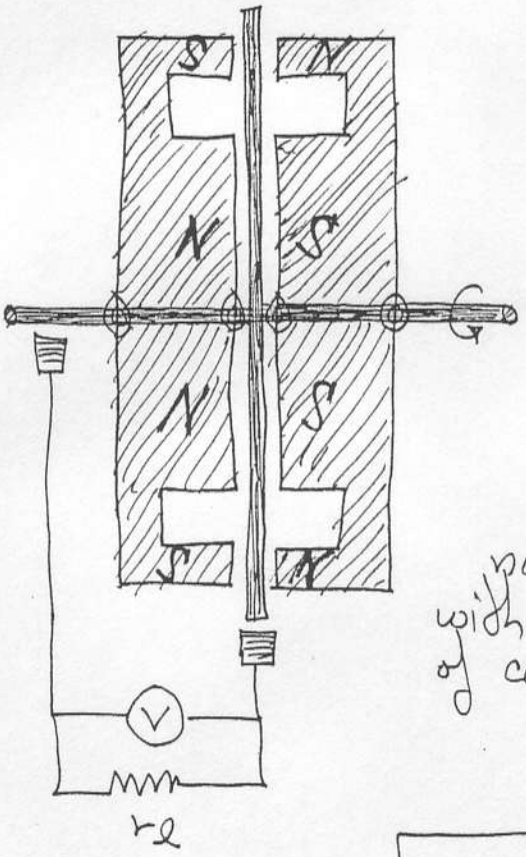
Original Faraday Disc

flux linkages closed external to disc.

machine exhibits drag with current flow through load.

figure (2)

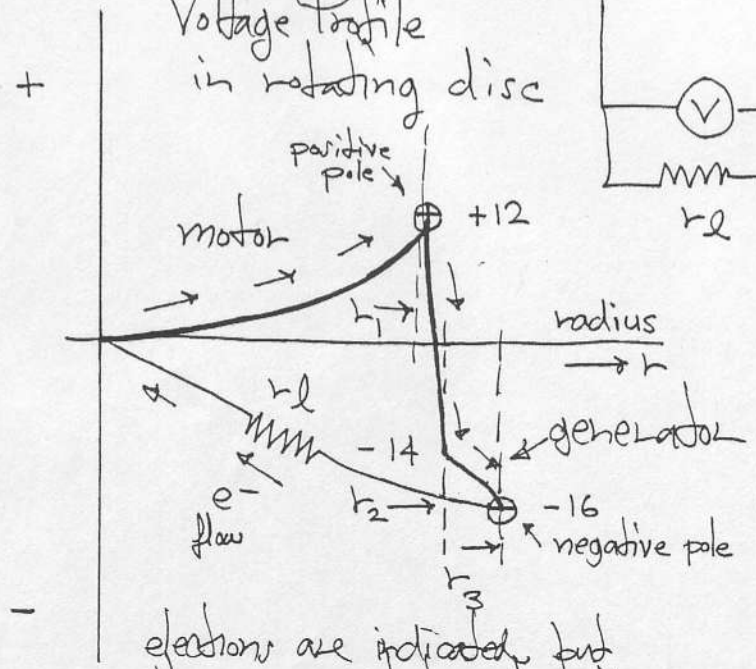
Faraday Disc with flux linkages closed through disc



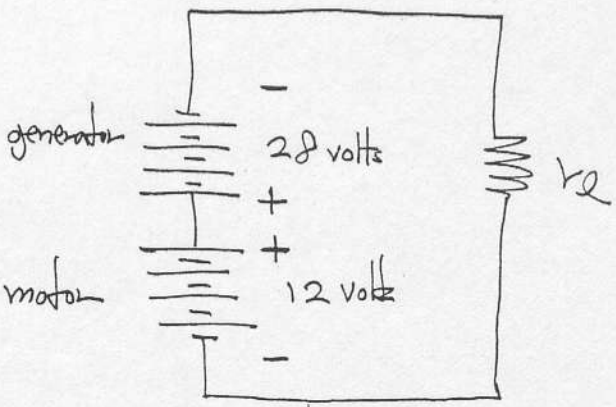
no drag with extraction of current.

figure (3)

Voltage Profile in rotating disc



elections are indicated, but they may not be what is flowing in the magnetized rotating disc.



equivalent circuit