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(54) LINEAR MAGNETIC HARMONIC MOTION CONVERTER

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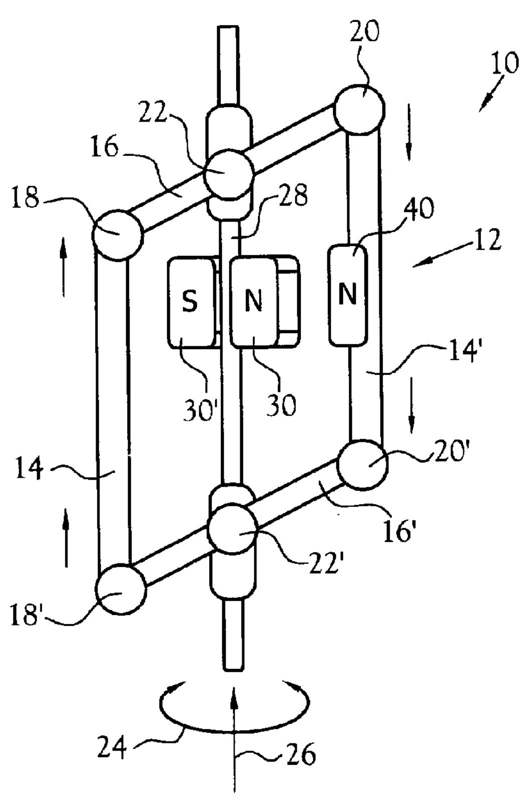
(57) ABSTRACT

A linear magnetic harmonic motion converter apparatus for transferring linear motion into rotational motion for producing work from an interaction of at least two magnetic fields. An axial shaft and a perimeter frame member are disposed in sliding or pivoting orientation. The frame member includes at least one perimeter magnet positioned to provide a first magnetic field moved between different positions in response to external forces on the frame member. The first magnetic field reciprocates parallel to a longitudinal axis of the frame member that is aligned with the axial shaft. One or a plurality of rotor magnets are orientated proximal to the axial shaft to provide a second magnetic field that is attracted or repulsed by the first magnetic field. Movement of the perimeter magnet creates repulsion and attraction of the rotor magnets, with inducement of axial shaft rotation, thereby producing rotational movement that is harnessed to perform work. Also disclosed are combinations of a plurality of rotor magnet units disposed to rotate about respective axial shafts upon the reciprocation of stator magnets disposed proximal to each rotor magnet unit, for utilization in the operation of a fluid pump and an electric generator.



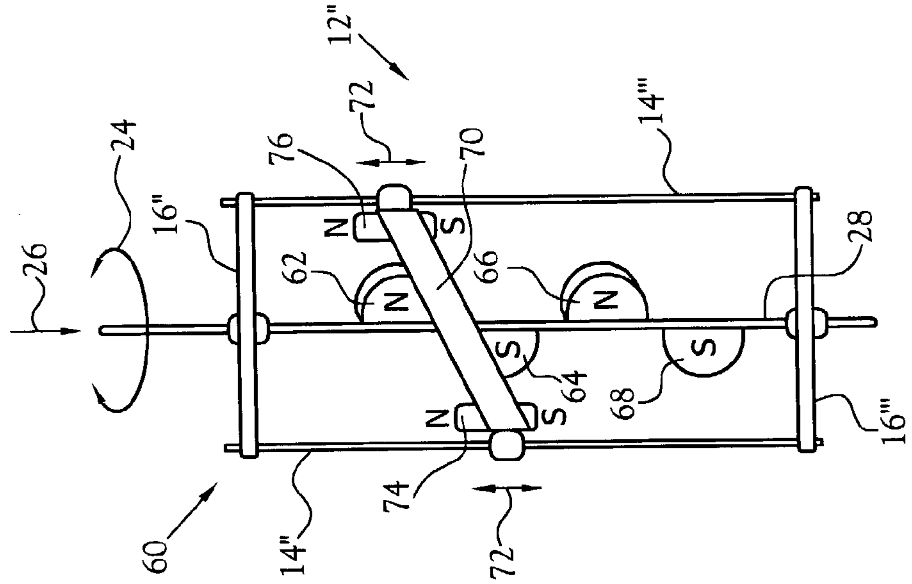

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Fig.2

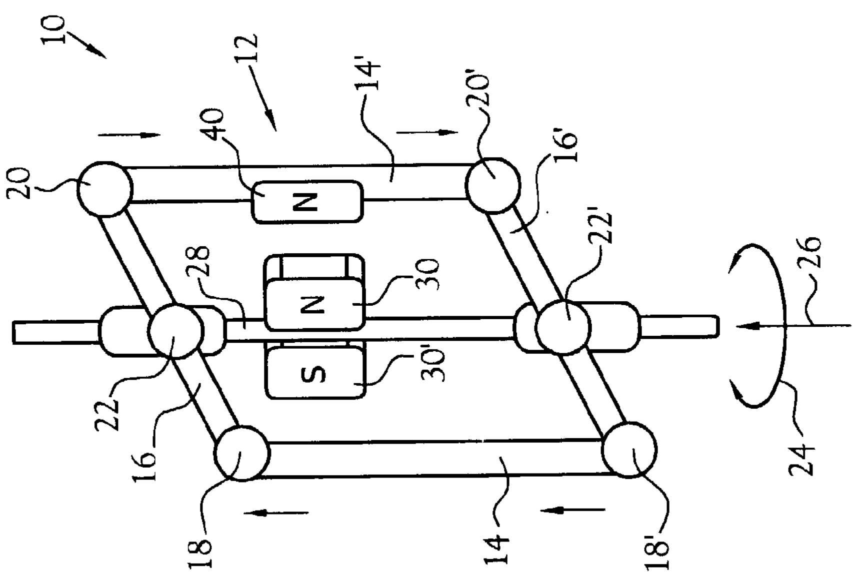
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Fig.1

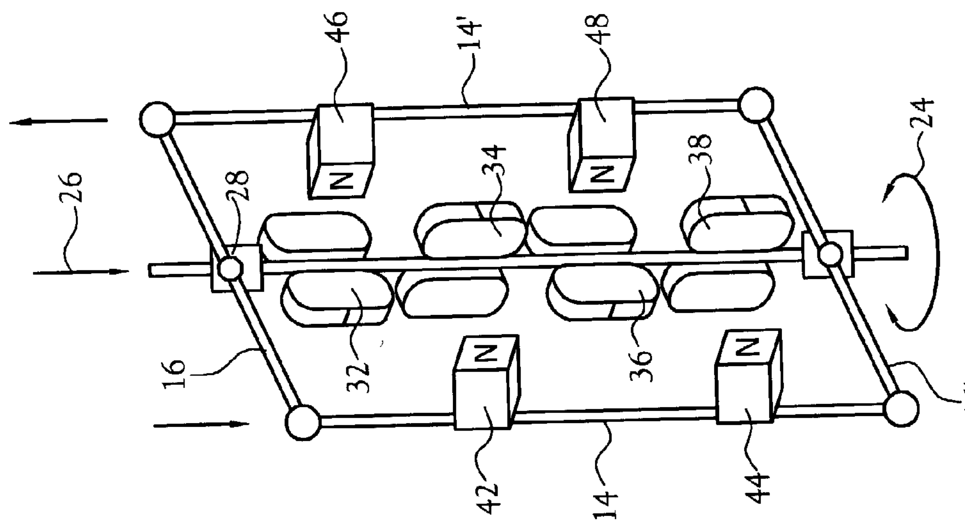

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Fig.3b

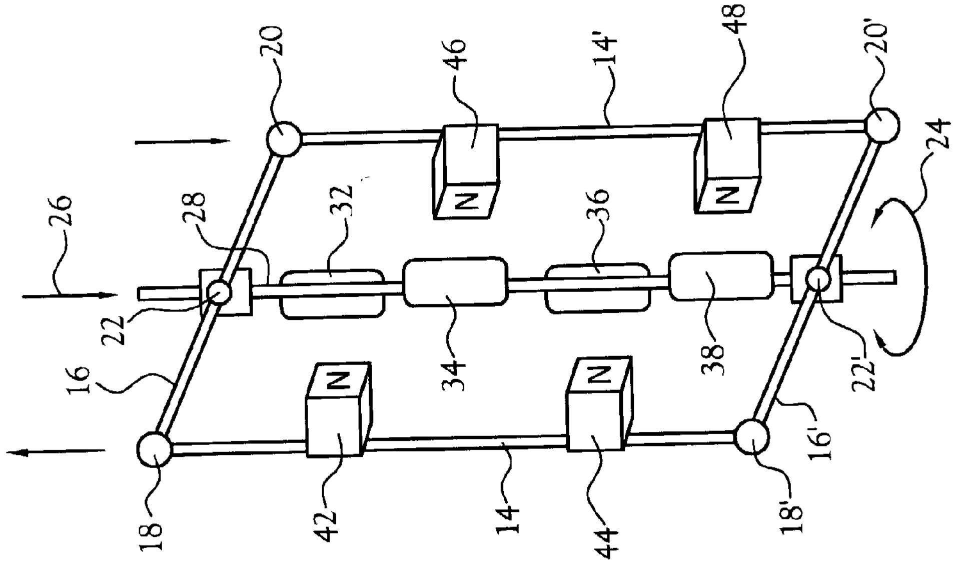

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Fig.3a

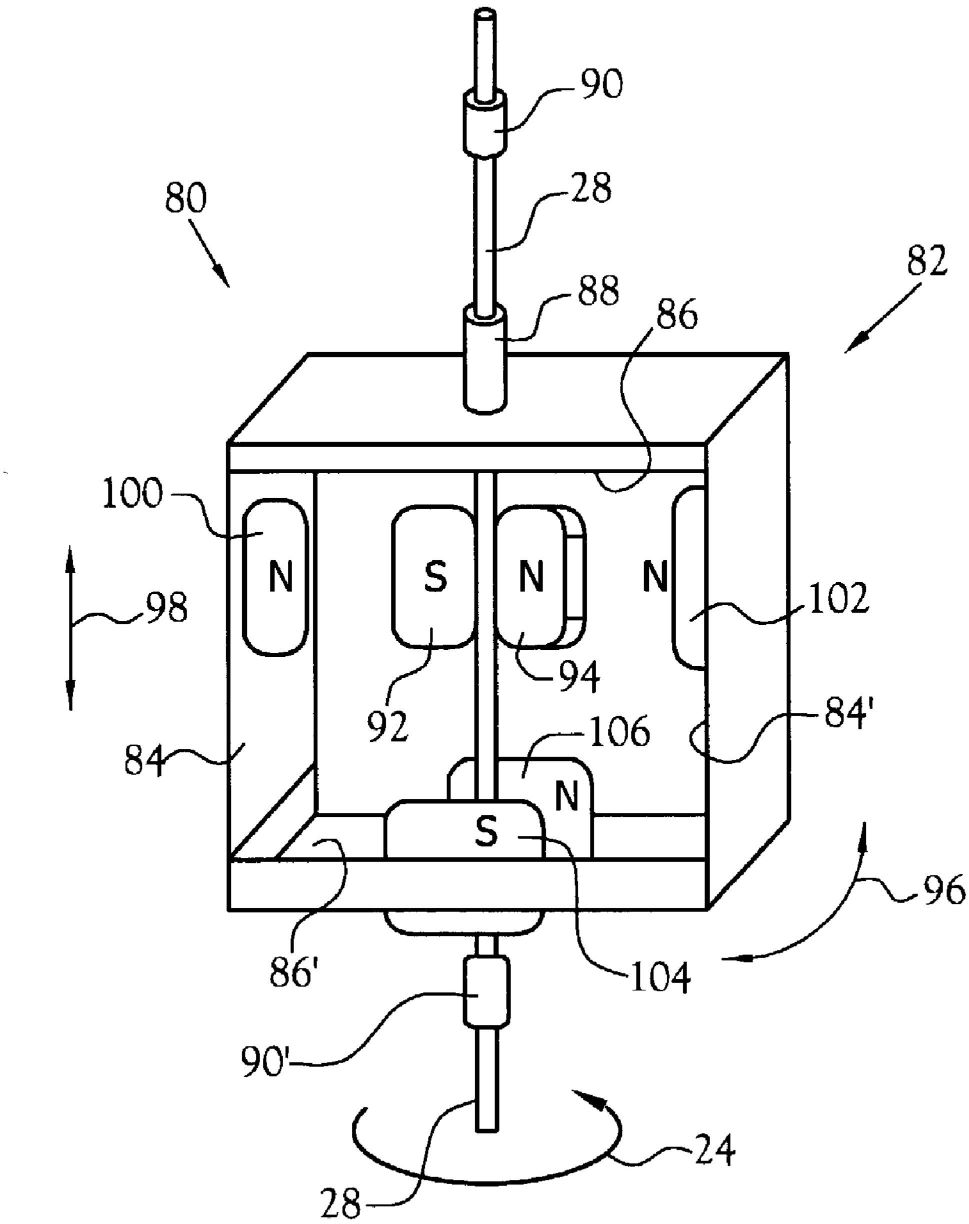
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Fig.4

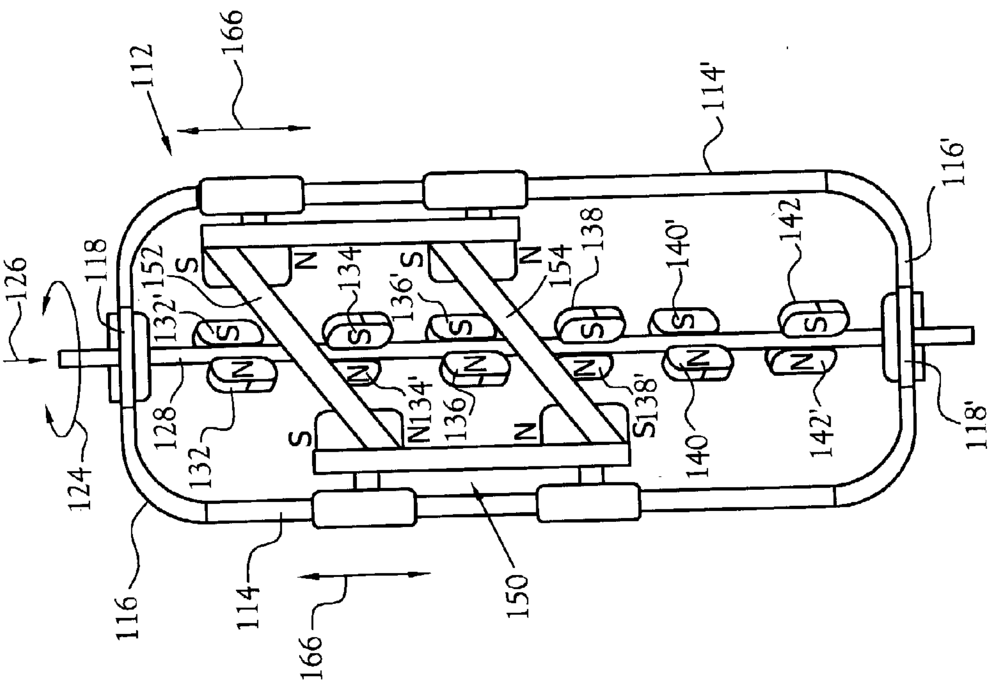
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Fig.5b

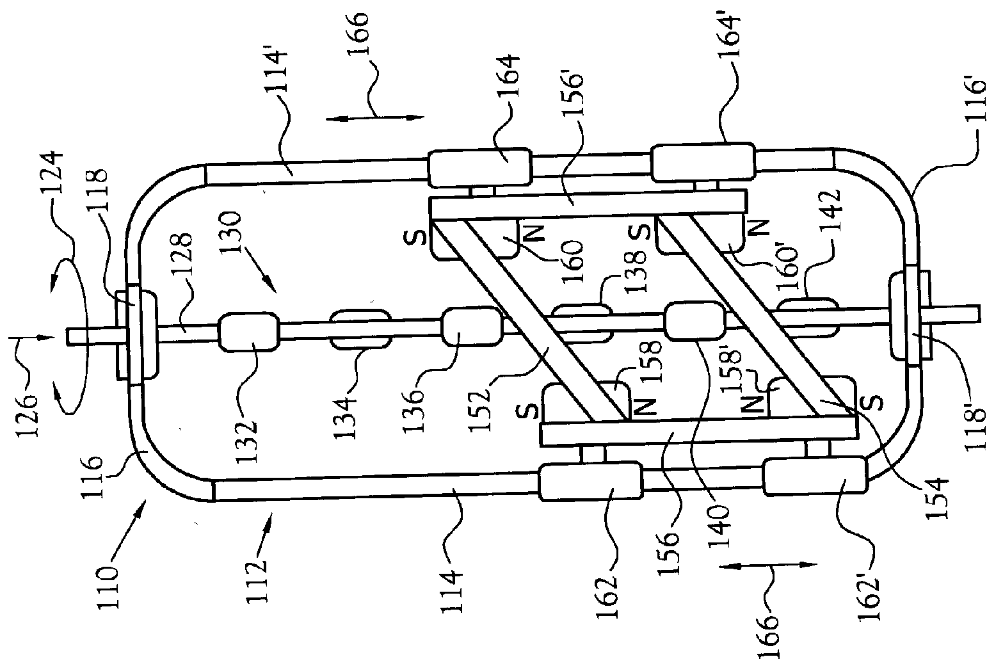
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Fig.5a

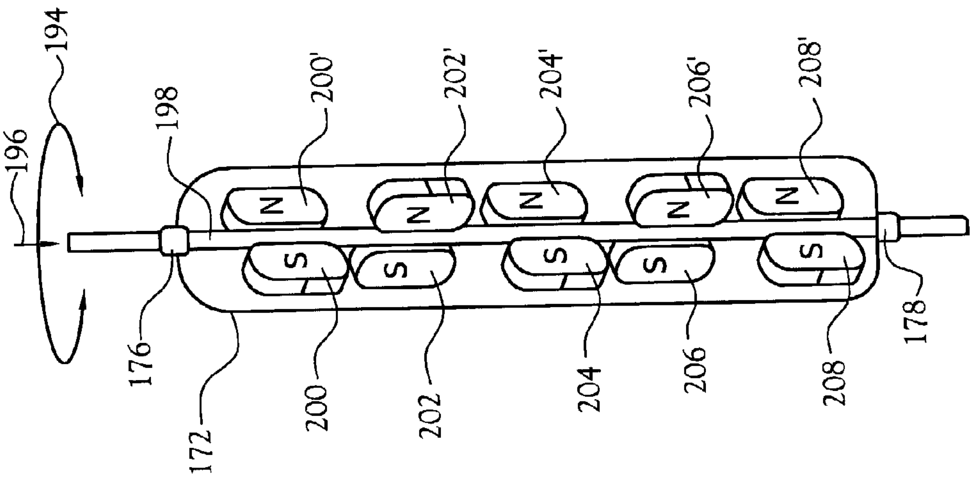

Fig.6d

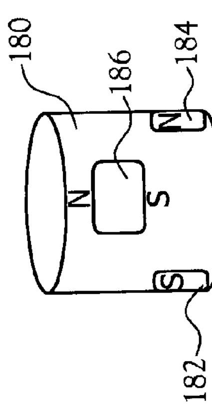

Fig.6b

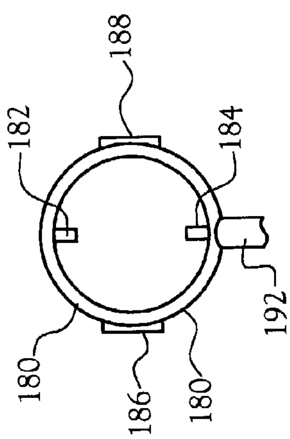

Fig.6c

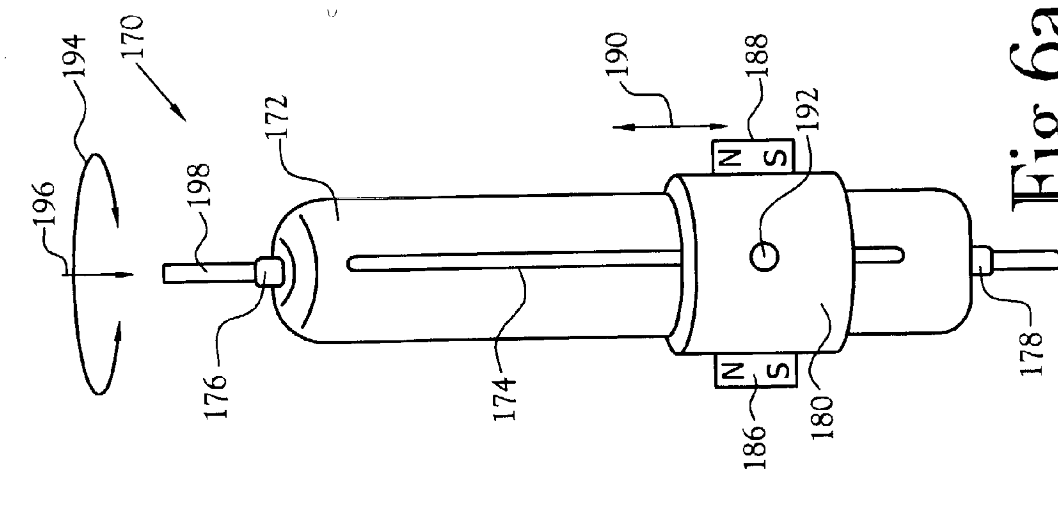

Fig.6a

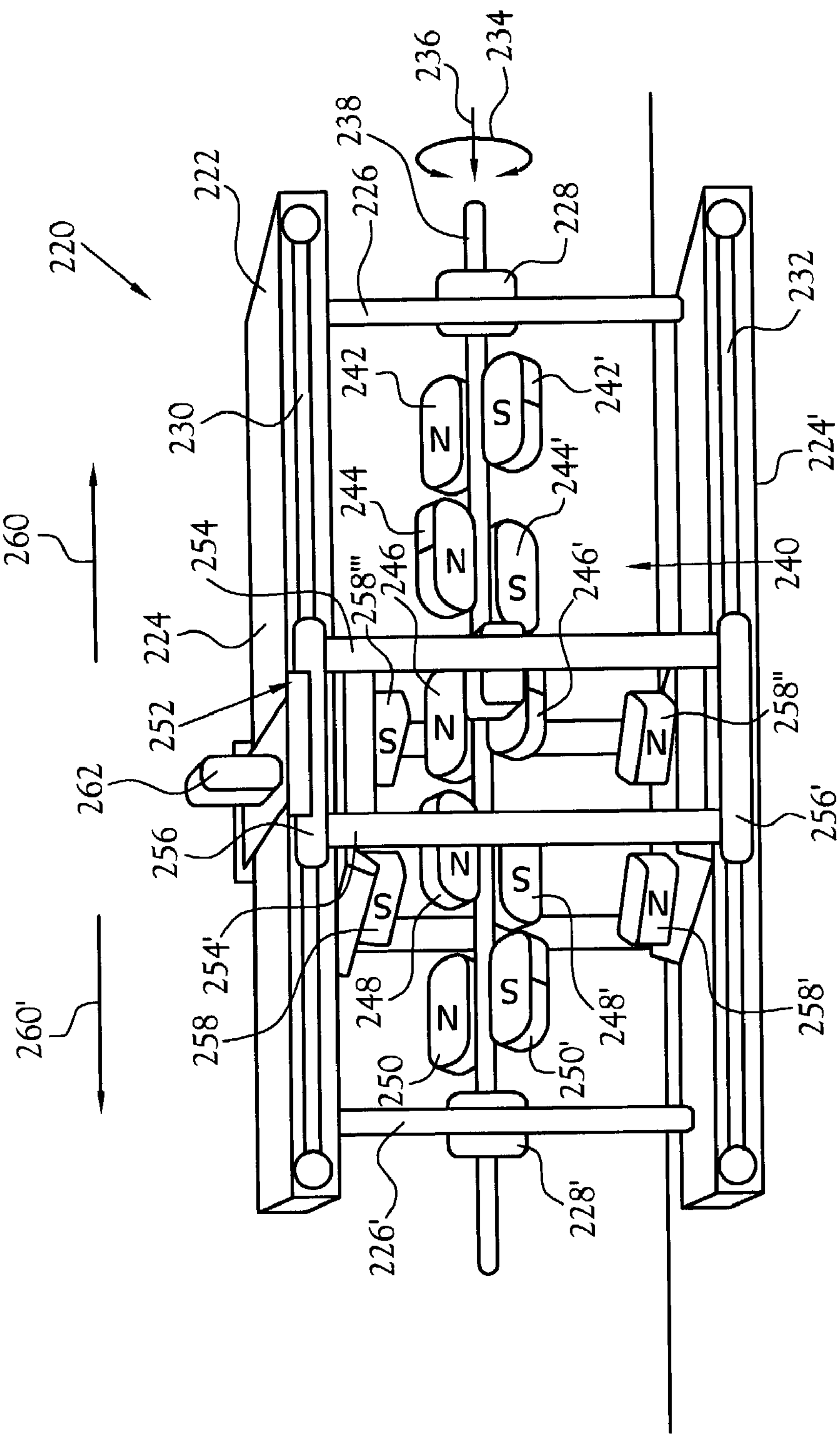
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Fig.7

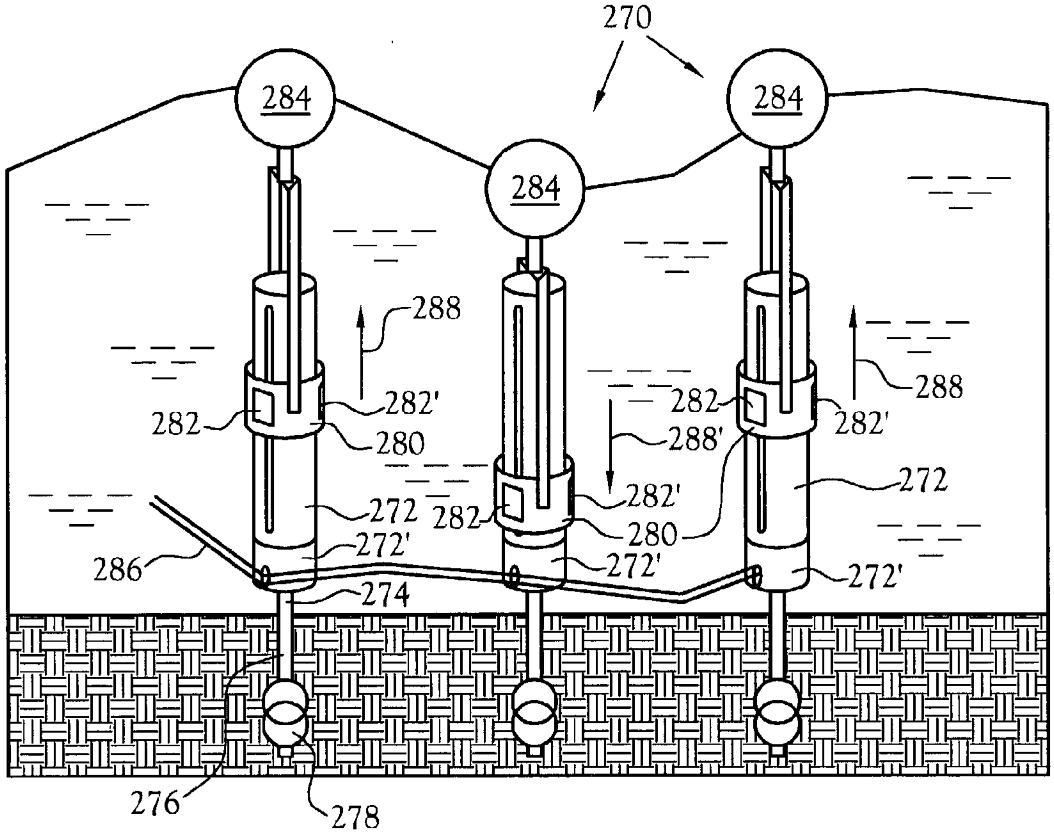
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Fig.8a

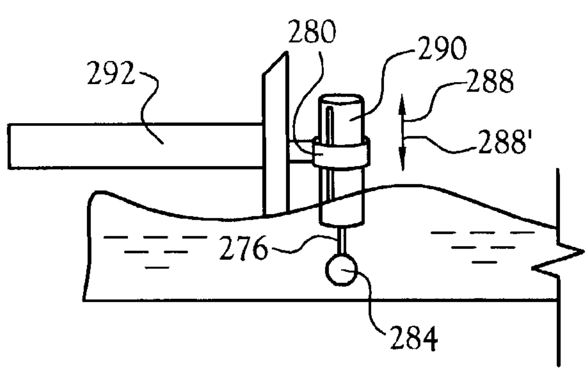
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Fig.8b

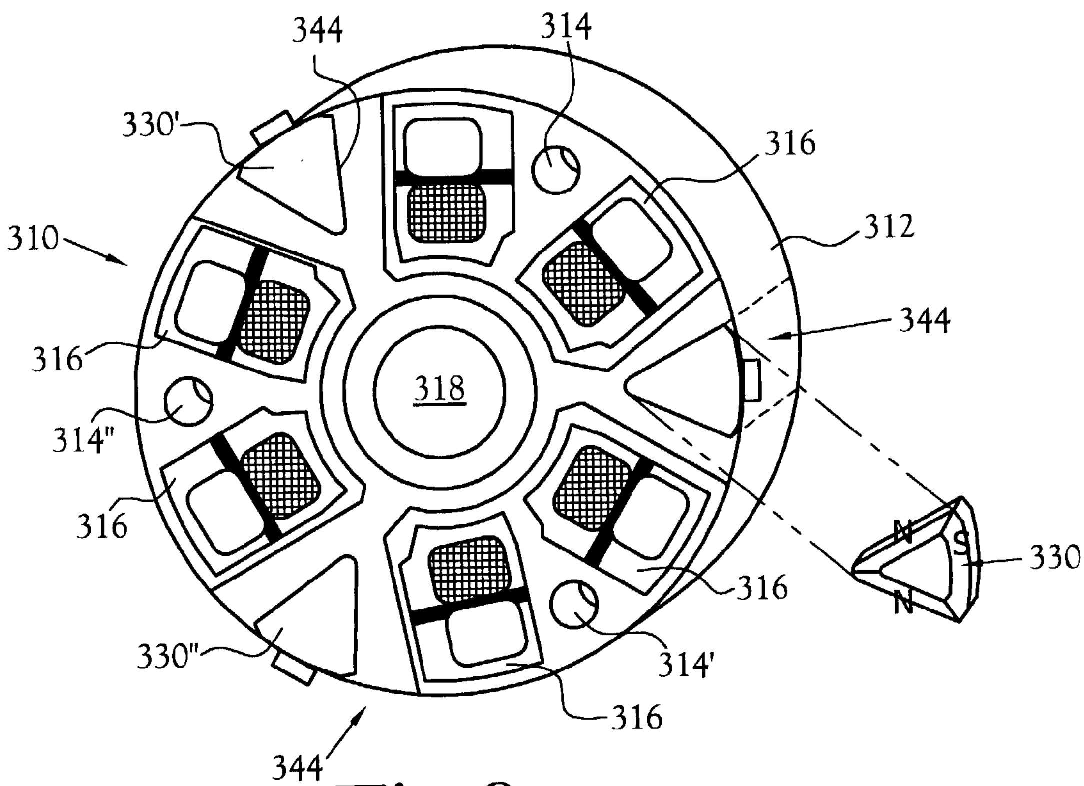
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Fig.9a

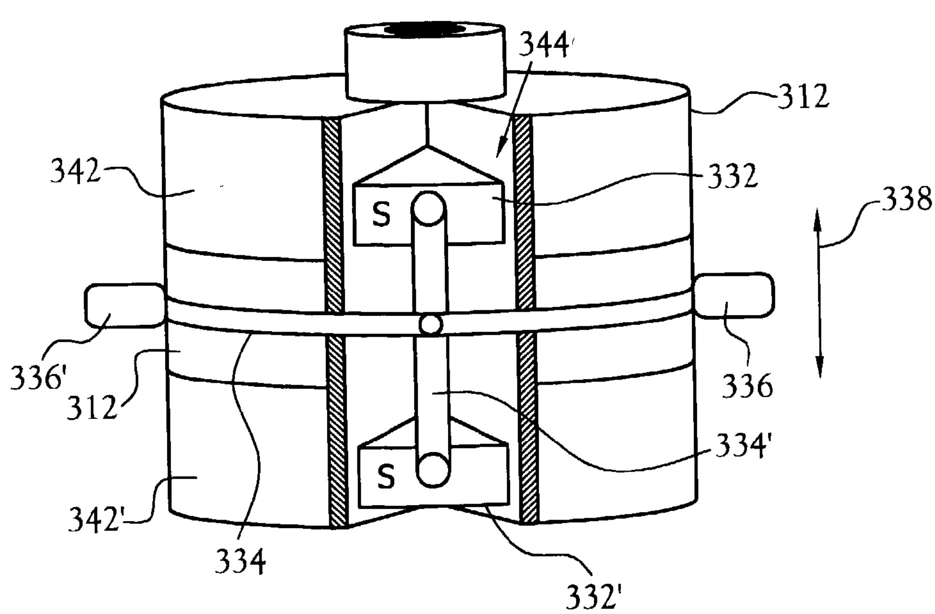
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Fig.9b

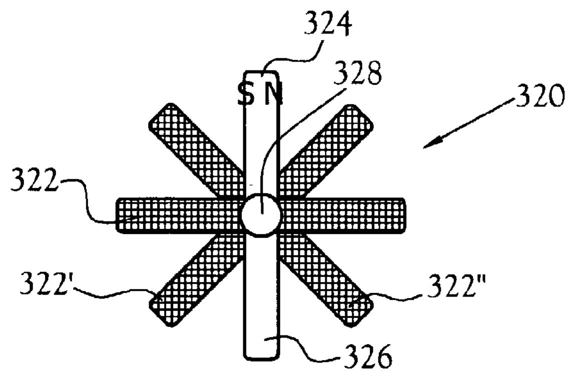

Fig.9c

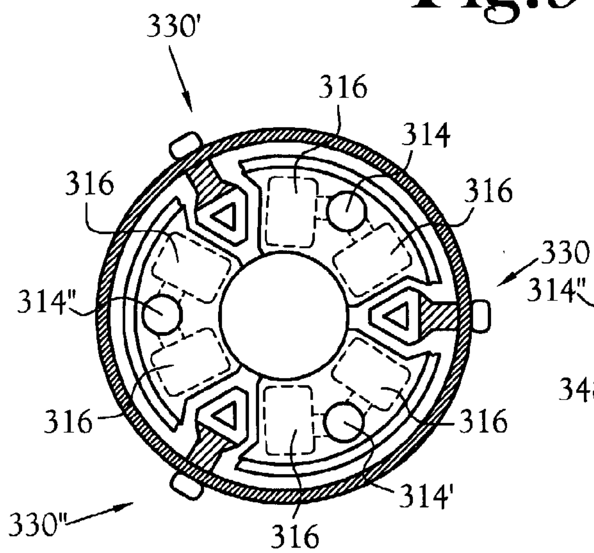

Fig.9d

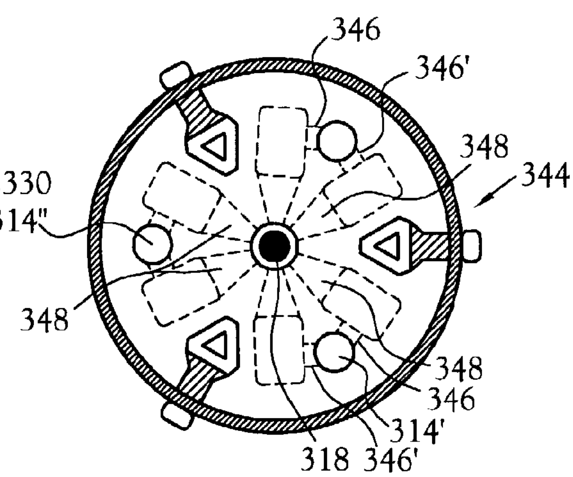

Fig.9e

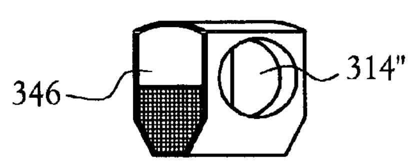

Fig.9f

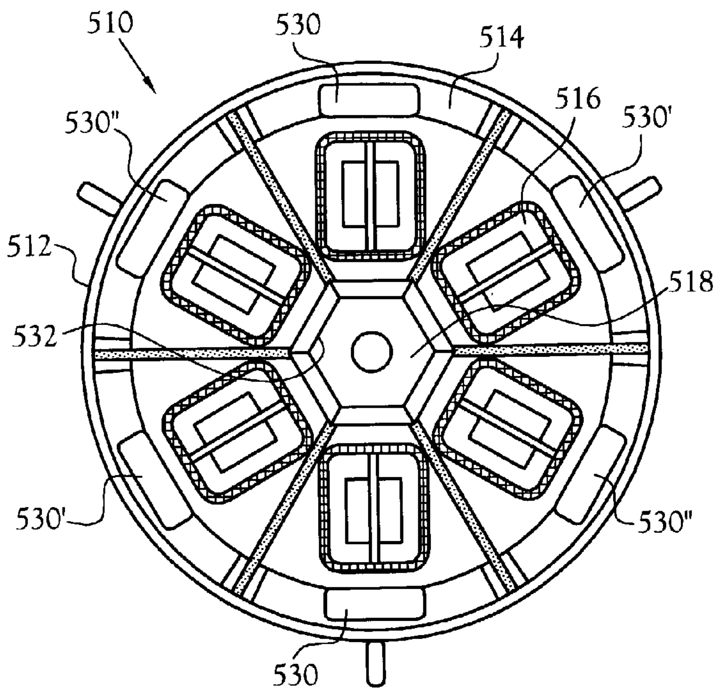

Fig.10a

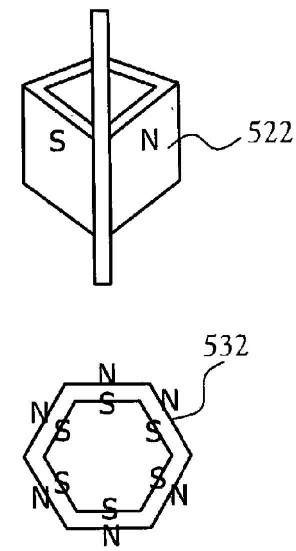

Fig.10d

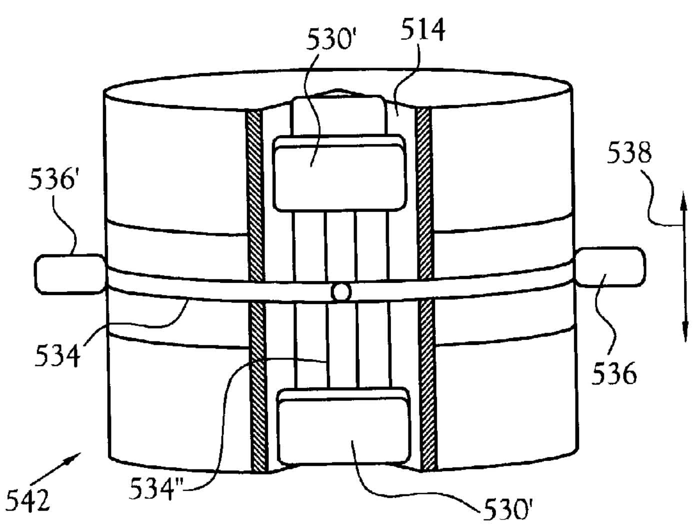

Fig.10b

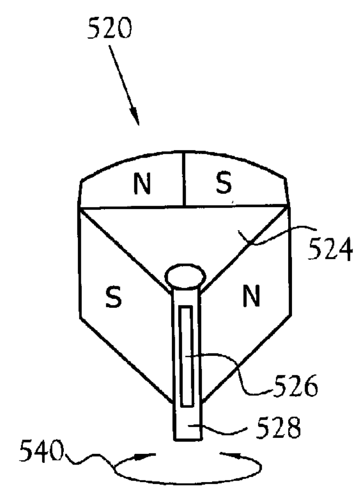

Fig.10c

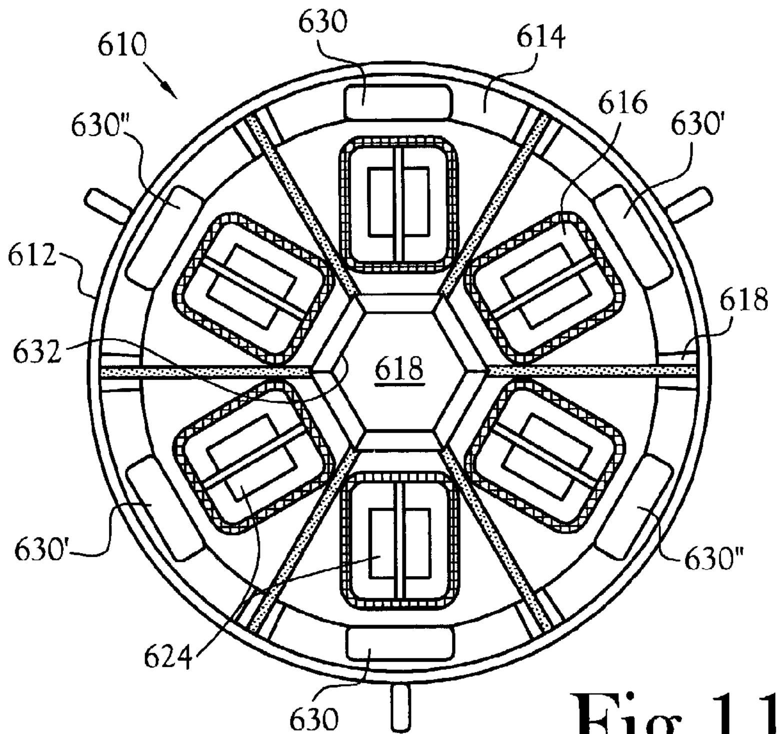

Fig. 11a

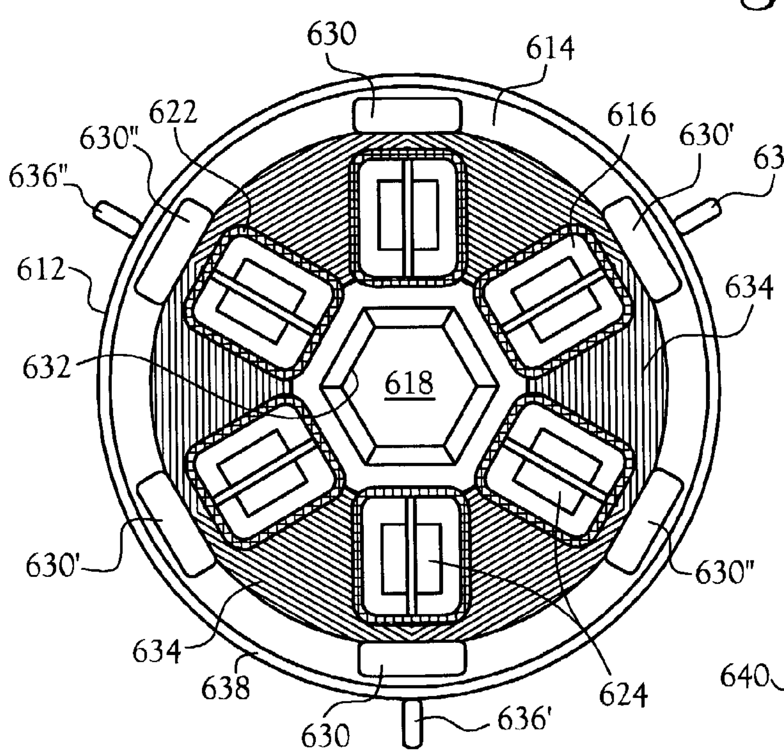

Fig. 11b

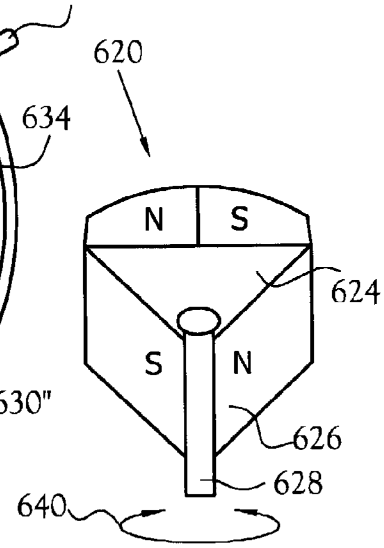

Fig. 11c

LINEAR MAGNETIC HARMONIC MOTION CONVERTER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 60/289,871, filed May 9, 2001.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

BACKGROUND OF THE INVENTION

[0003] 1. Field of Invention

[0004] This invention pertains to an apparatus for linear motion conversion using magnets that convert movement in a linear direction into linear or rotational motion. More particularly, this invention pertains to a plurality of magnets disposed proximal to each other for energy conversion of reciprocating linear or rotational movement into useful motion in rotational or linear movement.

[0005] 2. Description of the Related Art

[0006] Prior magnetic drive mechanisms include a combination of a rotor and a stator with the rotor having at least one magnet thereon for rotation about the stator. According to magnetic principles, magnetic fields of rotors and stators interact in symmetrical alignment in radial fashion and concentric relationship with a magnetically driven output shaft. Magnetic or electromagnetic components of prior magnetic drive mechanisms rotate to a top, dead or center position, utilizing skewed magnetic lines as the components seek alignment and de-energizing prior to a top, dead or center position by timing methods to allow the rotor to continue in a rotational path. In prior magnetic drive mechanisms the stator includes a plurality of inwardly oriented poles and the rotor includes a plurality of outwardly oriented poles. In basic electromagnetic motor designs, the speed of the output shaft is a function of the frequency with which the polarities and voltages are alternated in relation to proper timing of the rotation and orientation of the respective magnetic fields generated to influence the rotor and/or the stator. Timing is addressed by coil arrangements, voltage frequency, reversal of current and electronic controls known to those skilled in the art.

[0007] One example of a prior art device is an electromagnetic motor with a rotating disc and a rotating magnet on a shaft coupled to the disc. The magnetic motor includes a reciprocating magnet aligned proximal to, and movable toward and away from, the rotating magnet in order to repel the rotating magnet. The rotating magnet includes a predetermined number of permanent magnets disposed radially outward from the shaft. The rotating magnets are disposed substantially within the magnetic field of the reciprocating magnet for interaction of the magnetic fields of the rotating magnet and the reciprocating magnet through repulsion or attraction. The magnetic motor requires an actuator means and timing means for displacing the reciprocating magnetic assembly with respect to the rotating magnetic assembly to provide interaction with the magnetic fields of the rotating magnet and the reciprocating magnet to impose a rotational force on the shaft.

[0008] Another example of a prior art device is a rotor apparatus including a permanent magnet type rotating machine having a stator with armature windings thereon. The rotor includes a rotor and a plurality of permanent magnets arranged on the rotor core so as to negate magnetic flux of the armature windings passing through interpoles. The rotor is constructed so that the average of magnetic flex in an air gap between the rotor and the stator which is produced by the permanent magnets at the armature windings, provides a rotating machine which operates as an induction machine at the machine's starting and also operates as a synchronous machine at the rated driving due to smooth pull-in.

[0009] There is a need for a system for motion and force conversion that utilizes a plurality of magnets oriented for converting linear or nonlinear motion from an external energy source such as the movement of a human, into rotational motion for a pair of rotor magnets radially disposed in relation to a central magnetic element that is attracted or repulsed at multiple pivot angles to cause continuous rotary motion upon movement of the rotor magnets.

[0010] Further, it is an object of the present invention to provide an apparatus having units of motion and force conversion that are joined by stacking in parallel or by connecting in series to produce significant power outputs in relation to motion or energy inputs to each unit.

[0011] Additionally, it is an object of the present invention to provide a motion and force converter that operates without partial or incomplete strokes, and does not provide variations of amplitude by a reciprocating member where a continuous torque is desired.

BRIEF SUMMARY OF THE INVENTION

[0012] A motion and energy conversion apparatus for transferring linear motion into rotational motion for producing power from the interaction of at least two magnetic fields. The motion and energy conversion apparatus includes a rotor element having a rotor magnet disposed proximal to an axial shaft. The rotor magnet includes respective north and south poles oriented in a circumferential path of rotation about the axial shaft, with the net flux fields of the north and south poles directed substantially perpendicular to a radius from the axis of rotation of the axial shaft.

[0013] A frame member is disposed in sliding, rotating or pivoting orientation to the axial shaft. The frame member includes at least one perimeter magnet positioned to provide a first magnetic field that influences the movement of the rotor magnet and the rotation of the axial shaft extended through the frame member. The perimeter magnet on the frame member exhibits anisotropic properties having different magnetic flux field values when measured along axes in different directions. The perimeter magnet is moved between different positions in response to external stimuli from an energy source such as a physical input and/or a magnetic influence to force the frame member to reciprocate in relation to the axial shaft. The perimeter magnet on the frame member includes a first magnetic field that is moved by pivoting or sliding in relation to the rotor magnet disposed proximal to the axial shaft. One or more magnets are orientated on the axial shaft in an arrangement providing a second magnetic field sufficiently proximal to the perimeter magnet to be influenced by the attraction and repulsion of the second magnetic field in relation to the first magnetic field. Movement of the perimeter magnet creates a simultaneous repulsing and attracting of rotor magnets on the axial shaft, thereby producing a rotation of the axial shaft for production of rotational movement that is harnessed to perform work. The motion and energy conversion apparatus is utilized as a water wave energy converter, a pumping device for movement of fluids, and/or as a generator of electrical energy that is harnessed to perform work.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0014] The above-mentioned features of the invention will become more clearly understood from the following detailed description of the invention read together with the drawings in which:

[0015] **FIG. 1** is a side view of a linear magnetic harmonic motion converter of the present invention illustrating a pivotable frame having at least one magnet mounted to rotate around an axial shaft with at least one rotor magnet positioned on the axial shaft;

[0016] **FIG. 2** is a side view of an alternative embodiment of **FIG. 1**, illustrating a cross-member slidably movable in relation to a frame mounted to rotate about an axial shaft having at least two magnets thereon, the axial shaft provides rotation for the frame having at least one magnet on opposed ends of the cross-member;

[0017] **FIG. 3***a* is a side view of an alternative embodiment of **FIG. 2**, illustrating a rotatable frame member having corner pivots, with a plurality of rotor magnets disposed on an axial shaft and a plurality of spaced-apart magnets disposed on the side members of the frame member;

[0018] **FIG. 3***b* is a side view of **FIG. 3***a*, illustrating a frame member pivoted at the corner pivots, with the side member magnets moved in relation with the plurality of rotor magnets, resulting in rotation of the axial shaft;

[0019] **FIG. 4** is a perspective view of a linear magnetic harmonic apparatus illustrating a rotatable axial member having magnets thereon and a plurality of perimeter magnets attached on an interior surface of a pivoting structural member;

[0020] **FIG. 5***a* is a side view of an alternative embodiment of **FIG. 2**, illustrating a sliding member having two cross-members with at least two magnets thereon, the cross-members slidably positioned between parallel perimeter members, the cross-members positioned at a first end of an axial shaft around which the perimeter members are rotatable;

[0021] **FIG. 5***b* is a side view of **FIG. 5***a*, illustrating a rotated axial member and a sliding member slid to a second end of the axial shaft, with the axial shaft rotating as the sliding cross-member moves between first and second ends;

[0022] **FIG. 6***a* is a perspective view of an alternative embodiment of a motion converter apparatus illustrating a cylindrical member including a slidable stator unit having magnets thereon and an interior axial shaft having rotor magnets thereon, with the axial member rotatable by changing magnetic flux fields when the stator unit is slide along the exterior of the cylindrical member;

[0023] **FIG. 6***b* is a perspective view of the slidable stator unit of **FIG. 6***a*, illustrating a plurality of magnets positioned on the stator unit;

[0024] **FIG. 6***c* is a top view of the slidable stator unit of **FIG. 6***b*, illustrating a pair of slide pins having magnetic poles within the stator unit; **FIG. 6***d* is a cut-away view of the interior of **FIG. 6***a*, illustrating a plurality of rotor magnets positioned on the axial shaft;

[0025] **FIG. 7** is a perspective view of an alternative embodiment of **FIG. 5***a*, illustrating a rectangular frame member including a sliding cross-member with at least two magnets thereon, the cross-members slidably positioned exterior of parallel perimeter members, with the magnets on the cross-members positioned to provide a magnetic field for influencing the rotation of a plurality of magnets positioned on a rotatable axial shaft;

[0026] **FIG. 8***a* is a perspective view of an alternative embodiment of **FIG. 6***a*, illustrating a plurality of motion converters having magnets therein as illustrated in **FIG. 6***d*, with the motion converters submerged in a body of water and the slidable stator unit having magnets thereon for each motion converter being attached to a buoy on the surface of the water;

[0027] **FIG. 8***b* is a perspective view of an alternative embodiment of **FIG. 8***a*, illustrating a motion converter mounted to a pier and partially submerged in water;

[0028] **FIG. 9***a* is a top perspective view of an alternative embodiment illustrating a pump assembly having a plurality of rotatable impeller fin units;

[0029] **FIG. 9***b* is a side perspective view of **FIG. 9***a* illustrating a plurality of pump assemblies in a stacked configuration;

[0030] **FIG. 9***c* is a side view of one rotatable impeller fin magnet unit of **FIG. 9***a;*

[0031] **FIG. 9***d* is a top view of **FIG. 9***a* illustrating a plurality of fluid flow channels in relation to the stator magnets of the pump assembly;

[0032] **FIG. 9***e* is a top view of **FIG. 9***d* illustrating a plurality of fluid flow channels;

[0033] **FIG. 9***f* is a side perspective view of one fluid flow channel of **FIG. 9***e;*

[0034] **FIG. 10***a* is a top view of an alternative embodiment illustrating an electrical generator having a plurality of rotatable rotor magnet units positioned in a radial configuration within the generator;

[0035] **FIG. 10***b* is a side perspective view of the electrical generator having units in a stacked configuration;

[0036] **FIG. 10***c* is a side perspective view of one rotor magnet unit utilized in the electrical generator illustrated in **FIGS. 10***a* and **10***b;*

[0037] **FIG. 10***d* is a side perspective view of a central magnet positioned within the electrical generator of **FIGS. 10***a* and **10***b;*

[0038] **FIG. 11***a* is a top view of an alternative embodiment of an electrical generator illustrating a plurality of magnetic induction elements disposed between a plurality of rotatable rotor magnet units within the generator;

[0039] **FIG. 11***b* is a top view of an alternative embodiment of **FIG. 10***a* illustrating an electrical generator including a plurality of electromagnetic elements disposed between a plurality of rotatable rotor magnet units within the generator; and

[0040] **FIG. 11***c* is a side perspective view of one rotatable rotor magnet unit utilized in the electrical generator illustrated in **FIG. 10***a*.

DETAILED DESCRIPTION OF THE INVENTION

[0041] An apparatus for a linear magnetic harmonic motion converter **10** is disclosed as generally illustrated in FIGS. **1**-**3***a* and **3***b*. In one embodiment, the motion converter **10** provides conversion of linear, reciprocating movement into rotational motion by the interaction of magnetic fields created by the north and south magnetic poles of a plurality of magnets positioned in a spaced apart configuration around a rotational axis **26**. The motion converter **10** includes a frame **12** disposed to reciprocate along a longitudinal axis that is substantially parallel to the rotational axis **26**. The frame includes at least one side member, or a pair of side members **14, 14'** having opposed first and second ends, and end members **16, 16'** connected at a plurality of pivot junctions at each corner formed by respective opposed first and second ends of the side members **14, 14'**. A means for pivoting includes first side pivot points **18, 18'**, and second side pivot points **20, 20'**, and mid-line pivot points **22, 22'** for allowing the first side member **14** and second side member **14'** to reciprocatingly pivot in alternating directions when an external reciprocating force is imposed on the frame **12**. The plurality of pivot points **18, 18', 20, 20', 22, 22'**, allow the frame **12** to pivot in a reciprocating manner as induced by external forces, with resulting repositioning of at least one frame magnet **40** between first and second positions, resulting in re-orientating of the magnetic fields affecting the at least one rotor magnet **30** mounted along a rotational axis **26**.

[0042] The at least one rotor magnet **30** includes an anisotropic permanent magnet attached on an axial shaft **28** (see **FIG. 1**), also referred to as an axial pivot member, with the axial shaft **28** aligned with the rotational axis **26**. A counter weight **30'** may be attached opposite the one rotor magnet **30**. The rotor magnet **30** includes respective north and south poles oriented of opposed sides of the rotor magnet **30** (see **FIG. 1**), or on opposed ends of the rotor magnet **30** (not shown). The magnetic flux fields of the rotor magnet are oriented in a circumferential path of rotation about the axial shaft **28**, with the net flux fields of the north and south poles of the rotor magnet **30** are directed substantially perpendicular to a radius from the axis of rotation **26** of the axial shaft **28**. The axial shaft **28** serves as a rotational axis about which side members **14, 14'** are reciprocated (see **FIG. 1** and **2**). Movement of the side members **14, 14'** by pivoting at pivot points **18, 18', 20, 20', 22, 22'**, is effective in causing the re-orientation of the magnetic fields created by the north and south magnetic pole of the frame magnet **40**, and results in the creation of rotation of the rotor magnet **30** and rotation of the axial shaft **28** that can be harnessed for creation of rotational movement to perform work (see **FIG. 1**).

[0043] In an alternative embodiment of a motion converter **60**, a first rotor magnet **62**, a second rotor magnet **64**, a third rotor magnet **66**, and a fourth rotor magnet **68** are aligned on the axial shaft **28** and the rotational axis **26** (see **FIG. 2**). The motion converter **60** includes a frame **12"** having at least two side members **14", 14'"** and a pair of end members **16", 16'"** connected to support a slidable cross-member **70** between the at least two side members **14", 14'"**. The slidable cross-member **70** may be aligned to connected at right angles to respective side members **14", 14'"**, or the cross-member **70** may be angled to connected at an angle to respective side members **14", 14'"** (see **FIG. 2**). The cross-member **70** includes at least two cross-member magnets **74, 76** positioned on opposed ends of the cross-member **70**. As the cross-member **70** is moved by external forces to slide **72** along the respective side members **14", 14'"**, the cross-member magnets **74, 76**, having north and south magnetic ends, are slid with resulting repositioning of the cross-member magnets **74, 76** between first and second positions in respect to rotor magnets **62, 64, 66**, and **68** on the axial shaft **28**. Sliding of cross-member magnets **74, 76** results in movement of the cross-member magnets **74, 76** and re-orientation of the north and south magnetic fields created by cross-member magnets **74, 76**, in relation to rotor magnets **62, 64, 66**, and **68**. The re-orientation of the magnetic fields created by cross-member magnets **74, 76** influence the magnetic fields of rotor magnets **62, 64, 66**, and **68**, and result in the creation of rotation of the rotor magnets **62, 64, 66**, and **68**, and rotation of the axial shaft **28** that can be harnessed to perform work (see **FIG. 2**).

[0044] An alternative embodiment of the motion converter **10** is illustrated in **FIGS. 3***a* and **3***b*, includes a plurality of permanent magnet positioned along the frame **12**, including a first frame magnet **42** disposed in a spaced apart configuration on the first side member **14** from a second frame magnet **44**. A third frame magnet **46** is disposed in a spaced apart configuration on the second side member **14'** from a fourth frame magnet **48**. The axial shaft **28** includes a plurality of rotor magnets thereon, including a first rotor magnet **32**, a second rotor magnet **34**, a third rotor magnet **36**, and a fourth rotor magnet **38**, disposed along the length of the axial shaft **28** between the first end member **16** and the second end member **16'**. The rotor magnets include respective north and south poles oriented in a circumferential path of rotation about the axial shaft **28**, with the net flux fields of the north and south poles directed substantially perpendicular to a radius from the axis of rotation **26** of the axial shaft **28**. Reciprocating movement of the side members **14, 14'** by pivoting at pivot points **18, 18', 20, 20', 22, 22'**, is effective in causing the re-orientation of the magnetic fields created by the north and south magnetic poles of the permanent frame magnets **42, 44, 46, 48**, and results in the creation of rotation of the rotor magnets **32, 34, 36, 38** and rotation **24** of the axial shaft **28**, providing rotational movement that can be harnessed to perform work (see **FIGS. 3***a* and **3***b*). An alternative embodiment of permanent frame magnets **42, 44, 46, 48** includes a plurality of electromagnets (not shown) disposed on the side members **14, 14'**, with each electromagnet connected electrically to circuitry and a power means for timing the electrical pulses to each electromagnet, thereby providing a timed and repeated change in the electrical pulses to each electromagnet for repetitively changing the north and south polarity of each of the electromagnets disposed on the side members **14**, **14**'. With each change in polarity of the electromagnets, a re-orientation of the respective electromagnetic fields occurs to provide a means for reciprocating the polarity of the electromagnetic fields, therefore inducing rotation of rotor magnets **32**, **34**, **36**, **38** and corresponding rotation **24** of axial shaft **28** to perform work.

[**0045**] An alternative embodiment of the motion converter **10** is illustrated in **FIG. 4**, includes a structural member such as a shell **82**, either substantially rectangular (see **FIG. 4**) or cylindrical (not shown). The shell **82** includes a first interior side surface **84** and a second interior side surface **84**', and includes an end first bracket **86** and a second bracket **86**'. An axial shaft **28** includes at least two rotor magnets **92**, **94** disposed on the axial shaft **28** within the enclosure formed by the shell **82**. A first side magnet **100** and a second side magnet **102** are disposed on respective side surfaces **84**, **84**', and a first end magnet **104** and a second end magnet **106** are disposed on respective end brackets **86**, **86**'. The shell is rotatable **96** about about the axial shaft **28** by utilization of sleeves **88**, **88**' (not shown), and is reciprocatingly moved up and down **98** in relation to the axial shaft **28**. An upper range of motion is determined by the position of an upper stop member **90**, and a lower range of motion is determined by the position of lower stop member **90**'. When an external force reciprocates the shell **82** upwards or downwards, the resulting repositioning of side magnets **100**, **102** and end magnets **104**, **106**, between a first, a second, and additional positions during rotation around axial shaft **28**, results in re-orientating of the magnetic fields affecting rotor magnets **92**, **94**, which rotate under the influence of the re-orientation of the magnet fields to force rotation of axial shaft **28**. Reciprocation movement **98** of shell **82** results in the creation of rotation of the rotor magnets **92**, **94**, and rotation **24** of the axial shaft **28** for creation of rotational movement that can be harnessed to perform work (see **FIG. 4**). The rotor magnets **92**, **94** may be oriented at 180 degrees separation on the axial shaft **28**, or an additional embodiment may include three rotor magnets (not shown) that are oriented at 120 degrees separation on the axial shaft **28**, or may include two or four paired magnets oriented at 90 degrees separation, or any alternative angle of separation that allows the axial shaft **28** to remain balanced during rotation.

[**0046**] An alternative embodiment of the motion converter **110** is illustrated in **FIGS. 5***a* and **5***b*, including a frame **112** having a first side member **114** and a second side member **114**' that are substantially parallel to each other. A first end member **116** and a second end member **116**' are attached to the side members **114**, **114**' to for a substantially rigid frame. A first rotation connector **118** and a second rotation connector **118**' are centered along respective end members **116**, **116**', allowing an axial shaft **128** to extend through each rotation connector **118**, **118**' to allow free rotation **124** of the frame **112** about a rotational axis **126** aligned along the axial shaft **128**. A plurality of rotor magnets **130** are disposed in spaced apart positions along the axial shaft **128**. Rotor magnets **130** may be oriented at 180 degree separation from each other, including two or more permanent magnets such as first rotor magnet **132**, second rotor magnet **134**, third rotor magnet **136**, fourth rotor magnet **138**, fifth rotor magnet **140** and sixth rotor magnet **142** (see **FIG. 5***a*). The plurality of rotor magnets **130** may be positioned to extend from opposed sides (180 degree separation) of the axial shaft **128**, or may extend at 120 degree separation, at 90 degree separation, or any alternative angle of separation that allows the axial shaft **128** to remain balanced during rotation. An alternative embodiment is illustrated in **FIG. 5***b*, providing a plurality of pairs of rotor magnets **132**, **132**', **134**, **134**', **136**, **136**', **138**, **138**', **140**, **140**', **142**, **142**' that are disposed to extend outwards from the axial shaft **128**.

[**0047**] The motion converter **110** further includes a slide bracket **150** disposed to extend between, and to be slidably moved along each side member **114**, **114**'. The slide bracket **150** includes a first cross-member **152** and a second cross-member **154** attached between first bracket **156** and second side bracket **156**'. A pair of perimeter magnets **158**, **158**' are positioned proximal to a connecting junction of first bracket **152** with side brackets **156**, **156**'. A similar sized pair of perimeter magnets **160**, **160**' are positioned at a connecting junction of second bracket **154** with side brackets **156**, **156**' (see **FIGS. 5***a* and **5***b*). The perimeter magnets **158**, **158**', **160**, **160**' are spaced apart and oriented inwardly in order for each magnet's magnetic field to influence the magnetic fields of the plurality of rotor magnets **130**. A slide means includes sliding couplings **162**, **162**' and **164**, **164**' that provide reciprocating sliding motion **166** of the slide bracket **150** in relation to the frame **112**. When an external force reciprocates the slide bracket **150** upwards or downwards, the resulting repositioning of perimeter magnets **158**, **158**', **160**, **160**', between a first and a second position, results in re-orientating of the magnetic fields influencing rotor magnets **132**, **134**, **136**, **138**, **140**, **142**, which are rotated under the influence of the re-orientation of the magnet fields to force rotation of axial shaft **128**. Reciprocation movement **166** of slide bracket **150** results in the creation of rotation of the plurality of rotor magnets **130** and rotation **124** of the axial shaft **128** for creation of rotational movement that can be harnessed to perform work (see **FIGS. 5***a* and **5***b*).

[**0048**] An alternative embodiment of the motion converter **170** is illustrated in **FIGS. 6***a*, **6***b*, **6***c* and **6***d*, including a cylindrical frame **172** having a first end rotation connector **176** and a second end rotation connector **178**. A rotational axis **196** is aligned along the longitudinal axis of the cylindrical frame **172**. The rotational axis **196** is aligned with an axial shaft **198** that is rotated **194** in relation to the cylindrical frame **172**. Attached to the axial shaft **198**, on the interior of the cylindrical frame **172**, and disposed in spaced-apart separation to extend outwardly from the axial shaft **198**, are a plurality of rotor magnets. The magnets include a first pair of opposed rotor magnets **200**, **200**', a second pair of opposed rotor magnets **202**, **202**', a third pair of opposed rotor magnets **204**, **204**', a fourth pair of opposed rotor magnets **206**, **206**', and a fifth pair of rotor magnets **208**, **208**'. The plurality of rotor magnets may be positioned to extend from opposed sides (180 degree separation) of the axial shaft **198**, or may extend at 120 degree separation, at 90 degree separation, or any alternative angle of separation that allows the axial shaft **198** to remain balanced during rotation.

[**0049**] As illustrated in **FIGS. 6***a*, **6***b* and **6***c*, a slidable sleeve **180** is attached in a sliding configuration into at least one slot **174**, and preferably two opposed slots **174**, **174**' (not shown), in the exterior surface of the cylindrical frame **172**. The sleeve **180** includes two interior positioned slide pin members **182**, **184** which extend inwardly from the sleeve

180, and which insert into slots **174, 174'**. Each pin member **182, 184** includes a separate permanent magnet having respective north and south poles. Attached on an exterior surface of the sleeve **180** is at least one magnet **186**, and preferably at least one opposed magnet **188**. A connector member **192** is releasably attachable to the sleeve **180**, with the connector member attached to a means for movement (not shown) to the slidable sleeve **180**. When force is transferred to the sleeve **180**, the sliding movement **190** of sleeve **180**, pin member magnets **182, 184** and perimeter magnets **186, 188** on the sleeve **180** in relation to the frame **172** provides a re-orientation of the magnetic fields influencing the rotor magnets disposed on the axial shaft **198**. The re-orientation of the magnetic fields of the magnets associated with the sleeve **180**, results in the creation of rotation **194** of the rotor magnets **200, 200', 202, 202', 204, 204', 206, 206', 208, 208'**, and rotation of the axial shaft **198** that can be harnessed for creation of rotational movement to perform work (see **FIGS.** *6a* and *6d*).

[**0050**] An alternative embodiment of the motion converter is illustrated in **FIG. 7** as a motion converter **220** that is interconnectable to like-configured motion converters. A substantially rectangular frame **222** includes a first side member **224** and a second side member **224'** that are substantially parallel to each other. A first end member **226** and a second end member **226'** are attached to the side members **224, 224'** to for a substantially rigid frame. A first rotation connector **228** and a second rotation connector **228'** are centered along respective end members **226, 226'**, allowing an axial shaft **238** to extend through each rotation connector **228, 228'** to allow free rotation **234** of the frame **222** about a rotational axis **236** aligned along the axial shaft **238**. A pair of first slide channels **230, 230'** on opposed sides of first side member **224**, and a second pair of second slide channels **232, 232'** on opposed sides of second side member **224'** allow for sliding of a slide bracket **252** along the length of frame **222**. A plurality of pairs of rotor magnets **240** are disposed in spaced apart positions along the axial shaft **238**. Each pair of rotor magnets **230** may be oriented at 180 degree separation from each other, and includes any combination of two or more pairs of rotor magnets with five pairs of magnets illustrated as first rotor magnet **242**, second rotor magnet **244**, third rotor magnet **246**, fourth rotor magnet **248**, fifth rotor magnet **250** (see **FIG. 7**). The plurality of pairs of rotor magnets **240** may be positioned to extend from opposed sides (180 degree separation) of the axial shaft **238**, or may extend at 120 degree separation, at 90 degree separation, or any alternative angle of separation that allows the axial shaft **238** to remain balanced during rotation. The plurality of pairs of rotor magnets **240** include respective north and south poles oriented in a circumferential path of rotation about axial shaft **238**, with the net flux fields of the north and south poles directed substantially perpendicular to a radius from the axis of rotation **236** of axial shaft **238**.

[**0051**] The motion converter **220** further includes a slide bracket **252** disposed to extend between, and to be slidably moved along each side member **224, 224'** (see **FIG. 7**). The slide bracket **252** includes a first cross-member **254** and a second cross-member **254'** attached between first side bracket **256** and second side bracket **256'**. At least one pair of slide bracket magnets **258, 258'** are positioned proximal to a connecting junction of first and/or second cross-member **254, 254'** with side brackets **256, 256'**. The pair of slide bracket magnets **258, 258'**, are spaced apart and oriented inwardly in order for each magnet's magnetic field to influence the magnetic fields of the plurality of rotor magnets **240**. A second pair of slide bracket magnets **258", 258'"** may be positioned to one of the cross-members **254, 254'**. A slide means includes sliding couplings (not shown) inserted into respective grooves **230, 230', 232, 232'**, and a handle **262** or another device for manipulation of he slide means and slide bracket **252**, that allow for generation of a reciprocating sliding motion **260, 260'** of the slide bracket **252** in relation to the frame **222**. When an external force reciprocates the slide bracket **252** sideways, the resulting repositioning of slide bracket **258, 258'**, between a first and a second position, results in re-orientating of the magnetic fields influencing the plurality of rotor magnets **242, 242', 244, 244', 246, 246', 248, 248', 250, 250'**, which are rotated under the influence of the re-orientation of the magnet fields to force rotation of axial shaft **238**. Reciprocation movement **260, 260'** of slide bracket **252** results in the creation of rotation of the plurality of magnets **240** and rotation **234** of the axial shaft **238** for creation of rotor rotational movement that can be harnessed to perform work (see **FIG. 7**).

[**0052**] Alternative embodiments for the slidable sleeve **180** of **FIG.** *6a* includes a wave motion converter **270** as illustrated in **FIGS.** *8a* and *8b*. The wave motion converter **270** includes a cylindrical shell **272** having a configuration similar to **FIG.** *6a*, with a modification including an axial shaft **274** that does not rotate at the lower end **276**, which is connected to an anchor **278** or a similar weighted tether that is connected or rests on a lake or ocean bottom (see **FIG.** *8a*). A plurality of wave motion converters **270** may have a connector conduit **286** attached between each cylindrical shell **272**. The connector conduit **286** may include electrical cables interconnected between electrical circuitry housed in bottom member **272'** for transmission of wave movement data and/or transmission of electrical signals generated by the operation of each wave motion converter **270**. The axial shaft **274** extends through the interior of the cylindrical shell **272**, and includes a plurality of rotor magnets attached on the axial shaft **274** that is rotatable within the cylindrical shell **272**, with the magnets positioned in a spaced-apart configuration as illustrated in **FIG.** *6d*. The wave motion converter **270** further includes a sliding sleeve **280** that is attached to slots along the length of the cylindrical shell **272** (see **FIGS.** *6a* and *6c*), and is connected to a bracket **282** that extends upwards for a sufficient length from the sleeve **280** to connect to a buoy **284** that rests on, or just under, the surface of the lake or ocean. The buoy **284** moves upwards and downwards in unison with the movement of the waves, with resulting movement up **288** and movement down **288'** of the sleeve **280**. The sleeve **280** includes one or more magnets disposed thereon, as illustrated in **FIGS.** *6b* and *6c*. The sleeve magnets are of sufficient strength and are oriented to extend a magnetic field from each sleeve magnet attached to the sliding sleeve **280**, to influence the rotation of the plurality of rotor magnets that are disposed on the axial shaft **274** within the shell **272**. As waves move the buoy **284** up and down, the movement is transferred to the sleeve **280**, resulting in sliding movements of the sleeve **280** and magnets **282, 282'** attached to the each sleeve **280** in relation to the shell **272** and the rotor magnets within the cylindrical shell **280**. The reciprocating reorientation of the magnetic fields of the sleeve magnets influence the rotation of the rotor magnets disposed on the axial shaft **274**, resulting in the creation of electrical energy by electrical circuitry positioned to connect to the rotatable axial shaft **274**. The electrical energy created by the movement of the axial shaft **274** can be harnessed by electrical circuitry housed in water-tight bottom member **272**' for creation of electrical current for providing electrical power to illuminate buoy lights and/or buoy audio warning systems to warn marine vessels to maintain proper distances from the buoys **284**. An alternative embodiment is illustrated in **FIG. 8***b*, with the cylindrical shell **290** being connected in a sliding configuration to a dock or a similar non-movable object. The lower end **276** of the axial shaft **274** is connected to a submerged buoy **284** that is moved up **288** and down **288**' with the movement of the water. The reciprocating re-orientation of the magnetic fields of the sleeve magnets influence the rotation of the rotor magnets disposed on the axial shaft **274**, resulting in the creation of electrical energy by electrical circuitry positioned to connect to the rotatable axial shaft **274**. The electrical energy created by the movement of the axial shaft **274** can be harnessed for creation of electrical current for providing electrical power to illuminate dock lights and other accessories on the dock.

[**0053**] An alternative embodiment of the motion converter is illustrated in **FIGS. 9***a***9***f*, illustrating a motion converter operating as a pump assembly **310** for movement of fluids through a housing **312** utilizing rotatable rotor magnet and impeller units **320** including impeller fins **322, 322', 322"** having at least one rotor magnet **324** interposed between the impeller fins (see **FIG. 9***c*). A second rotor magnet (not shown) may be opposed from the first rotor magnet **324**, or a counter weight **326** may be opposed from the first rotor magnet **324**. The impeller fins **322, 322', 322"** are mounted in a radially extended orientation on an axial shaft **328** similar to a paddle wheel oriented within respective channels within a housing **312** having a plurality of fluid channels **314, 316, 318, 346,** and **348** for fluids to move through. Each rotor magnet **324** includes respective north and south poles oriented in a circumferential path of rotation about each axial shaft **328**. The net flux fields of the north and south poles of each rotor magnet **324** are directed substantially perpendicular to a radius from the axis of rotation of the axial shaft **328**. The housing **312** includes a central fluid channel **318** for flow of fluid out of the housing **312,** with the central fluid channel **318** interconnected by additional fluid channels to an input channel **314** A generally rectangular fluid channel **316** includes at least rotatable rotor magnet and impeller unit **320** therein. The housing **312** includes a plurality of perimeter oriented magnet channels **344** having at least one, or a pair of interconnected stator magnets **332, 332**' disposed to reciprocate in a linear direction within each magnet channel **318**. **FIG. 9***b* illustrates an interconnecting means such as a peripheral linkage **334** and a connector bracket **334**' attached between respective slide pins **336, 336**' that are manipulated to move linearly **338** by a mechanical means (not shown) for moving each stator magnet **332** or each pair of stator magnets **332, 332**' in linear relationship to the plurality of impeller fin units **320** rotatable **340** around each rotation shaft **328**. During reciprocation of the peripheral linkage **334** and connector bracket **334**', the stator magnets **332, 332**' are reciprocated along magnet channels **344** in relation to each rotor magnet **324** on each impeller unit **320**. Each rotatable rotor magnet and impeller unit **320** having respective impeller fins **322, 322', 322"** are rotated under the influence of the re-orientation of the magnet fields from each pair of stator magnets **332, 332**' to force rotation of each axial shaft **328**, with resulting movement of fluids through respective fluid channels **314, 316, 318**. The housing **312** is stackable with like configured housings **342, 342**' to provide for additional capacity for pumping liquids.

[**0054**] **FIGS. 9***d* and **9***e* are top views of **FIG. 9***a* illustrating a plurality of fluid flow channels in relation to the rotatable rotor magnet and impeller units **320** of the pump assembly **310**. A fluid intake is illustrated as a plurality of fluid channel openings **314** that are in fluid communication with lateral channels **346, 346**'. Fluid is allowed to move from lateral channels **346, 346**' into respective fluid channels **316** in which at least rotatable rotor magnet and impeller unit **320** is disposed. **FIG. 9***f* is a side perspective view of one fluid channel opening **314** connected to lateral channels **346, 346**'. Each respective impeller fin **322, 322', 322"** rotates in response to rotation influenced by rotor magnets **324, 324**' to provide fluid flow from each respective fluid channel **316** through respective connector fluid channels **348** and into central fluid channel **318** for movement of fluid out of the housing **312**. Flow may be reversed by changing the magnetic poles of the stator magnets **332, 332**' and/or changing the orientation and movement of the stator magnets **330, 330', 330"** within the respective perimeter channels **344**. The housing **312** is stackable with like configured housings **342, 342**' to provide for additional capacity for pumping liquids.

[**0055**] An alternative embodiment of the motion converter for utilization as an electrical generator **510** is illustrated in **FIGS. 10***a***-10***d*. **FIG. 10***a* is a top view of an electrical generator **510** having a housing **512** with a plurality of rotor magnet units **520** positioned to rotate within channels **516** in a radial configuration in the housing **512**. The plurality of rotor magnet units **520** are rotated about an axial shaft **528** due to the influence of a changing magnetic flux field generated by linear movement of opposed pairs of stator magnets **530, 530', 530"** positioned at a perimeter of the housing **512**. Each of the rotor magnet units **520** are disposed to rotate within a channel **516** that is radially oriented in relation to a central channel **518** formed within a central magnet **532**. Each of the opposed pairs of stator magnets **530, 530', 530"** are disposed in respective channels **514** that open outwardly in a spaced apart configuration along the perimeter of the housing **512**. Each rotor magnet units **520** may include a two-sided magnet (not shown), a three-sided magnet **522** having a north and south pole on opposed, angled surfaces, or a multi-sided rotor magnet **524** having a north and south magnetic pole positioned on a perimeter side of the magnet **524**. Additional north and south poles may be oriented on opposed angled sides of rotor magnet **524** as illustrated in **FIG. 10***c*. Each north and south pole is oriented in a circumferential path of rotation about the axial shaft **528**, with the net flux fields of the north and south poles directed substantially perpendicular to a radius from the axial shaft **528** around which the rotor magnet **524** rotates within each respective channel **516**. Each channel **516** is oriented having a lengthwise axis positioned toward a central magnet **532** positioned within the housing **512** (see **FIG. 10***a* and **10***d*). A counter-weight **526** may be attached to axial shaft **528** in an opposed orientation from respective magnet **522** or **524**. The rotation **540** of the rotor magnets **522** or **524** is induced by movement of the stator magnets **530** within respective channels **514** along the perimeter of the housing **512** A plurality of pairs of stator magnets **530, 530', 530"** are oriented in pairs as illustrated in **FIG. 10***a*. Each stator magnet **530, 530', 530"** may be connected by a perimeter connector bracket **534** to allow movement of one pair **530** of stator magnets in unison with a second pair **530'**, and a third pair **530"** of stator magnets, which can also be combined in a stacked orientation **542** (see **FIG. 10***b*) to be disposed in a spaced apart orientation by a generally vertical oriented connector bracket **534'**. One or a plurality of slide pins **536, 536'** are attached to the perimeter connector bracket **534** to allow an outside force to reciprocate the slide pins **536, 536'**, the brackets **534, 534'** and the pairs of stator magnets **530, 530', 530"** in a linear movement **538** within each channel **514**. Upon reciprocating motion of the pairs of stator magnets **530, 530', 530"**, as induced by external forces, the resulting re-orientating of the respective north and south magnetic fields induces rotational movement **540** for each rotor magnet **522** or **524**, thereby generating electrical energy that is collected by electrical circuitry (not shown) associated with the housing **512** and connected with each of the plurality of rotor magnet units **520**.

[**0056**] An alternative embodiment of the motion converter for utilization as an electrical generator **510** illustrated in **FIG. 10***a*, is an electrical generator **610** illustrated in **FIGS. 11***a*-**11***c*. Electrical generator **610** includes a housing **612** in which a plurality of magnetic induction elements **622** (see **FIG. 1***a*) are disposed between a plurality of rotor magnet units **620** that are individually rotatable within separate channels **616** in the housing **612**. The magnetic induction elements **622** are interdisposed between the channels **616** and electric generation circuitry (not shown) is interconnected with each magnetic induction elements **622**. The plurality of rotor magnet units **620** are rotated about an axial shaft **628** due to the influence of a changing magnetic flux field generated by linear movement of opposed pairs of stator magnets **630, 630', 630"** positioned at a perimeter of the housing **612**. Each of the rotor magnet units **620** are disposed to rotate within a channel **616** that is radially oriented in relation to a central channel **618** formed within a central magnet **632**. Each of the opposed pairs of stator magnets **630, 630', 630"** are disposed in respective channels **614** that open outwardly in a spaced apart configuration along the perimeter of the housing **612**, as illustrated in **FIG. 10***b* for the perimeter of a like-configured generator **510**. As illustrated in **FIG. 11***c,* each rotor magnet unit **620** includes a multi-sided rotor magnet **624** having a north and south magnetic pole positioned on a perimeter of the magnet **624**. Additional north and south poles may be oriented on opposed angled sides of rotor magnet **624** as illustrated in **FIG. 11***c*. Each north and south pole is oriented in a circumferential path of rotation about the axial shaft **628**, with the net flux fields of the north and south poles directed substantially perpendicular to a radius from the axial shaft **628** around which the rotor magnet **624** rotates within each respective channel **616**. Each channel **616** is oriented having a lengthwise axis positioned toward a central magnet **632** positioned within the housing **612** (see **FIGS. 11***a* and **11***d*). A counter-weight (not shown) may to attached to axial shaft **628** in an opposed orientation from rotor magnet **624**, or alternative two-sided or three-sided rotor magnets (not shown) may be utilized for each rotor magnet unit **620**. The rotation **640** of the rotor magnets **624** is induced by movement of the stator magnets **630** within respective channels **614** along the perimeter of the housing **612**. A plurality of pairs of stator magnets **630, 630', 630"** are oriented in pairs as illustrated in **FIG. 11***a*. Each stator magnet **630, 630', 630"** may be connected by a perimeter connector bracket **638** to allow movement of one pair **630** of stator magnets in unison with a second pair **630'**, and a third pair **630"** of stator magnets, which may also be connected in a stacked orientation (not shown). One or a plurality of slide pins **636, 636'** are attached to the perimeter connector bracket **638** to allow an outside force to reciprocate the slide pins **636, 636', 636"** and the pairs of stator magnets **630, 630', 630"** in a linear movement along the perimeter of the housing **612**. Upon reciprocating motion of the pairs of stator magnets **630, 630', 630"**, as induced by external forces, the resulting reorientating of the respective north and south magnetic fields induces rotational movement **640** for each rotor magnet **624**, thereby generating electrical energy that is collected by electrical circuitry (not shown) associated with the housing **612** and connected with each of the plurality of rotor magnet units **620**. An alternative embodiment, as illustrated in **FIG. 11***b,* includes the housing **612** having a plurality of electromagnet induction elements **634** disposed between each rotor magnet unit **624**. Pulsed electrical current may be provided to each electromagnet induction element **634** for re-orientating of the respective north and south magnetic fields of each induction element **634**, thereby inducing rotational movement **640** for each rotor magnet **624**, with or without reciprocating movement of each pair of stator magnets **630, 630', 630"** resulting in generating of electrical energy that is collected by electrical circuitry (not shown) associated with the housing **612**. Electrical generation circuitry (not shown) is associated with each electromagnetic induction element, with the circuitry producing electricity upon the rotation of each respective rotor magnet **624**.

[**0057**] From the foregoing description, it will be recognized by those skilled in the art that a linear magnetic harmonic drive motion converter apparatus has been provided. For embodiments connecting to motors and pumps for conversion of linear motion into rotational motion, the present invention provides simplicity of structure and provides a highly adaptable and efficient apparatus. Additional embodiments are utilized for motors, positioning devices, battery recharging units, gear actuation devices, transit and conveying components, motion conversion, drive-trains, drive motors for water craft, and harnessing of energy from wave motion in aquatic environments.

[**0058**] While the present invention has been illustrated by description of several embodiments and while the illustrative embodiments have been described in considerable detail, it is not the intention of the applicant to restrict or in any way limit the scope of the appended claims to such detail. Additional advantages and modifications will readily appear to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus and methods, and illustrative examples shown and described herein. Accordingly, departures may be made from such details without departing from the spirit or scope of applicant's general inventive concept as described in the appended claims.

Having thus described the aforementioned invention, I claim:

1. A linear magnetic harmonic motion converter apparatus comprising:

a frame member including a first side member disposed to rotate about a longitudinal axis, said frame member having first and second end members attached between opposed ends of said first side member;

at least one perimeter magnet disposed on said first side member, said at least one perimeter magnet having first and second magnet ends defining respective north and south poles, said first and second magnet ends having a first magnetic field of sufficient strength to extend to said longitudinal axis of said frame member;

an axial shaft having an axis of rotation disposed parallel with said longitudinal axis of said frame member, said axial shaft extended substantially parallel to said first side member; and

at least one rotor magnet disposed on said axial shaft, said at least one rotor magnet rotates in unison with said axial shaft, said at least one rotor magnet having first and second magnet ends defining respective north and south poles, said first and second poles including a second magnetic field oriented in a circumferential path of rotation about said axial shaft, said second magnetic field directed substantially perpendicular to a radius from said axis of rotation of said axial shaft, said second magnetic field is alternately attracted to and repelled by said first magnetic field to induce rotation of said axial shaft when said frame member is reciprocated in relation to said axial shaft.

2. The apparatus of claim 1 wherein said axial shaft further includes a plurality of rotor magnets disposed in spaced apart orientation along said axial shaft, each rotor magnet having respective second magnetic fields oriented in a circumferential path of rotation about said axial shaft, each respective second magnetic field is alternately attracted to and repelled by said first magnetic field of said at least one perimeter magnet to induce rotation of said axial shaft when said first side member is reciprocated in relation to said axial shaft.

3. The apparatus of claim 2 wherein said plurality of rotor magnets further includes a plurality of pairs of rotor magnets positioned in spaced apart configuration along said axial shaft, each pair of said plurality of pairs of rotor magnets are separated by an angle of separation in a range between about 180 degrees of separation to about 90 degrees of separation.

4. The apparatus of claim 2 wherein said frame member further includes a second side member disposed parallel to and opposed from said first side member, said frame member further includes said first end member and said second end members extended to connect between respective first and second ends of said first and second side members, said first and second end members are disposed substantially parallel to said axial shaft and are reciprocatingly moved substantially parallel to said axial shaft, said first and second ends of said first and second side members are pivotably connected to said first and second end members to form corner junctions having means for pivoting at each corner junction to allow reciprocation of said first and second side members in relation to said axial shaft, whereby said first and second side members are reciprocated by an externally provided reciprocating force, said first magnetic field is re-oriented in relation to said plurality of rotor magnets with each reciprocation of said first and second side members, each second magnetic field is alternately attracted to and repelled by said first magnetic field to induce rotation of said axial shaft with each reciprocation of said first and second side members.

5. The apparatus of claim 2 wherein said frame member further includes an enclosure shell formed by a first and second end bracket positioned to extend parallel to respective first and second end members, said first and second end brackets rigidly connect between respective first and second ends of said first and second side members, said first end bracket having a third magnet connected to an interior surface of said first end bracket, said second end bracket having a fourth magnet connected to an interior surface of said second end bracket, said enclosure shell is rotatable as a substantially rigid unit in relation to said axial shaft that is extended through first and second pivot brackets disposed through a mid-portion of respective first and second end brackets, said third and fourth magnets having respective third and fourth magnetic fields of sufficient strength to extend to said axial shaft, each second magnetic field of said plurality of rotor magnets is alternately attracted to and repelled by said first magnetic field, said third magnetic field and said fourth magnetic field to induce rotation of said axial shaft when said enclosure shell is rotated in relation to said axial shaft.

6. The apparatus of claim 2 wherein said first and second side members are connected by at least one cross-member that is slidably connected between said first and second side members, said at least one cross-member having at least two perimeter magnets disposed at opposed ends of said at least one cross-member, said at least two perimeter magnets having respective north and south poles associated with each magnet, each of said at least two perimeter magnets having a first magnetic field of sufficient strength to extend to said longitudinal axis of said frame member.

7. A linear magnetic harmonic motion converter apparatus comprising:

a frame member including first and second side members disposed to be supported in a stationary position, said frame member further including first and second end members attached between respective first and second side members, said frame member having a lengthwise axis extended between a first end and a second end of said frame member;

said first and second side members are connected by at least two cross-members that are slidably connected between said first and second side members, said at least two cross-members having at least two perimeter magnets disposed at opposed ends of said at least two cross-members, said at least two perimeter magnets having respective north and south poles associated with each perimeter magnet, each of said at least two perimeter magnets having a first magnetic field of sufficient strength to extend to said lengthwise axis of said frame member, said at least two cross-members are reciprocatingly slid between said first end and said second end of said frame member;

an axial shaft extended substantially parallel with said lengthwise axis of said frame member, said axial shaft extended substantially parallel to said first and second side members, said axial shaft is rotatable in relation to said frame member; and

at least one rotor magnet disposed on said axial shaft, said at least one rotor magnet rotates in unison with said axial shaft, said at least one rotor magnet having first and second magnet ends defining respective north and south poles oriented in a circumferential path of rotation about said axial shaft with the net flux fields of the north and south poles directed substantially perpendicular to the axis of rotation of said axial shaft, said first and second magnet ends including a second magnetic field extended from said axial shaft, said second magnetic field is alternately attracted to and repelled from said first magnetic field to induce rotation of said axial shaft when said at least two cross-members having perimeter magnets thereon are slid between said first end and said second end of said frame member.

8. The apparatus of claim 7 wherein said at least one rotor magnet includes a plurality of pairs of rotor magnets positioned in spaced apart configuration along said axial shaft, each pair of said plurality of pairs are separated by an angle of separation of a range between about 180 degrees of separation to about 90 degrees of separation.

9. A linear magnetic harmonic motion converter apparatus comprising:

a cylindrical frame having first and second rotation brackets at opposed first and second ends of said cylindrical frame, said cylindrical frame having a pair of slots oriented through an exterior surface of said cylindrical frame, each of said slots extended along the lengthwise axis of said cylindrical frame, each slot being extended a spaced apart distance interior of said first end and said second end of said cylindrical frame;

a cylindrical sleeve positioned around an exterior of said cylindrical frame, said cylindrical sleeve having two interior slide members spaced apart to fit into respective first and second slots, each of said two interior slide members having a first and second perimeter magnet disposed to project inwardly on each slide member, said first and second perimeter magnets producing a perimeter magnetic field oriented inwardly of said cylindrical sleeve, said cylindrical sleeve is reciprocatingly slidable between said first end and said second end of said cylindrical frame;

an axial shaft extended through said first and second rotation brackets, said cylindrical frame is rotatable around said axial shaft; and

a plurality of pairs of rotor magnets disposed in spaced apart orientation along a length of said axial shaft, each of said rotor magnets having respective north and south poles oriented in a circumferential path of rotation about said axial shaft with the net flux fields of the north and south poles directed substantially perpendicular to the axis of rotation of said cylindrical frame about said axial shaft, said plurality of pairs of rotor magnets producing a plurality of second magnetic fields extended outwardly from said axial shaft;

whereby said perimeter magnetic field is re-oriented with each sliding movement of said cylindrical sleeve along the lengthwise axis of said cylindrical frame, said second magnetic fields are alternately attracted and repelled by said perimeter magnetic field to induce rotation of said axial shaft with each sliding movement of said cylindrical sleeve.

10. A linear magnetic harmonic motion converter apparatus for use in a body of water comprising:

a cylindrical frame having first and second rotation brackets at opposed first and second ends of said cylindrical frame, said cylindrical frame having a pair of slots oriented through an exterior surface of said cylindrical frame, each of said slots extended along the lengthwise axis of said cylindrical frame, each slot being extended a spaced apart distance interior of said first end and said second end of said cylindrical frame;

a cylindrical sleeve positioned around an exterior of said cylindrical frame, said cylindrical sleeve having two interior slide members spaced apart to fit into respective first and second slots, each of said two interior slide members having a first and second perimeter magnet disposed to project inwardly on each slide member, said first and second perimeter magnets producing a perimeter magnetic field oriented inwardly of said cylindrical sleeve, said cylindrical sleeve is reciprocatingly slidable between said first end and said second end of said cylindrical frame;

a bracket having a first end connected to said cylindrical sleeve, said bracket having a second end extended an sufficient length past said first end of said cylindrical frame, said second end connected to a device having buoyancy in water;

an axial shaft extended through said first and second rotation brackets, said axial shaft is rotatable within said cylindrical frame;

a plurality of pairs of rotor magnets disposed in spaced apart orientation along a length of said axial shaft, each of said rotor magnets having respective north and south poles oriented in a circumferential path of rotation about said axial shaft with the net flux fields of the north and south poles directed substantially perpendicular to the axis of rotation of said axial shaft, each of said rotor magnets producing a plurality of second magnetic fields extended outwardly from said axial shaft; and

an extension member of said axial shaft, said extension member is extended from said second end of said cylindrical frame, said extension member having a lower end connected to an anchor device for extension toward the floor of the body of water;

whereby said perimeter magnetic field is re-oriented with each sliding movement of said cylindrical sleeve in response to the device having buoyancy moving with wave motions of the body of water, said second magnetic fields are alternately attracted and repelled by said perimeter magnetic field to induce rotation of said axial shaft with each sliding movement of said cylindrical sleeve.

11. A linear magnetic harmonic motion converter apparatus comprising:

a frame member including first and second side members disposed to rotate about a longitudinal axis, said frame member further including first and second end members attached between respective first and second side members;

a plurality of electromagnets disposed in spaced apart orientation on said first and second side members, each of said plurality of electromagnets having an electrical control means powered by an electric power source connected thereto, said electrical control means provides electric power in a timed sequence to alternate the magnetic poles of each of said plurality of electromagnets with re-orientation of a first magnetic field for each electromagnet of sufficient strength to extend to said longitudinal axis of said frame member;

an axial shaft extended along said longitudinal axis of said frame member, said axial shaft extended substantially parallel to said first and second side members; and

at least one rotor magnet disposed on said axial shaft, said at least one rotor magnet rotates in unison with said axial shaft, said at least one rotor magnet having first and second magnet ends defining respective north and south poles oriented in a circumferential path of rotation about said axial shaft with the net flux fields of the north and south poles directed substantially perpendicular to the axis of rotation of said axial shaft, the net flux fields of the north and south poles provides a second magnetic field extended from said axial shaft, said second magnetic field is alternately attracted to and repelled from said first magnetic field for each electromagnet on said first and second side members to induce rotation of said axial shaft in relation to said frame member.

12. The apparatus of claim 11 wherein said at least one rotor magnet includes a plurality of pairs of rotor magnets positioned in spaced apart configuration along said axial shaft, each pair of said plurality of pairs of rotor magnets are separated by an angle of separation in a range between about 180 degrees of separation to about 90 degrees of separation.

13. A linear magnetic harmonic pump including a housing having a plurality of fluid channels therein, the plurality of fluid channels including at least one inlet fluid channel and at least one output fluid channel, comprising:

a plurality of stator magnets disposed in spaced-apart orientation along a perimeter of a housing, said plurality of stator magnets are reciprocatingly moved in a linear path relative to the perimeter of the housing, each stator magnet having a north and a south magnet pole having respective north and south magnetic fields;

a plurality of rotor magnet units disposed within the housing, each rotor magnet unit including an axial shaft disposed within each one of a plurality of radially oriented fluid channels of the plurality of fluid channels, each radially oriented fluid channel is in fluid communication with at least one inlet fluid channel and with a centrally disposed output fluid channel within the housing, each rotor magnet unit further including:

a plurality of impeller fins interconnected at a base end of each impeller fin to rotate around said axial shaft, each impeller fin having distal ends rotating around said axial shaft for transfer of fluid through each respective radially oriented fluid channel; and

at least one rotor magnet extended in a radial configuration interdisposed between said impeller fins, said at least one rotor magnet rotatable around said axial shaft in unison with said plurality of impeller fins, each rotor magnet including respective north and south poles oriented in a circumferential path of rotation about said axial shaft with the net flux fields of the north and south poles directed substantially perpendicular to the axis of rotation of said axial shaft;

whereby rotation occurs for each rotor magnet unit about each respective axial shaft upon the influence on the net flux fields of the north and south poles of each respective rotor magnet by the movement of the magnet fields of each stator magnet disposed along the perimeter of the housing, with resulting pumping of fluids through each respective fluid channel from the at least one inlet fluid channel and toward the at least one output fluid channel of the pump.

14. A linear magnetic harmonic pump including a housing having a plurality of fluid channels therein, the plurality of fluid channels including at least one inlet fluid channel and at least one output fluid channel, comprising:

a plurality of stator magnets disposed in spaced-apart orientation along a perimeter of a housing, said plurality of stator magnets are reciprocatingly moved in a linear path relative to the perimeter of the housing, each stator magnet having a north and a south magnet pole having respective north and south magnetic fields;

a plurality of rotor magnet units disposed within the housing, each rotor magnet unit including an axial shaft disposed within each one of a plurality of radially oriented fluid channels of the plurality of fluid channels, each radially oriented fluid channel is in fluid communication with at least one inlet fluid channel and with a centrally disposed output fluid channel within the housing, each rotor magnet unit further including:

a plurality of impeller fins interconnected at a base end of each impeller fin to rotate around said axial shaft, each impeller fin having distal ends rotating around said axial shaft for transfer of fluid through each respective radially oriented fluid channel;

at least one rotor magnet extended in a radial configuration interdisposed between said impeller fins, said at least one rotor magnet rotatable around said axial shaft in unison with said plurality of impeller fins, each rotor magnet including respective north and south poles oriented in a circumferential path of rotation about said axial shaft with the net flux fields of the north and south poles directed substantially perpendicular to the axis of rotation of said axial shaft; and

a plurality of electromagnets disposed in spaced apart orientation within said housing, each electromagnet is interdisposed between each rotor magnet unit, each electromagnet connected to an electric power source and a control means providing electric power in a timed sequence to each electromagnet to alternate the magnetic poles of each electromagnet;

whereby rotation occurs for each rotor magnet unit about each respective axial shaft upon the influence on the net flux fields of the north and south poles of each respective rotor magnet by the movement of the magnet fields of each stator magnet disposed along the perimeter of the housing and the alternation of the magnetic poles of each electromagnet, with resulting pumping of fluids through each respective fluid channel from the at least one inlet fluid channel and toward the at least one output fluid channel of the pump.

15. A linear magnetic harmonic electric generator including a housing having a plurality of channels therein, said electric generator including electromagnetic induction elements interdisposed between the plurality of channels and circuitry interconnected with the electromagnetic induction elements, said electric generator comprising:

a plurality of stator magnets disposed in spaced-apart orientation along a perimeter of a housing, said plurality of stator magnets are reciprocatingly moved in a linear path relative to the perimeter of the housing, each stator magnet having a north and a south magnet pole having respective north and south magnetic fields; and

a plurality of rotor magnet units disposed within the housing, each rotor magnet unit including an axial shaft disposed within each one of a plurality of radially oriented channels of the plurality of channels, each radially oriented channel is adjacent at least one of the electromagnetic induction elements, each rotor magnet unit further including:

at least one rotor magnet rotatable around said axial shaft, each rotor magnet including respective north and south poles oriented in a circumferential path of rotation about said axial shaft with the net flux fields of the north and south poles directed substantially perpendicular to the axis of rotation of said axial shaft;

whereby rotation occurs for each rotor magnet unit about each respective axial shaft upon the influence on the net flux fields of the north and south poles of each respective rotor magnet by the movement of the magnet fields of each stator magnet disposed along the perimeter of the housing, and the alternation of the magnetic poles of each electromagnet, the rotation of each rotor magnet unit produces a magnetic flux field within each rotor magnet unit that activates circuitry for the production of electricity.

16. A linear magnetic harmonic electric generator including a housing having a plurality of channels therein, said electric generator including magnetic induction elements interdisposed between the plurality of channels and circuitry interconnected with the magnetic induction elements, said electric generator comprising:

a plurality of stator magnets disposed in spaced-apart orientation along a perimeter of a housing, said plurality of stator magnets are reciprocatingly moved in a linear path relative to the perimeter of the housing, each stator magnet having a north and a south magnet pole having respective north and south magnetic fields; and

a plurality of rotor magnet units disposed within the housing, each rotor magnet unit including an axial shaft disposed within each one of a plurality of radially oriented channels of the plurality of channels, each radially oriented channel is adjacent at least one of the magnetic induction elements, each rotor magnet unit further including:

at least one rotor magnet rotatable around said axial shaft, each rotor magnet including respective north and south poles oriented in a circumferential path of rotation about said axial shaft with the net flux fields of the north and south poles directed substantially perpendicular to the axis of rotation of said axial shaft;

whereby rotation occurs for each rotor magnet unit about each respective axial shaft upon the influence on the net flux fields of the north and south poles of each respective rotor magnet by the movement of the magnet fields of each stator magnet disposed along the perimeter of the housing, the rotation of each rotor magnet unit produces a magnetic flux field within each rotor magnet unit that activates circuitry attached to each magnetic induction element for the production of electricity.

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