More thoughts on the Uwe Jarck Device

© Cyril Smith

1. Introduction

Jarck's international patent WO/962882 was issued in September 1996, and has been the subject of much debate since. It was brought to my attention this month (October 2020). In this paper I give my views on what it may really mean in terms of an overlooked feature of ferromagnets that to my knowledge has never before been used as a possible energy source. I take the reader through some overlooked features of the Jarck device in an attempt to show that some known (but unused) magnetic laws could explain its anomalous performance. In my opinion Jarck's claims for its performance come from someone who has read a lot about so called free-energy and has simply put together a lot of scientific nonsense to explain the anomaly. I think my explanation is more rigorous but of course may not be true in that what I describe is too small an effect to be of any practical use. Only well contrived experiments will show whether this offers a real route to obtaining free energy and I offer more realistic set-ups than the Jarck device for proving this.

2. On conical coils

An unusual feature of Jarck is the use of a conical coil. He describes his cone as shaped like a chalice, but here we will restrict ourselves to plain cones. Figure 1 is the magnetic field produced by a coil wound onto a conical surface. Of significance here is the field that exists in the region where Jarck's magnet is placed, shown as a red outline (note this is not a copy of Jarck's geometry, it is only for illustrative purposes).

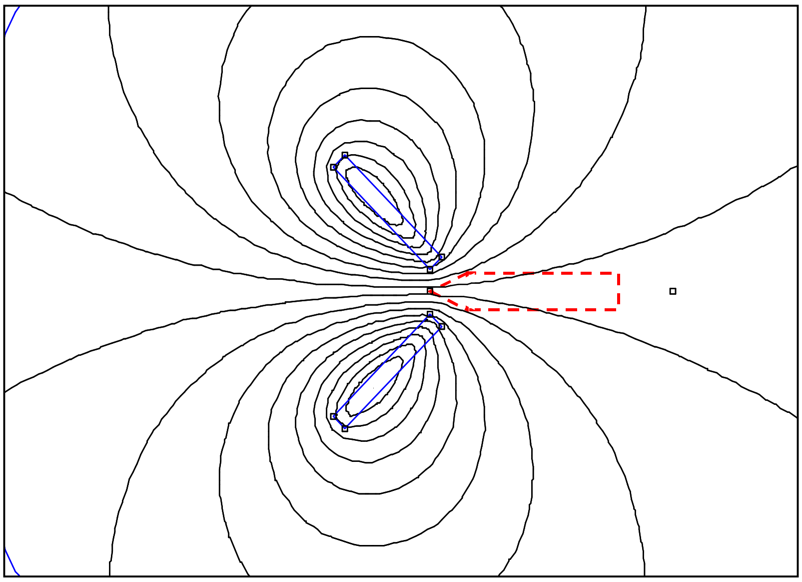

Figure 1. Field from a conical coil

Note that this field is not uniform along the length of the magnet. Figure 2 is the field taken along the centreline of the magnet where it is seen to (a) align itself with the axial magnet field (this field is not shown) and (b) offer a field gradient along the magnet. It is this gradient that could be the key to anomalous performance. A magnetic dipole within a magnetic field gradient will endure a force pulling it along the gradient, and of course the magnet contains a vast number of atomic dipoles. Since each atomic dipole is an electron, either orbiting a nucleus or, in the case of a conductive magnet, a free electron that has aligned spin, that force can alter the spatial electron distribution. For a non-conducting magnet the effect is similar to dielectric polarization that is normally done by application of an electric field, the overall neutral charge distribution is disturbed by the pulled elliptical orbits, and since the disturbed electrons are still magnetic dipoles this means that the overall magnetization distribution is also disturbed.

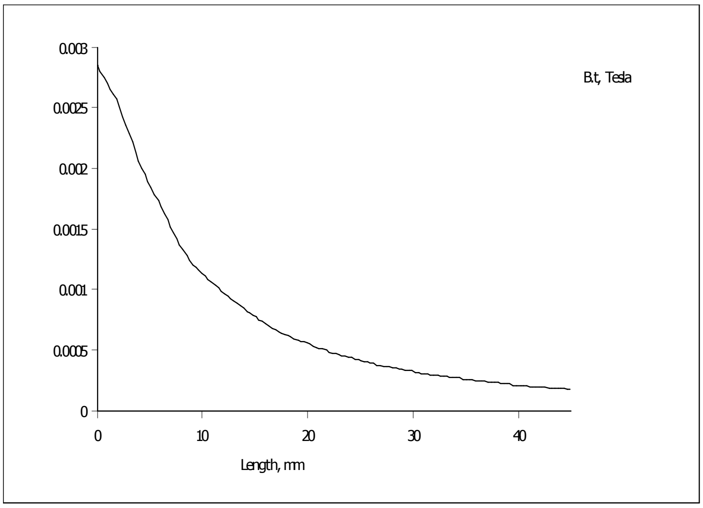

Figure 2. Field along magnet axis

If the magnet is electrically conductive (we will assume it is magnetized iron) then all its conduction electrons will be spin polarized, their movement will add to the disturbed magnetization distribution. Note that the field gradient supplied by the conical coil can penetrate the material and pull the conduction electrons, unlike an electric field that can't penetrate a good conductor. Here we will concentrate on the conducting magnet, since the electron movement there is expected to offer a greater effect than that from the bound electrons.

3. Gradient Driven Effects

The gradient will apply a force to the conduction electrons so that they get pulled away from the their normal mean positions. There will be an imbalance between the normal uniform volume distribution of the Fe ions (static because the ions cannot move) and the normal static distribution of the electrons, and since the electrons supply some of the magnetization that magnetization plotted along the magnet axis will be different from that with no externally applied gradient. *It is this difference that we wish to employ.*

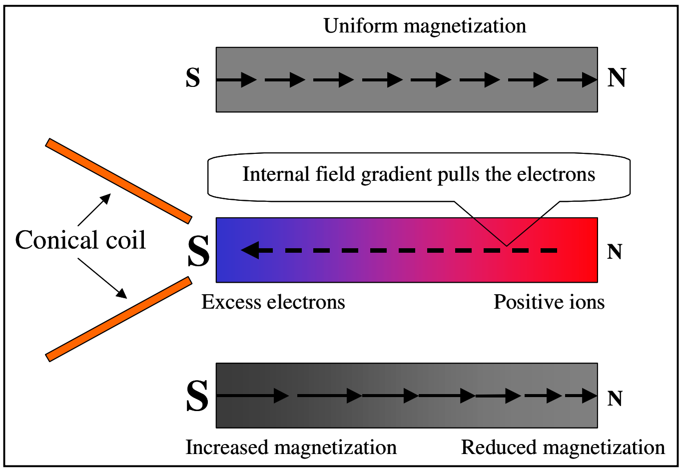

Figure 3. Showing the redistributed magnetization

Depending on the direction of the current in the coil the magnetic force on the electrons in the magnet will either tend to force them towards the coil or away from the coil. We can have an alternating current in the conical coil that creates an alternating current along the magnet axis, but note that this not the usual form of induction. With the surplus of electron's negative charge towards one end being countered by the surplus of the ion's positive charge at the other end this back and forth motion of the electrons can be likened to a spring. Application of the coil current causes the electrons to move to their unnatural position, and removal allows the electrons to move back again. This spring-like action can be expected to offer a resonance. Note that this resonance is unheard of in classic EM theory. Also note that any electron movement represents a current, and it is well known that conduction electrons move relatively slowly, their effect will be time delayed compared to the application of the driving gradient. This hitherto unknown resonance could have a low frequency compared to other known resonances within ferromagnetic material, such as FMR, ESR or NMR.

I can find very little evidence of a magnetic field gradient being used against spin-polarized electrons. I have come across it being used to force spin-polarized electrons so as to follow a narrow channel along a thin Fe film where any deviation from this channel creates the sideways force needed to keep them centralized. I have also offered elsewhere the possibility of a spin battery where tiny triangular shaped Fe film is magnetized by the uniform field from nearby permanent magnets, hence naturally have a field gradient within them. A large number of these connected in series using copper wire offers this potential, but it could fail because the loss of spin-polarization on passing from Fe to Cu could set up a counter emf at that point. Here in the Jarck device there is no loss of spin-polarization, the electron back and forth movement remains within the Fe.

4. Extracting the Effect.

To remove the normal transformer coupling between the conical input coil and any output requires at least two output coils. A coil is wound round each end of the magnet, they are connected in series opposing and their turns are adjusted so that the fast application of current into the conical coil (before the magnet's electrons have time to move) does not produce a voltage, the two inductions cancel out. Then the magnet's electrons move to their unnatural position, during which time voltages are induced into each coil as the electrons, acting like tiny bar magnets, move from one coil towards the other. These voltages add and current then flows through a load resistor. Energy supplied to the load comes from that gradient-driven electron movement internal to the magnet. On fast removal of the coil current the same procedure follows, energy is supplied to the load resistor as the electrons spring back to their natural positions. Figure 4 shows the set-up, and comparison with the Jarck device as shown in the patent is striking.

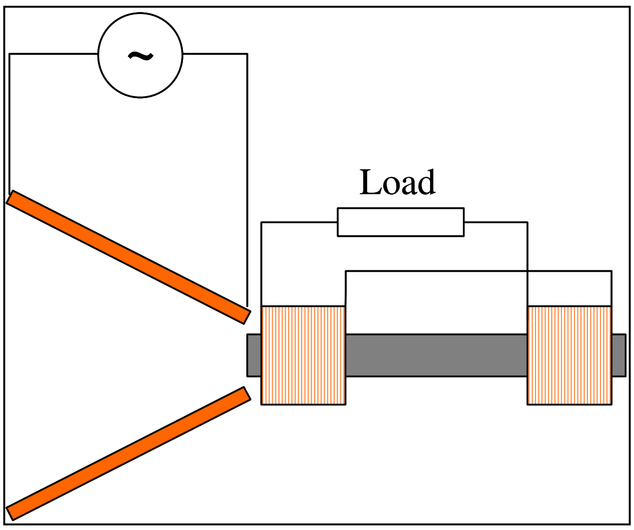

Figure 4. Overall set-up

5. Improved Design

If the electron redistribution, hence magnetization redistribution, really works then there is a better way to move the electrons. The magnetic gradient force on the electron dipole is tiny, and a much greater force can be applied electrically operating on the electron charge. To obtain an internal electric field we can use a time changing magnetic vector potential **A** field, as this is known to penetrate conductive material. If we place a toroidally wound ring core around the magnet we can induce that internal electric field as shown in Figure 5.

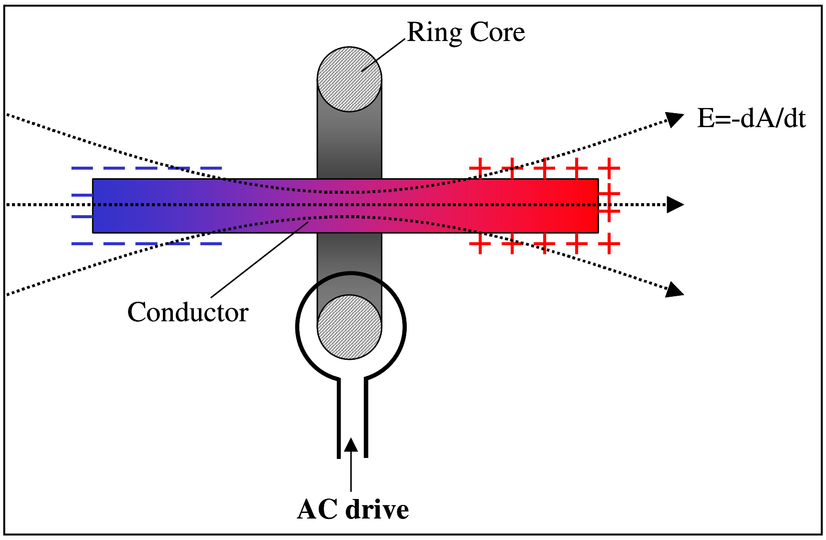

Figure 5. Induced internal charge distribution

If we use Fe that is magnetized from a pair of magnets placed at each end, the internal electron movement is also internal magnetization movement that we can make use of. Figure 6 shows the set-up which includes the pair of output coils that detect the changing magnetization.

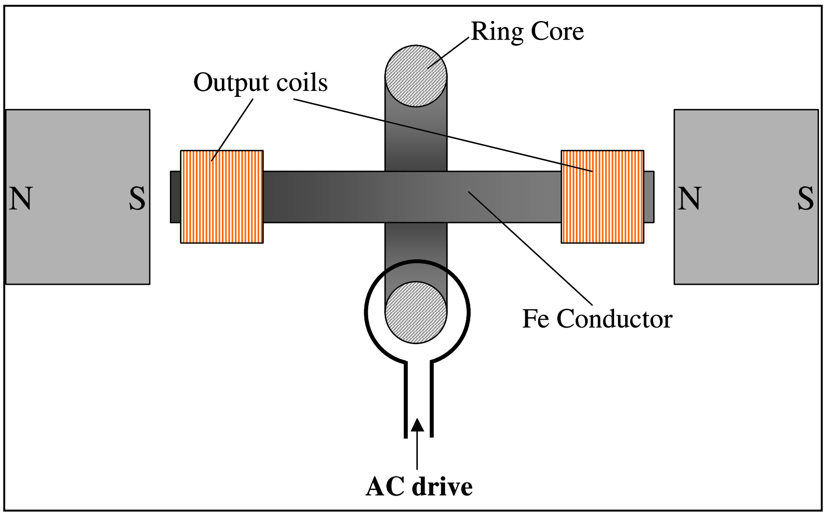

Figure 6. Final set-up.

Further improvements could use a bunch of Fe wires in place of the solid Fe rod to minimise eddy currents. Also capacitive loading at the ends of the rod or wires could increase the effect. Figure 7 shows the bunch of Fe wires that have Cu wires included at each end to get maximum capacitance there via the enamel coating on the Fe wires.

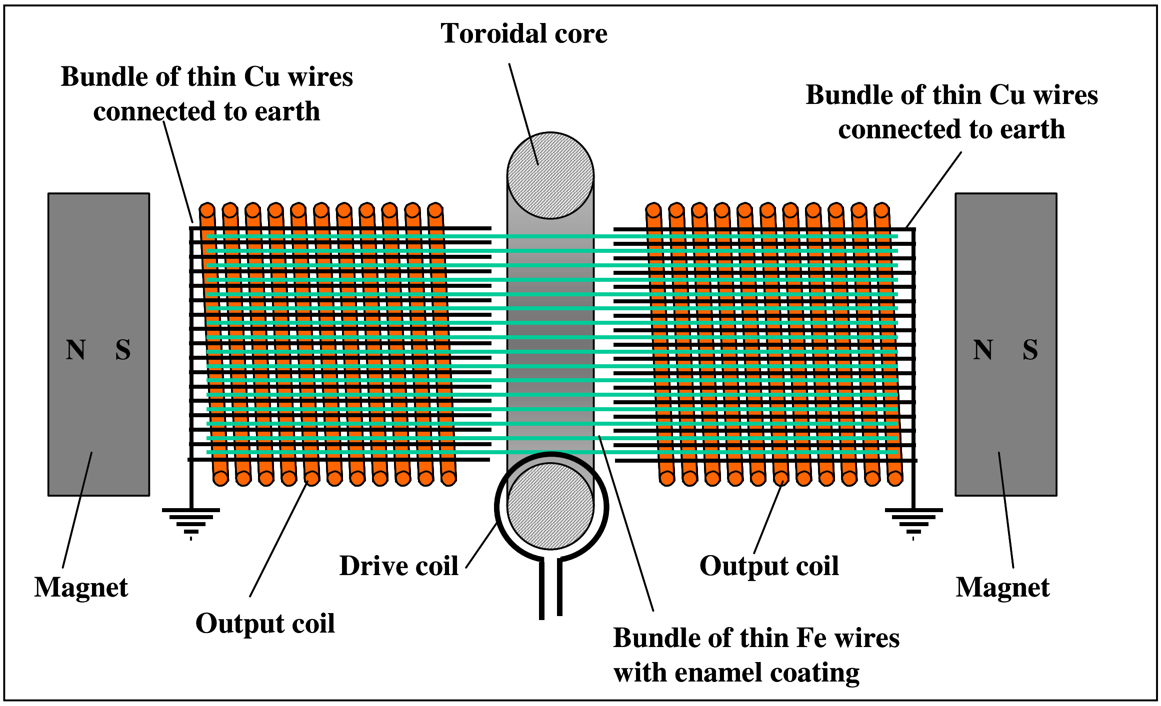

Figure 7. Capacitively loaded Fe wires