Title: ISOLATION TIMING MAGNETIC MOTOR

Abstract: A magnetic motor has a shaft. An upper magnet is attached to the shaft and positioned around an upper perimeter of the shaft. A lower magnet is positioned around a lower perimeter of the shaft. A plurality of grooves is formed in the upper magnet and the lower magnet. Field diversion bands are positioned within the plurality of grooves.
ISOLATION TIMING MAGNETIC MOTOR
AND METHOD

RELATED APPLICATIONS

[0001] The present patent application is related to and claims the benefit of U.S. Provisional Application entitled, "Isolation and Timing Magnetic Motor", filed November 13, 2009, having U.S. Serial No. 61/261,206, in the name of the same inventors, and which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] Embodiments of this disclosure relate generally to motors, and, more specifically, to a magnetic motor that creates a new paradigm in how energy is produced. The intent of this design is to create a functional magnetic motor with significant torque and to can be self starting.

[0003] Magnets and magnetism, including electromagnetism, have been incorporated and used historically in an assortment of designs. A review of the "prior art"
reveals distinct and different designs separate from this invention. Functionality and efficiency is lacking in some form or fashion in every instance, particularly in areas related to the facilitation of production of torque force, the methods of control of the torque forces produced including directionality, and the maintenance of the torque force produced and resultant usable Kinetic Energy.

[0004] U. S. Patent No. 6,433,452B1 issued to Graham, discloses a magnetic motor wherein rotation of an output shaft is achieved by means of a cam wheel which is interconnected to the output shaft and an associated power rod operatively associated therewith with a magnet attached to the power rod. Multiple magnets are affixed to the outer periphery of a balance wheel which is interconnected to the output shaft. Linear movement of the magnet mounted on the power rod together with intermittent attractive or repulsive forces between magnet mounted on the power rod and multiple magnets mounted on the balance wheel provides continuous rotation to the output shaft.

[0005] U. S. Patent No. 5,753,990 issued to Flynn et al., discloses a device for converting magnetic to mechanical force. The device has a member having an axis about which it is rotatable, the member having a peripheral edge portion formed of a material that is affected by the presence of a magnetic force adjacent thereto. At least one magnetic member is positioned
adjacent the peripheral portion of the rotatable member to produce a magnetic coupling force there between. The peripheral portion of the rotatable member has a shape such that the magnetic coupling between the magnetic member and the peripheral portion of the rotatable member varies continuously as the rotatable member rotates.

[0006] U. S. Patent No. 4,598,221 issued to Lawson et al., discloses a self-starting rotational motor that uses a magnetic propelling force. The motor is based on the principle of maintaining interacting substantially perpendicular rotor and stator magnet flux field one within the other without gaps or spacing around the entire circumference of the magnet stator. The rotor magnets are controlled and moved relative to the stator magnets by a mechanism whereby the perpendicular rotor and stator magnet flux fields are maintained constantly in interacting relationship to produce turning of the rotor in one direction.

[0007] U. S. Patent No. 4,196,365 issued to Presley, discloses a permanent magnet motor comprising a rotating shaft and a rotating magnet coupled to rotate with the shaft and sweeping a disc-like area as the shaft rotates. A reciprocating magnet aligned to repel the rotary magnet is positioned adjacent to the area swept by the rotating magnet. Means coupled to the reciprocating magnet is provided to forcefully displace the
reciprocating magnet toward the rotating magnet as the rotating magnet is passing a top dead center position and for displacing the reciprocating magnet away from the rotating magnet after the rotating magnet has passed the bottom dead center position.

[0008] The first design forces a magnet in and out of the magnetic field. Our design moves a magnet through the field and uses diversion techniques to move the field out of the way when the field could hamper rotation of the armature.

[0009] Some of these designs have a rotating center that is extremely different from the present invention. In one case the design does not contain magnets in the rotating portion. Further the rotating disk changes mass as a function of the degrees of rotation or changes radius as a function of degrees of rotation. Neither of these takes place in the present invention having a rotating shuttle armature.

[0010] Other designs deal with perpendicular fields and rotating or rocking a magnet inside a field. The present invention works with parallel fields and the magnets are moving through the field. The present invention use shields to divert the magnetic fields when the magnets need to rotate through the opposing rotational fields.

[0011] Finally another design contains a rotating disk with magnets incorporated on the face of the disk. The present application utilizes magnets that make up a rotating armature.
This design also incorporates a long bar that toggles back and forth with the use of a solenoid that is timed off of a cam. Our design has no such toggling bar.

[0012] Therefore, it would be desirable to provide a system and method that overcomes the above.

SUMMARY

[0013] In accordance with one embodiment, a magnetic motor has a shaft. An upper magnet is attached to the shaft and positioned around an upper perimeter of the shaft. A lower magnet is positioned around a lower perimeter of the shaft. A plurality of grooves is formed in the upper magnet and the lower magnet. Field diversion bands are positioned within the plurality of grooves.

[0014] The features, functions, and advantages can be achieved independently in various embodiments of the disclosure or may be combined in yet other embodiments.

DRAWINGS

[0015] Embodiments of the disclosure will become more fully understood from the detailed description and the accompanying drawings, wherein:

[0016] FIG 1 is a cross-sectional view of the magnetic motor perpendicular to shaft rotation.
[0017] FIG 2A is a cross-sectional view of the stationary field assembly parallel to the shaft.

[0018] FIG 2B is a cross-sectional view of the stationary field assembly perpendicular to the shaft.

[0019] FIG 3A is a cross-sectional view of the shuttle armature assembly parallel to the shaft.

[0020] FIG 3B is a cross-sectional view of the shuttle armature assembly perpendicular to the shaft.

[0021] FIG 4A is a cross-sectional view of the shuttle armature inside the stationary field assembly parallel to the shaft.

[0022] FIG 4B is a cross-sectional view of the shuttle armature inside the stationary field assembly perpendicular to the shaft.

[0023] FIG 5A is a cross-sectional view of the magnet motor assembly perpendicular to the shaft with diversion bands aligned and magnets aligned.

[0024] FIG 5B is a cross-sectional view of the magnet motor assembly perpendicular to the shaft with diversion rings aligned to center of magnet positions.

[0025] FIG 6A shows two magnetic motors mounted to the same shaft with a cam between them. In this orientation the two motors are 180 degree out of sync with each other.
FIG 6B shows the same assembly as FIG 6A after shaft rotates 180 degrees.

FIG 7A shows the inner and outer arc magnets.

FIG 7B shows a cross-section of the inner and outer arc magnets.

FIG 8A to FIG 8G shows different positions the shuttle armature achieves as it rotates in a cross-sectional view perpendicular to the axis of rotation.

FIG 8A' to FIG 8G' shows different positions the shuttle armature achieves as it rotates in a cross-sectional view parallel to the axis of rotation.

DETAILED DESCRIPTION

In the Figures, the following reference numbers may be used:

20 Mild steel tubing

21 Arc magnets

22 Field diversion bands

23 Gap between top and bottom magnets

24 Non ferrous bonding compound

30 Mild steel tube shaft

31 Arc magnets

32 Field diversion rings

33 Gap between magnets
The present invention for a magnetic motor will produce shaft power that can be connected to any thing that needs to move or produce power. The key to this product line is the use of plates or rings to divert the magnetic fields when the field interferes with producing rotation. Sliding a diversion ring or plate perpendicular to a magnetic field takes very little energy as compared to pulling a magnet or plate in and out of a field. Further we can control the speed and torque of rotation by controlling the amount of diversion allowed by controlling the distance the shuttle armature is allowed to travel.

FIG 1 shows two magnetic motors in a completed assembly. The second assembly is aligned 180 degrees of rotation away from the first assembly. There is a cam (51) (in
this design it is situated between the two motors) which is used to cause the armature to shuttle back and forth as it rotates. The magnet force (52) is shown aligned in the left motor and blocked by the diversion rings on the right motor.

[0052] FIG 2A shows two arc magnets (21) mounted on opposite sides of the inside of a steel tube (20). Fig 2A also shows the diversion rings (22) mounted in the groves of the arc magnets but going all the way around. There is a gap (23) between the two arc magnets.

[0053] FIG 2B is a cross section view of Fig 2A. This figure shows how the arc magnets (21) are grooved. It also shows the placement of the diversion rings (22) in the groves of the arc magnets (21). The arc magnets (21) are secured to the inside of the steel tube (20). A non ferrous bonding material (24) is used to affix the rings (22) inside the groves but not touching the magnets.

[0054] FIG 3A shows two arc magnets (31) mounted on opposite sides of the shaft (30). Fig 3A also shows the diversion rings (32) mounted in the groves of the arc magnets (31) but going all the way around. Between the two arc magnets is a small gap (33).

[0055] FIG 3B is a cross section view of Fig 3A. This figure shows how the arc magnets (31) are grooved. It shows the placement of the diversion rings (32) in the groves of the arc
magnets (31). The arc magnets are secured to the shaft (30). A non ferrous bonding material (34) is used to affix the rings (32) inside the groves but not touching the magnets. Fig 3B also shows bearings (35) on the shaft to allow it to rotate and shuttle.

[0056] FIG 4A shows the shuttle armature (40) placed inside the stationary field assembly (41) with a small gap (42) between the two all the way around.

[0057] FIG 4B is a cross-sectional view showing the shuttle armature (40) inside the stationary field assembly (41) with bearings (35) on the ends of the shuttle armature allowing it to rotate inside the stationary field assembly (41) and to shift in and out of the stationary field assembly (41).

[0058] FIG 5A shows the diversion rings (22 and 32) aligned in the inner (40) to the outer (41) assemblies. The diversion rings (22 and 32) are aligned to allow the magnetic fields to interact as shown in Fig 1 on the left side.

[0059] FIG 5B shows the diversion rings (22 and 32) aligned to the arc magnet points between the inner (40) and outer (41) assemblies. The diversion rings (22 and 32) are aligned to divert the magnetic fields and prevent them from interacting as shown in Fig 1 on the right side.

[0060] FIG 6A shows the alignment of two motor assemblies on the same shaft 30. One is mounted 180 degrees of
rotation away from the other. This shows how multiple motors can be aligned to produce torque in different relative angles of rotation. This allows for more continuous torque along a single shaft 30.

[0061] FIG 6B shows the armature after it rotates 180 degrees from its position in Fig 6A. This shows how the interaction between magnets 31 in the first half of the paired motors goes from a torque position to a non torque position, while the right side moves from a non torque state to a torque state, thus providing torque for a greater duration of rotation around the shaft 30.

[0062] FIG 7A shows the inner (61) and outer (60) arc magnets. These figures give what appears to be a better shape of magnet to use than the bar magnets 30 in the previous embodiments.

[0063] FIG 7B shows the groves through a cross-section of the inner (61) and outer (60) arc magnets. This view shows how the points and groves are made into the arc magnets.

[0064] FIG 8A to FIG 8G shows different positions the shuttle armature achieves as it rotates in a cross-sectional view perpendicular to the axis of rotation. This sequence of figures steps through one full rotation of the shuttle armature. It shows how the shuttle armature magnets change their orientation in relation to the outer field assembly magnets.
FIG 8A' to FIG 8G' shows different positions the shuttle armature achieves as it rotates in a cross-sectional view parallel to the axis of rotation. This sequence of figures steps through one full rotation of the shuttle armature. It shows how the shuttle armature moves in and out of the outer field assembly. As it moves in and out the relative position of the diversion rings in the armature and the outer assembly is changed. Figures 8A to 8G correlate to 8A' to 8G'.

A single motor unit consists of a stationary field assembly, a shuttle armature, a pair of end plates with shuttle cams, a torque shaft and enclosing housing. The stationary field assembly is contained in a mild steel tubing which acts also as a magnetic circuit to divert all outward magnetic force (from centerline) of the arc magnets bonded inside and bonded to the inner arc surfaces are bands of mild steel for magnetic diversion (of inward). The shuttle armature consists of a pair of arc magnets bonded and banded to a mild steel tube at the ends of are support bushings that have the cam followers and fastenings to the torque shaft which passes through the end plates. During rotation of the torque shaft the rear end plate cam is timed to shuttle the armature to the front and the front end plate cam is timed to shuttle the armature to the rear. During the 160 degrees torque effort the armature diversion bands and the field diversion bands exposes the
magnetic fields. During the 180 degrees of free wheel the shuttle is aligned to divert all field/armature magnetic fields. The Stationary Field Assembly can be rotated 180 degrees for reversal of shaft rotation and power control.

OPERATION

[0067] This design can be made to be self starting by inserting the armature in the beginning pull position and from there it will continue to spin. Inserting the armature in the neutral position will keep the motor from starting until an external force is added to rotate the shaft 180 degrees and from there it will be self powered.

[0068] The cam design and operation is not detailed in this application as it can be completed in so many different ways. There are numerous mechanical and electronic systems that can be used to manage the amount of shuttling the armature performs. In successive designs there will be more detail which includes speed and torque management. These designs will vary with the type of device the motor is installed in and the needs of the device. The operation and timing of the cam is important as the synchronization with the magnetic field and the rings diverting the fields can be used to manage the performance and direction of the motor.
Basic operation begins as the diversions rings are shuttled back and forth to expose the attractive or opposing magnetic fields to each other allowing them to pull each other together or push each other apart. As depicted in the figure sequence 8A to 8C. The diversion rings are moved back to a position diverting the fields as the armature rotates blocking the attractive or opposing force. As depicted in figure sequence 8D to 8G. This allows the armature to free rotate without the magnetic fields trying to reverse the forward rotation. The cycle repeats allowing the motor to continue to operate producing usable shaft power.

This technology design can be scaled to fit into an integrated circuit. It can be packaged like a battery to replace existing batteries. Its size can be increased to be larger than any existing generators by stacking magnets in all three dimensions. Multiple motors can be combined on the same shaft (in parallel) to increase torque. Multiple motors or parallel shafts of motors can be combined with chains, belts, gears and/or other transmission techniques. It is also possible to have one armature inside another armature and so on to increase torque. Very quickly this design will be sized to fit any power need: micro, small, medium, large and extra large.

In this design the armature is shuttling in and out of the magnetic field. However, it can be designed where
the outer field assembly is shuttling while the inner armature is only rotating. This design appears to be less productive but may have applications in specific needs areas when used with other systems. It should also be noted that the armature in this design could be fixed and not rotate while the outer assembly does both rotate and shuttle in and out of the magnetic fields.

[0072] The diversion has been performed in proof of concept experiments in several ways. The diversion rings are the most practical means at this time. This has also been accomplished with a cylinder that slides in between the armature and outer field assembly. It passes through the magnetic field when it needs to be diverted. The cylinder passes from one side to the other and then back again on the second cycle.

[0073] Diversion has also been accomplished in a fixed mode situation. The shields are situated adjacent to fixed magnets. One set is located one a disk or armature and a second set make a ring around the outside of the armature or outer field assembly. The shields are located such that they divert the fields on the back side of the magnets away from the magnets on the disk as they pass.

[0074] One potential design uses the magnetic force to lift and gravity to pull the mass down on a down stroke while the diversion of the magnetic fields is taking place.
The primary design discussed in this PPA uses arc magnets with ridges, as this seems to be the strongest combination at this time. Previous designs have included regular arc magnets, bar magnets, round magnets, spherical magnets, and button magnets. Each of these designs has been practical but again this PPA is focused on what seems to be the best at this time.

Early production designs will be focused for transportation. The designs will be fitted into any product that requires a source of power, or a need to move. Some things that will happen quickly may include cell phones, home electronics, appliances, and generators. Some designs will be used to provide personal emergency or permanent home and business power. The possibilities are as endless as the imagination.

Some of the early designs may be better suited for different applications. The first uses flat arced plates and bar magnets between the plates, the armature is a round plate with opposing bar magnets between. There can be many plates stacked in a row. The metal plates act to divert the fields to the edges of the plates with minimal field in the gaps between them. The armature plates are shifted to align with the outer arc plates for torque and miss-aligned for minimal torque.
Second flat plate design uses metal plates that can be bent at different angles to conduct a field to the point of the armature without actually having the magnets right by the armature. See figure below for one such design. It should be noted that the longer the metal plates the weaker the fields at the armature. This technique could be used to bring a magnetic field to a place where you don't want or can't get the magnet into.

The basic premise of the present invention is that the magnetic fields can be diverted or isolated, this being the key principle in this design. Using this diversion technique, magnetic forces are allowed to interact only when they apply torque to the armature. Further, using this technique to concentrate the magnetic field to a point or ridge should provide greater torque with the same strength magnets. Additionally, the diversion technique is used to remove the interaction between the magnetic fields or provide magnetic isolation when it interferes with the direction of rotation. This is accomplished by providing a field diverter or isolation which can be moved in and out of the fields. It appears with the current data that it is best to move these diverters perpendicular to the field lines.

FIG. 9 shows a more practical way to assemble a motor with continuous torque through the full rotation of the
shaft. The motor armature is made of a series of arc magnets bonded to the shaft with diversion rings in between them. The outer assemble contains a series of magnets bonded to the outer housing and diversion rings in between. These outer magnets can be arranged in a sequence of different angles of rotation to create continuous pull around the shaft. As with the other motors the center armature is shifted back and forth allowing the different fields to interact. In this design the arc magnets are created with a single point and bonded in series together to create a multipoint arc magnet.

[0081] While embodiments of the disclosure have been described in terms of various specific embodiments, those skilled in the art will recognize that the embodiments of the disclosure can be practiced with modifications within the spirit and scope of the claims.
What is claimed is:

1. A magnetic motor comprising:
   a shaft;
   an upper magnet attached to the shaft and positioned around an upper perimeter of the shaft;
   a lower magnet positioned around a lower perimeter of the shaft;
   a plurality of grooves formed in the upper magnet and the lower magnet; and
   field diversion bands positioned within the plurality of grooves.

2. The magnetic motor of Claim 1, further comprising bearings attached to a first end and a second end of the shaft.

3. The magnetic motor of Claim 1, further comprising a non-metallic bonding compound positioned within the grooves formed in the upper magnet and the lower magnet.

4. The magnetic motor of Claim 1, further comprising a non-metallic bonding compound positioned within the grooves formed in the upper magnet and the lower magnet to affix the field
diversion bands within the plurality of grooves formed in the upper magnet and the lower magnet and separated from the upper magnet and the lower magnet.

5. The magnetic motor of Claim 1, further comprising a tube positioned around the upper magnet and the lower magnet, the shaft positioned through a central area of the tube.

6. The magnetic motor of Claim 1, further comprising bearings positioned on a first end and a second end of the shaft.

7. The magnetic motor of Claim 1, further comprising a cam assembly to move the shaft back and forth as the shaft rotates.

8. A magnetic motor system comprising:
   a first motor assembly;
   a second motor assembly;
   a shaft positioned through the first motor assembly and the second motor assembly, wherein the first motor assembly and the second motor assembly each comprises:
an upper magnet attached to the shaft and positioned around an upper perimeter of the shaft;

a lower magnet positioned around a lower perimeter of the shaft;

a plurality of grooves formed in the upper magnet and the lower magnet; and

field diversion bands positioned within the plurality of grooves;

wherein the first motor assembly is approximately 180° of rotation away from the second motor assembly.

9. The magnetic motor of Claim 8, further comprising a cam assembly positioned between the first motor assembly and the second motor assembly.

10. The magnetic motor of Claim 8, further comprising bearings attached to a first end and a second end of the shaft.

11. The magnetic motor of Claim 8, further comprising a non-metallic bonding compound positioned within the grooves formed in the upper magnet and the lower magnet.
12. The magnetic motor of Claim 8, further comprising a non-metallic bonding compound positioned within the grooves formed in the upper magnet and the lower magnet to affix the field diversion bands within the plurality of grooves formed in the upper magnet and the lower magnet and separated from the upper magnet and the lower magnet.

13. The magnetic motor of Claim 8, further comprising a tube positioned around the upper magnet and the lower magnet of the first motor assembly and the second motor assembly, the shaft positioned through a central area of the tube.

14. The magnetic motor of Claim 8, further comprising bearings positioned on a first end and a second end of the shaft.
Figure 2A

A  Cross-section outer Assy.
20  Mild Steel Tubing
21  Arc Magnet
22  Field Diversion Bands
23  Gap Between top and bottom magnets

Stationary Field Assembly

Figure 2B

20  Mild Steel Tubing
21  Arc Magnet
22  Field Diversion Bands
24  Non metal bonding compound

Stationary Field Assembly
View A
Figure 3A

Shuttle Armature Assembly

- B Cross-section Armature
- 30 Mild Steel Tube (Shaft)
- 31 Arc Magnet
- 32 Field Diversion Bands
- 33 Gap between magnets

Figure 3B

Shuttle Armature Assembly View B

- 30 Mild Steel Tube (Shaft)
- 31 Arc Magnet
- 32 Field Diversion Bands
- 34 Non metal bonding compound
- 35 Bearings
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(8) - H02K 49/10 (201 01)

USPC - 310/152

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification-system followed by classification symbols)

IPC(8) - 49/10, 1/00, 1/06, 1/12, 1/22, 21/00, 21/26, 23/04, 23/46 (2011.01)

USPC - 310/152, 103, 115, 116, 154.01, 154.25, 154.26, 154.29, 156.38, 156.57, 190, 191, 254.1, 268

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of data base and, where practicable, search terms used)

MicroPatent, IP.com, Google Scholar

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<td>Y</td>
<td>US 2003/0102751 A1 (BRYANT) 05 June 2003 (05.06.2003) entire document</td>
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Date of the actual completion of the international search

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Date of mailing of the international search report

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