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(54) **CIRCULAR SELF-POWERED MAGNETIC GENERATOR**

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H02K 53/00 (2006.01)

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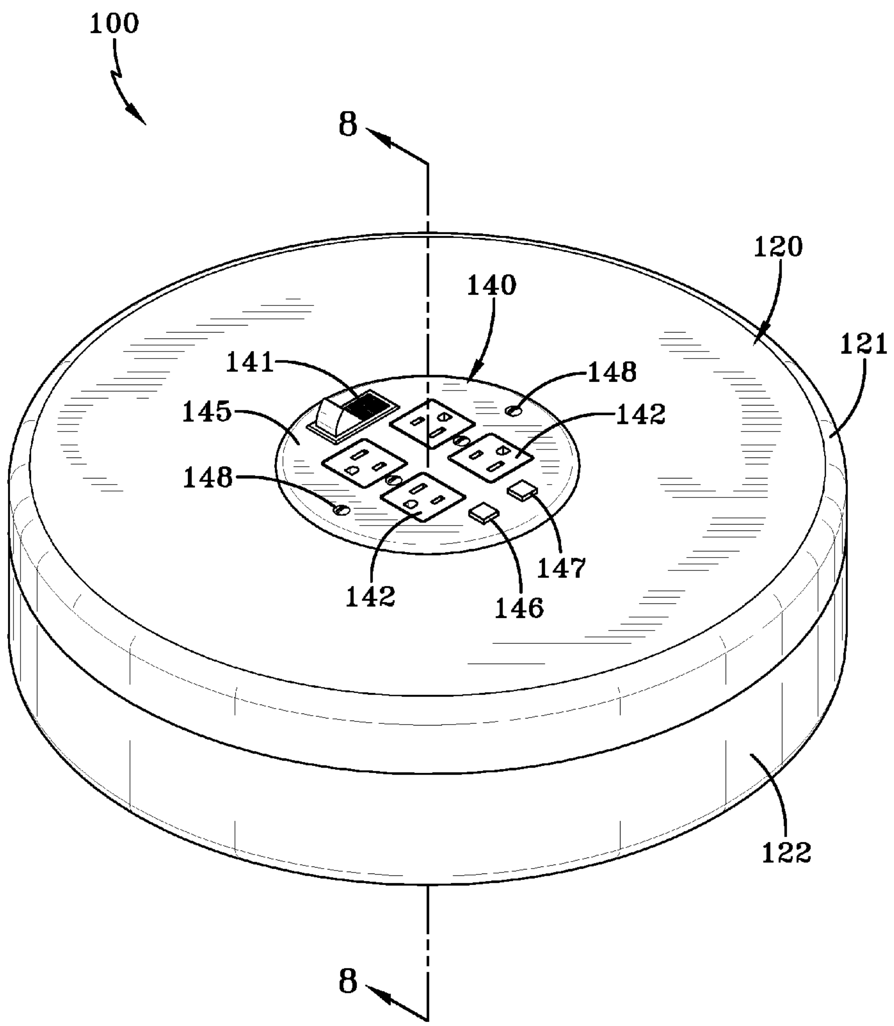
(57) **ABSTRACT**

An improved power generation apparatus **100** has one or more moving permanent magnets **10**, the rapid movement of the one or more permanent magnets **10** successively switches on and off the different electromagnets **20** in sequence to pull the one or more magnets **10** in a circular motion. This circular movement of the one or more magnets **10** generates an electric current in each central coil **40** to power the activating means **30** and to charge the battery **50** for storage or any excess electricity generated can be used to power other devices. Alternatively, as described in a second embodiment, the electromagnets **20** can be switched on when the same polarity of the one or more permanent magnets **10** pass to create a repulsive force which pushes the one or more permanent magnets **10** along the guide means **2** to propel the permanent magnets **10**.



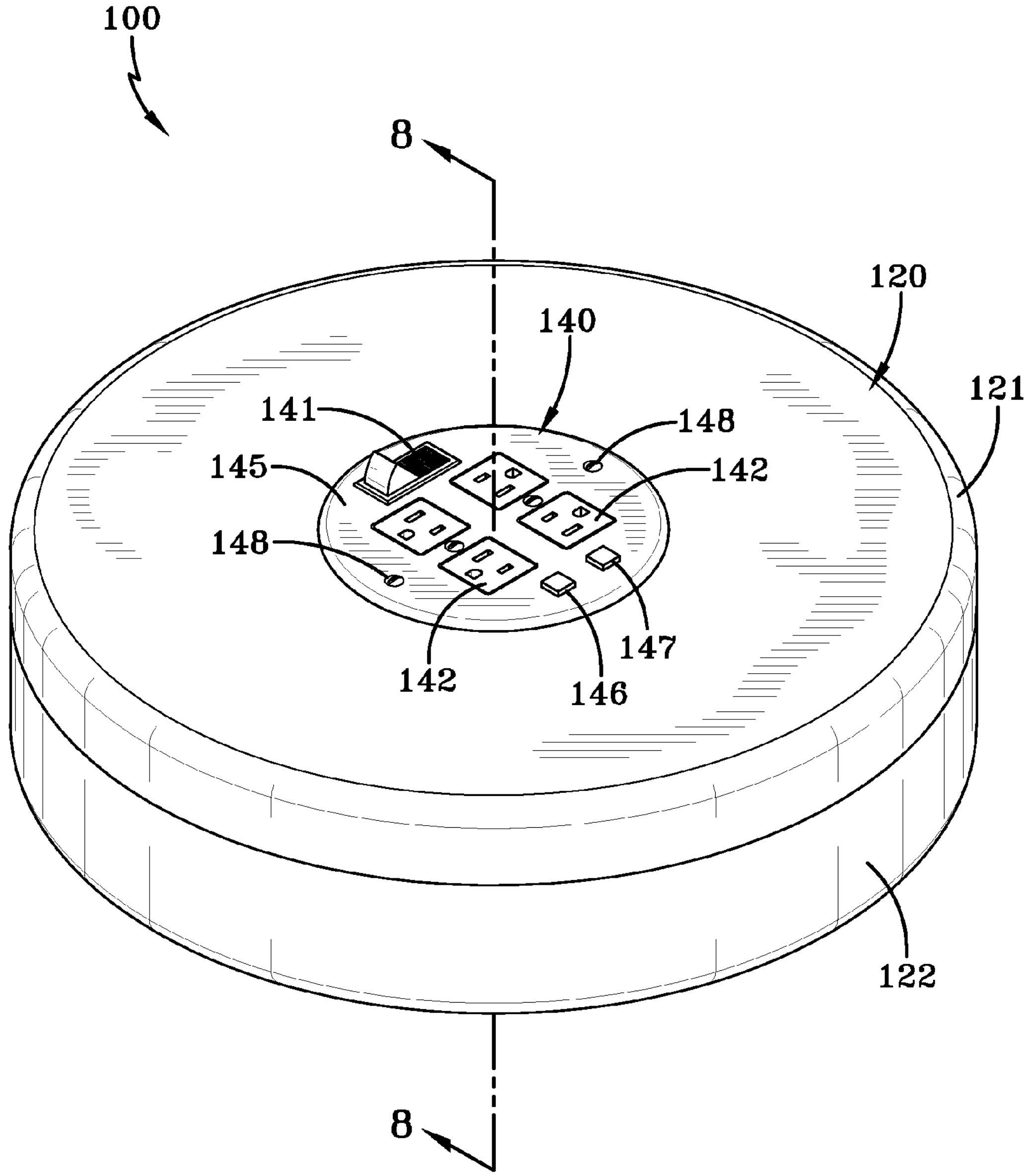


FIG-1

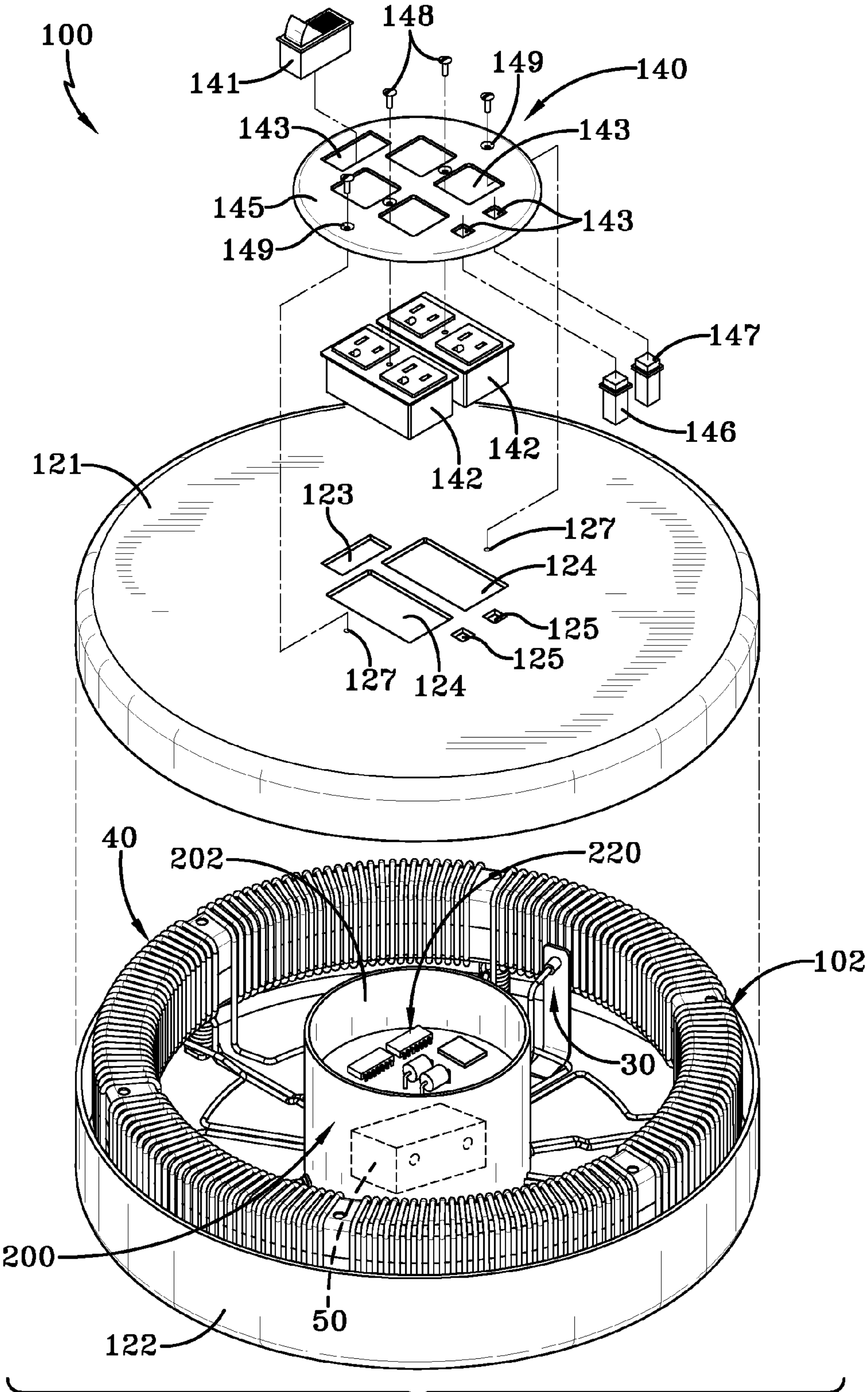
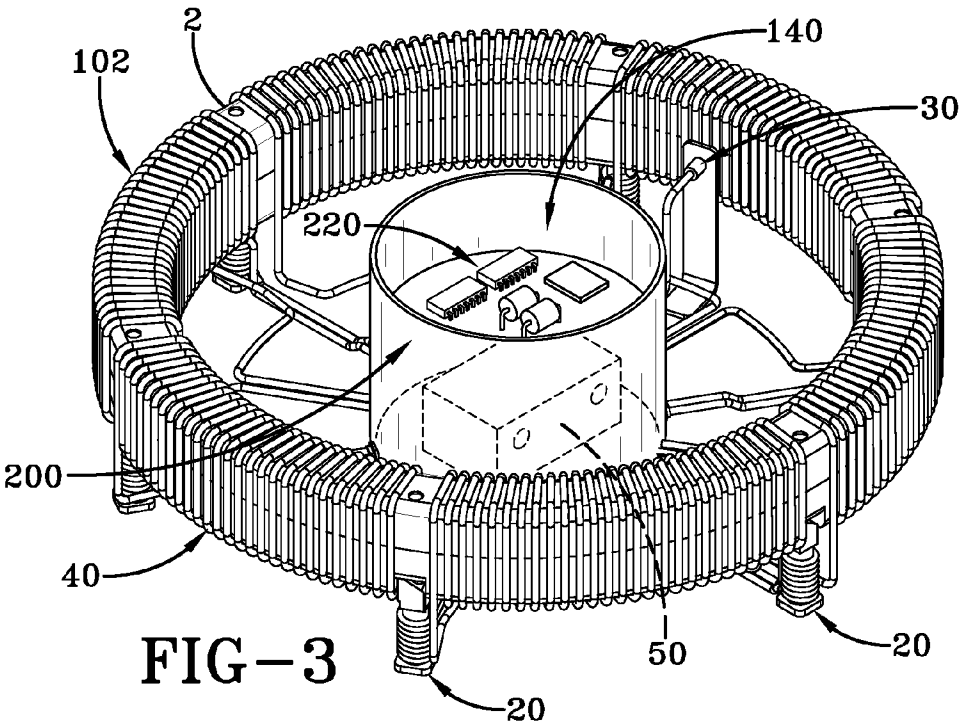
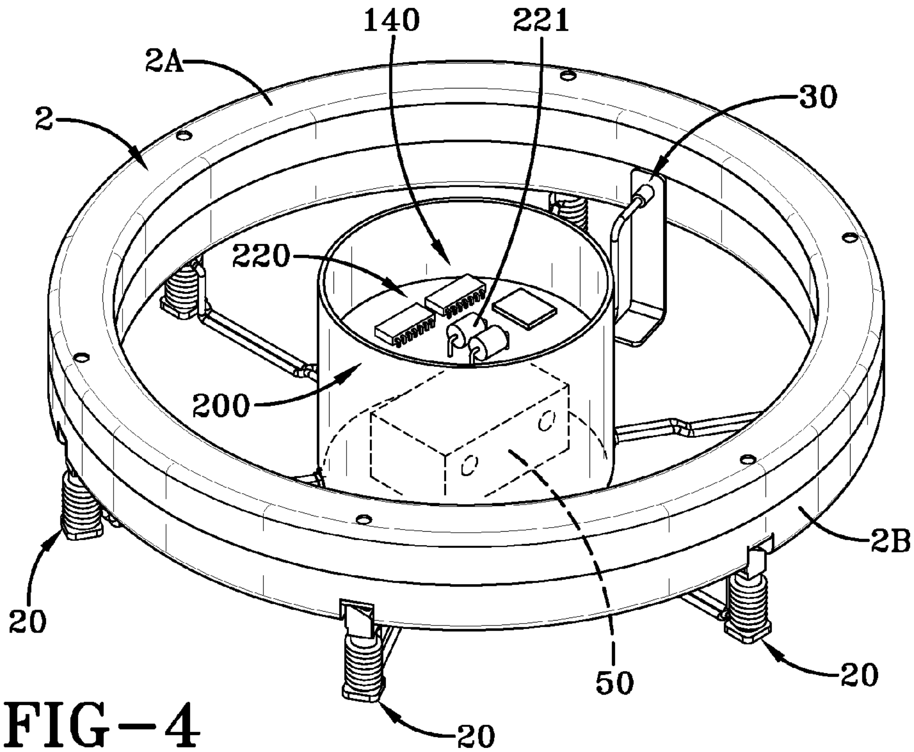

100
141
148
149
140
143
143
145
143
149
147
146
142
142
121
123
127
124
125
125
127
124
40
202
220
102
30
200
50
122

FIG-2



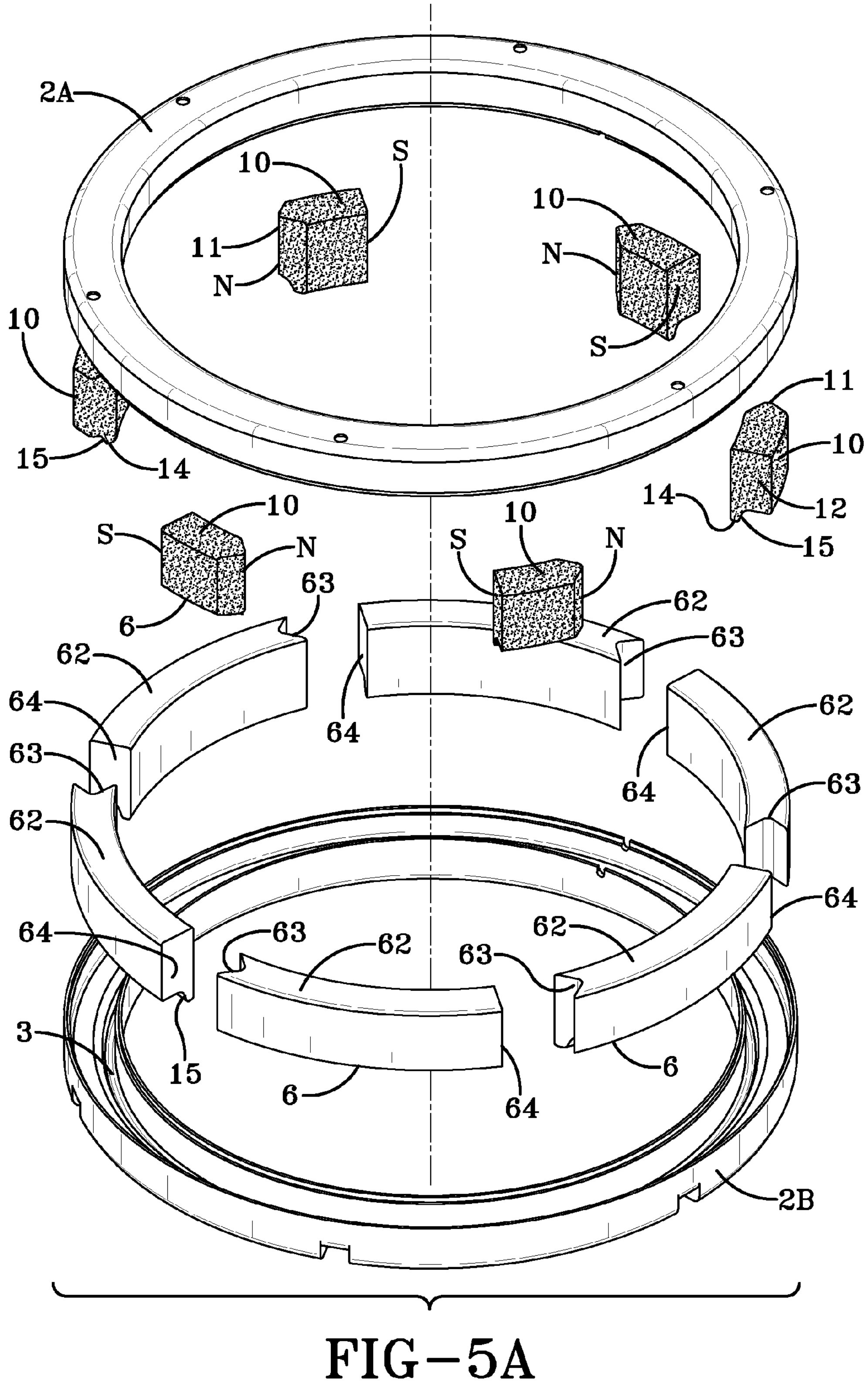
102
2
140
30
220
200
40
50
20
20

FIG-3



140
221
2A
2
30
220
200
2B
20
50
20
20

FIG-4


2A
10
S
11
N
10
N
S
10
15
14
11
10
12
14
15
10
S
N
6
63
10
S
N
62
63
62
64
64
63
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62
64
63
62
62
64
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6
3
15
6
64
2B

FIG-5A

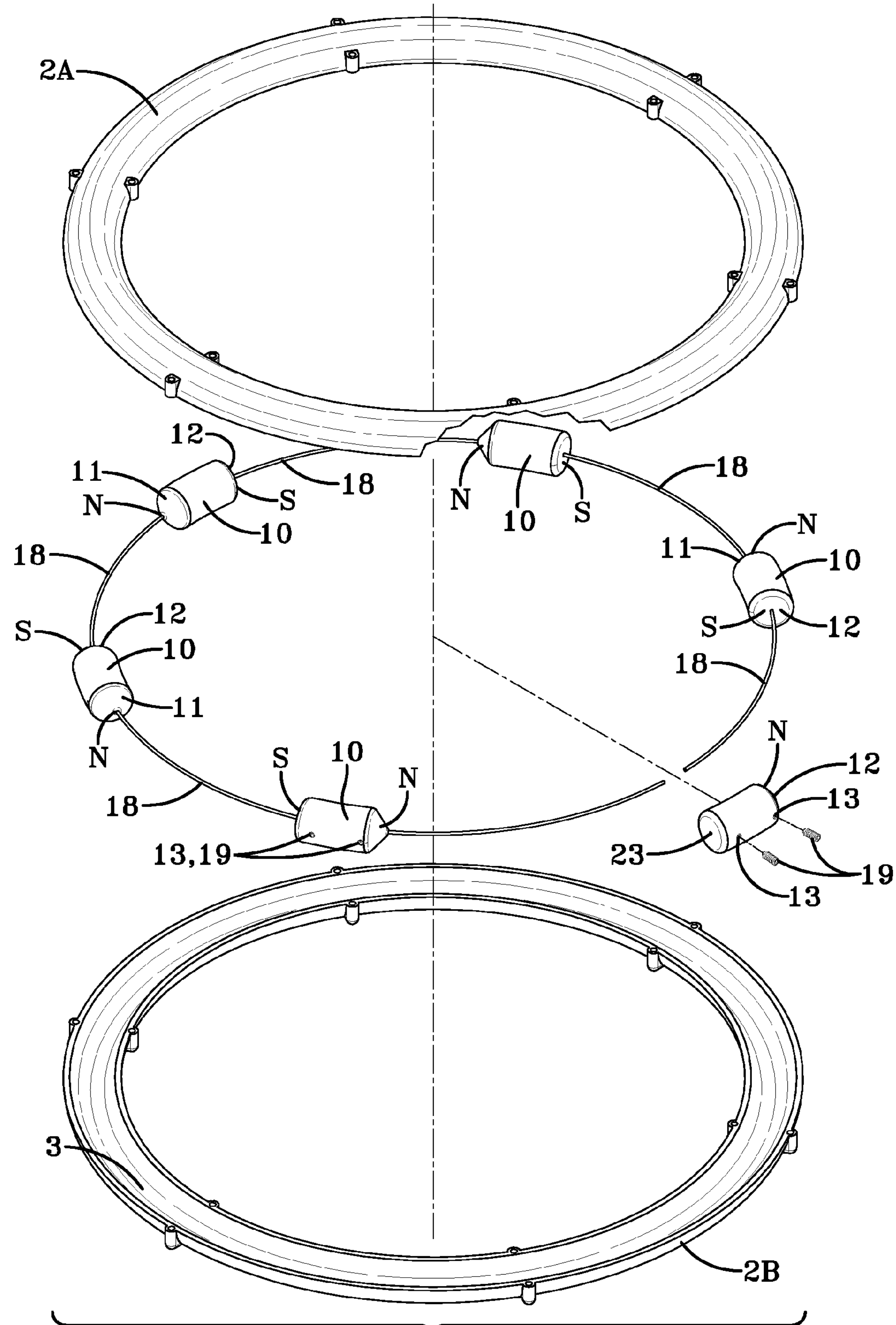

2A
12
11
N
S
18
10
18
S
12
10
11
N
18
S
10
N
13,19
N
10
S
18
N
11
10
S
12
18
N
12
13
23
19
13
3
2B

FIG-5B

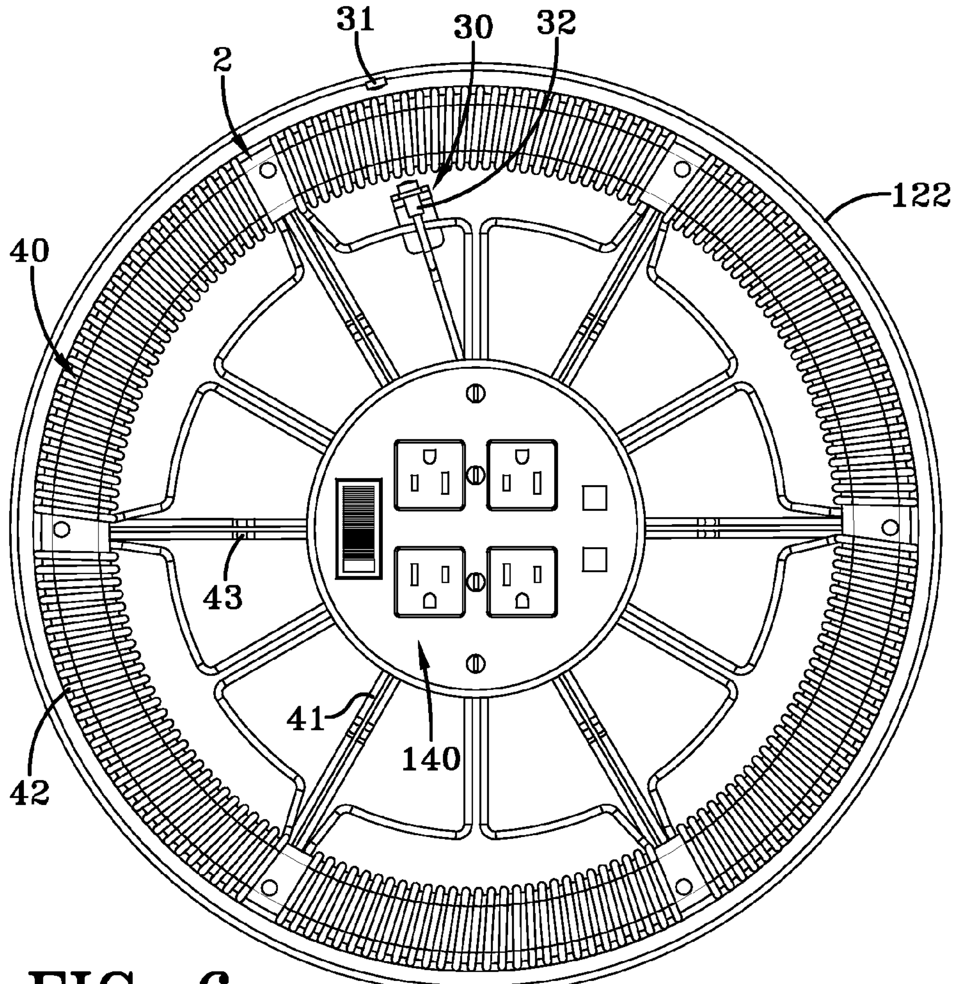

31
30
32
2
122
40
43
41
140
42

FIG-6

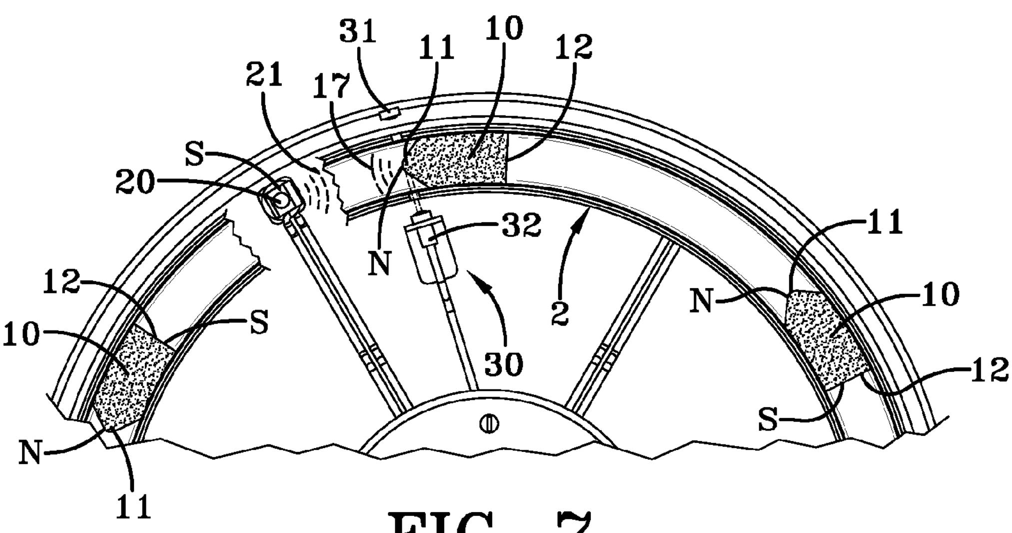
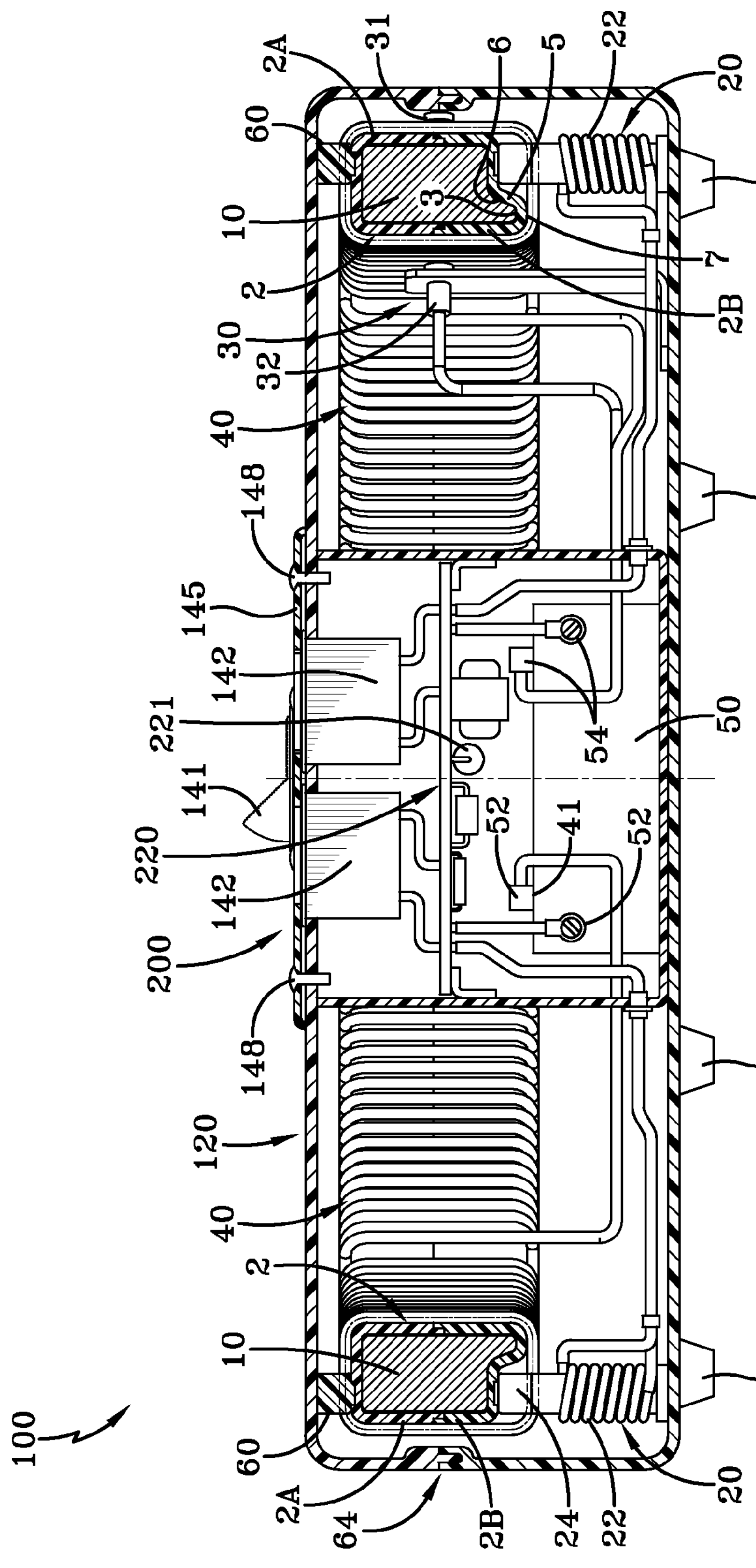

31
11
10
12
21
17
S
20
32
N
11
12
N
10
S
10
30
2
12
S
N
11

FIG-7


100
2A
31
6
5
22
20
60
10
3
7
2
2B
30
32
40
66
148
145
142
221
141
220
200
54
50
52
41
120
64
24

FIG—8

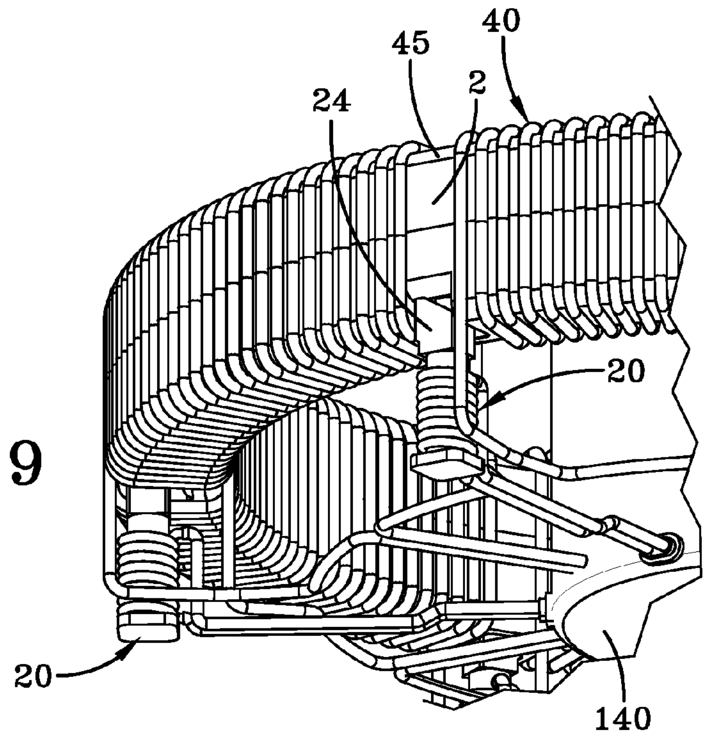


FIG-9

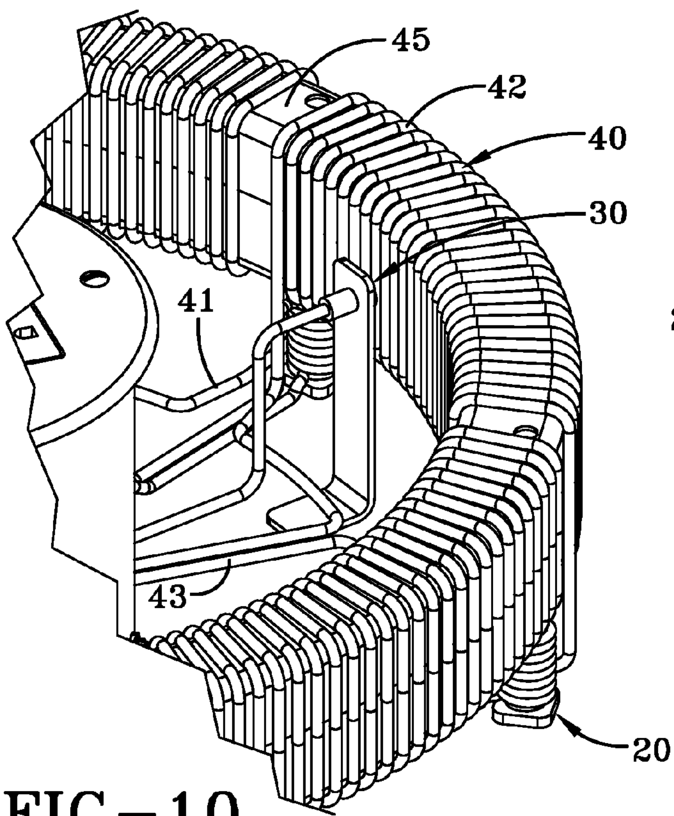


FIG-10

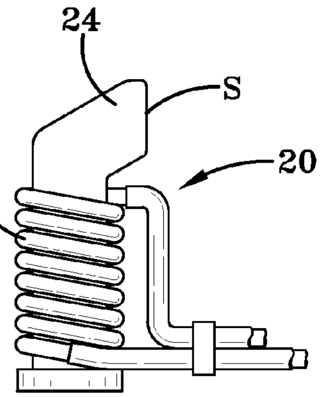


FIG-11

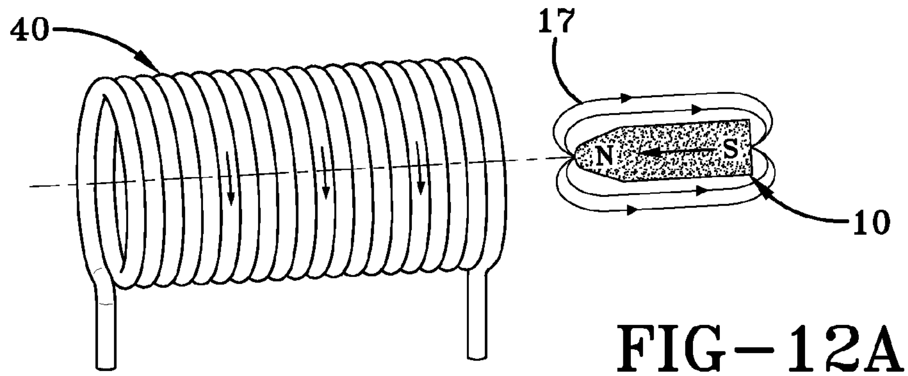


FIG-12A

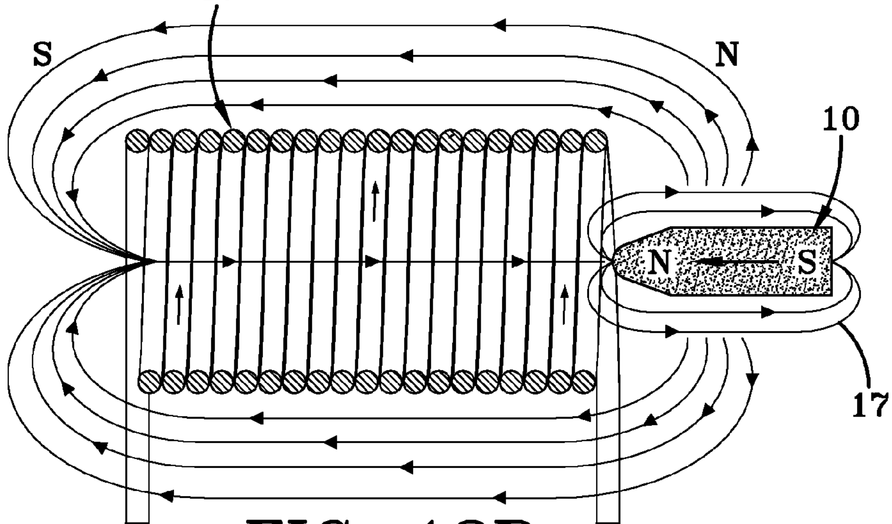


FIG-12B

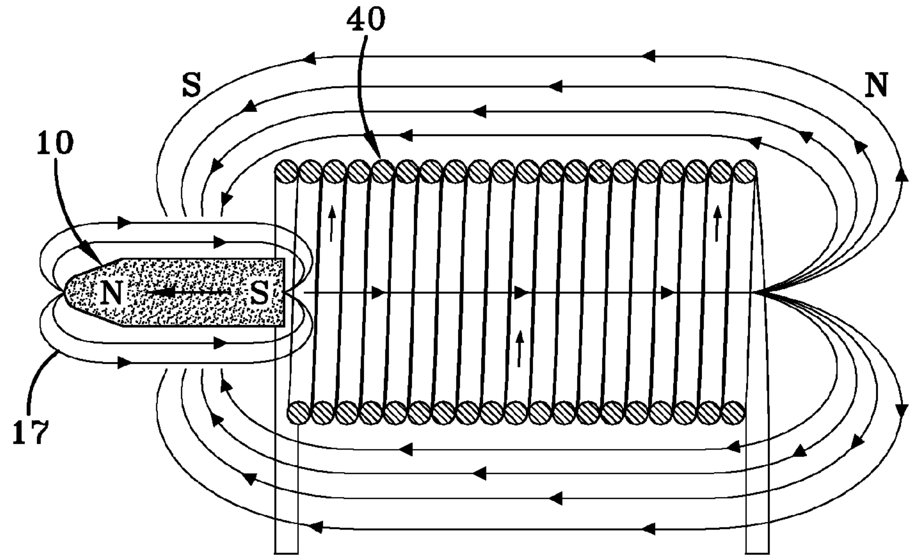


FIG-12C

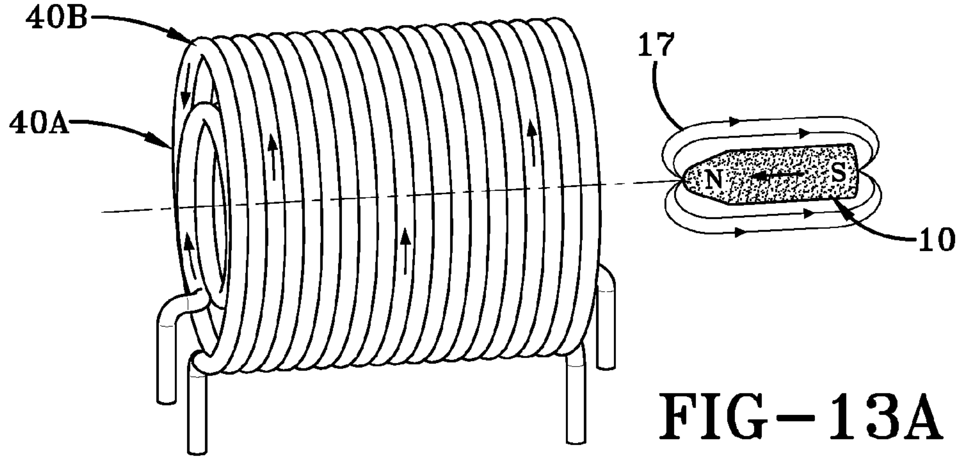


FIG-13A

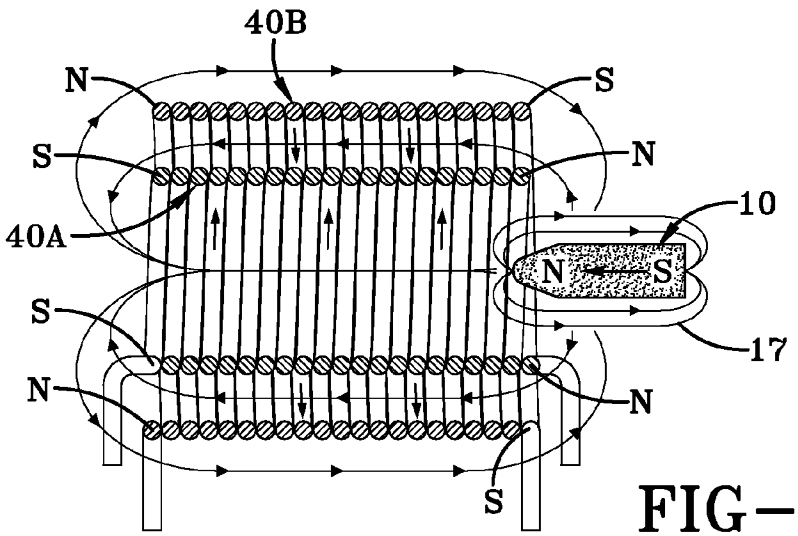


FIG-13B

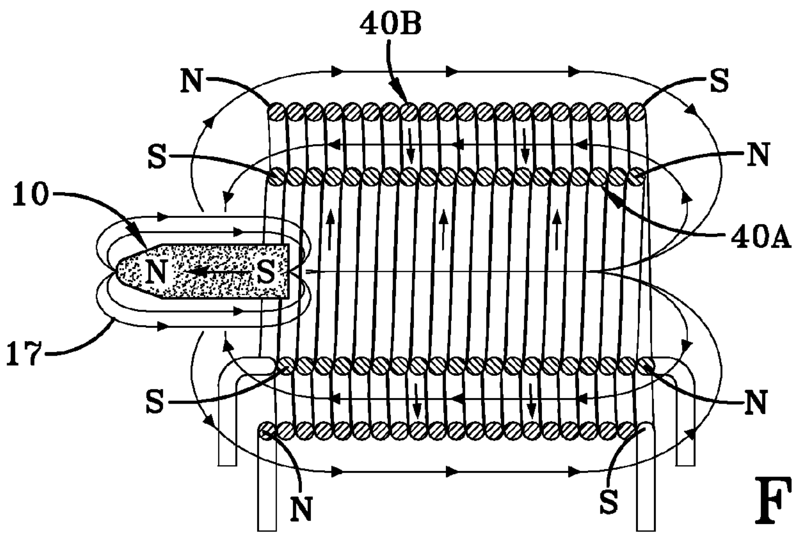


FIG-13C

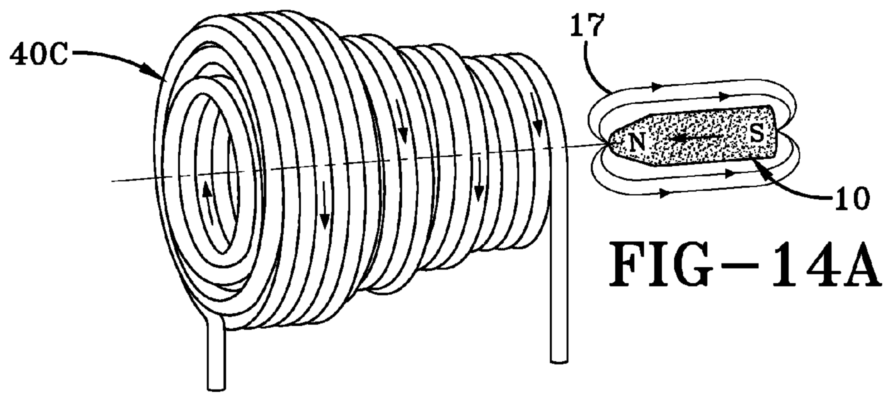


FIG-14A

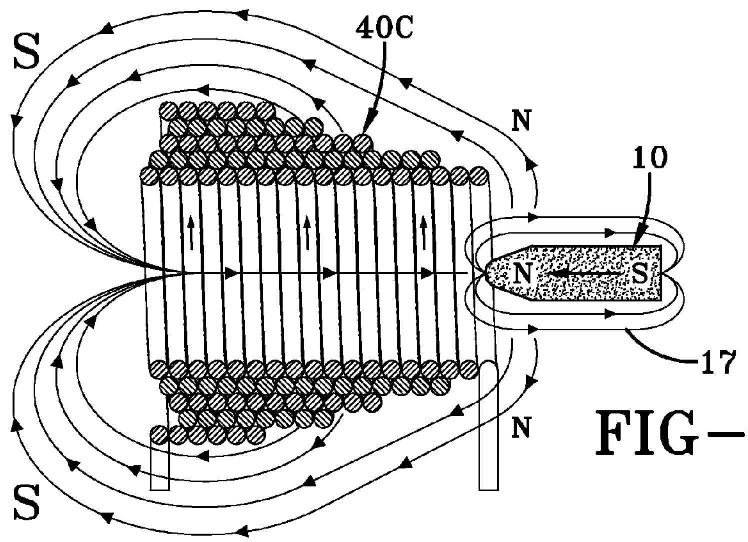


FIG-14B

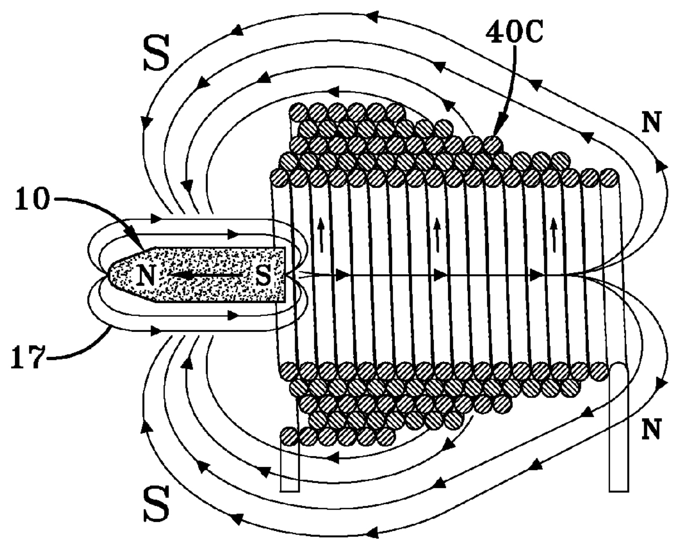


FIG-14C

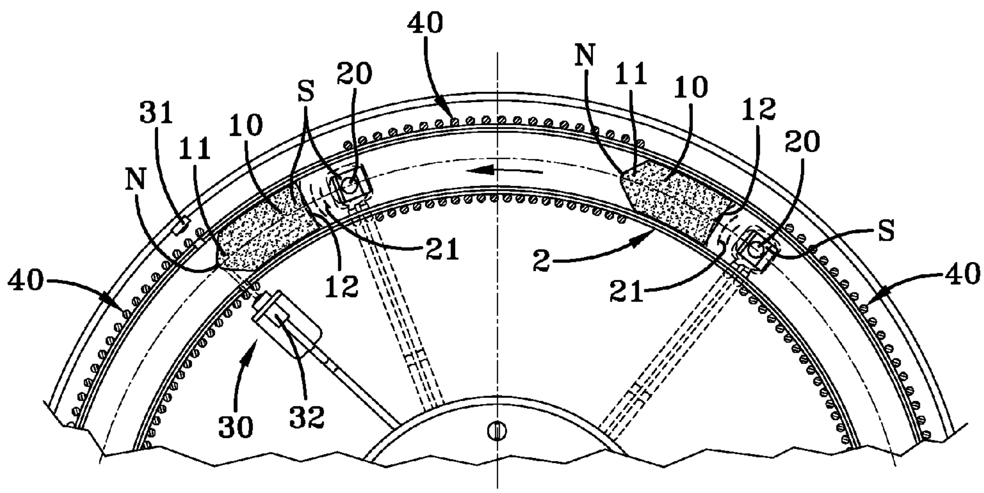
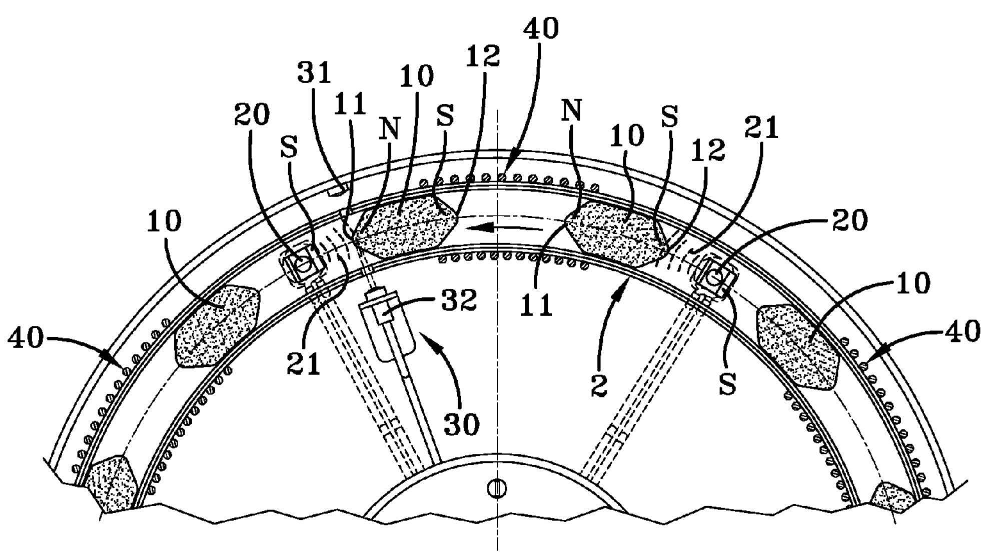

40
N
11
10
12
20
S
31
10
11
N
S
20
21
2
21
S
40
40
12
30
32

FIG-15


40
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31
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11
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S
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12
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20
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20
10
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21
11
2
S
30

FIG-16

CIRCULAR SELF-POWERED MAGNETIC GENERATOR

RELATED APPLICATIONS

[0001] This application is a continuation in part application and claims priority to U.S. patent application Ser. No. 11/945,473 entitled "Circular Self-Powered Magnetic Generator" filed on Nov. 27, 2007 and PCT application serial number PCT/US08/83951 entitled "Circular Self-Powered Magnetic Generator" filed on Nov. 19, 2008.

TECHNICAL FIELD

[0002] The present invention relates to an apparatus that generates electric currents through a plurality of coils to power or charge a battery using one or more moving permanent magnets and electro-magnetic coils. Power generation is self-sufficient i.e. no external power sources are needed.

BACKGROUND OF THE INVENTION

[0003] The ability to generate an electric current by passing a magnet through a coil of electrically conductive wires is well known, and commonly referred to as the Michael Faraday experiment.

[0004] The use of wires wound around a rotating bank of magnets is a common practice in the manufacture of electric motors and electric power generators.

[0005] It has long been a goal to use naturally occurring mechanical power to generate electricity. Hydraulic generation of power uses water flows to turn turbines; wave's motion has been suggested to generate electricity; new wind driven propellers are now making electricity and solar energy can be captured and converted to electric energy by using solar panels.

[0006] All of these devices convert an external physical force or energy into electricity. The biggest problem with such devices is that the source of energy is not always constant. Water flows, wind and solar energy often times are not predictable and, in the case of solar power it is not available during the night.

[0007] It is therefore a desirable objective to develop electricity from a source that is relatively constant or at least predictable.

[0008] It is a further object to create a device that can generate electricity with very few losses in efficiency while having no adverse effects on the surrounding environment.

[0009] The following described invention uses a magnetic attraction of unlike poles or repulsion of like poles to create motion and converts the moving magnetic force field into electricity to generate a power supply.

SUMMARY OF THE INVENTION

[0010] An improved power generation apparatus has one or more moving permanent magnets, each magnet having a north polarity at a first end and a south polarity at an opposite second end; a plurality of electromagnets are positioned in proximity to a guide means, the guide means preferably providing a low friction guide path in a continuous loop. The guide means can be in the form of guide rails and can be incorporated in structures like a hollow tubular annular or circular ring having an oval cross section for housing the one or more permanent magnets. Each electromagnet has a coil wrapped around a central iron core. When activated, at least one or more electromagnets provide either an attractive force of opposite polarity relative to an end or ends of the one or more permanent magnets or a repulsive force of the same polarity or a combination as the respective polarized ends of the permanent magnets move to generate a propulsive force to the one or more permanent magnets in one direction. The apparatus further has one or more activating means, preferably being in the form of a location sensing device and a switch combination for activating each electromagnet and a plurality of central coils encircling the one or more permanent magnets and the guide means and a battery or a series or bank of batteries connected to the ends of each of the central coils. Within each central coil a permanent magnet is moving rapidly along the guide means toward each closest electromagnet. In the preferred embodiment, as the N or S end of the permanent magnet approaches an electromagnet of the opposite polarity, the one or more activating means turns the closest electromagnetic coil on, creating an attractive electromagnetic field pulling the moving permanent magnet in the direction of the field thus advancing the permanent magnet towards the electromagnet. The design of activating means can be a light and switch combination which functions such that the on state is very short, the rapid movement of the one or more permanent magnets successfully switches on and off the different electromagnets in sequence to pull the one or more permanent magnets in a circular motion. This circular movement of the one or more permanent magnets generates an electric current in each central coil to power the activating means and to charge the battery for storage or any excess electricity generated to be used to power other devices. Alternatively, as described in a second embodiment, the electromagnets can be switched on when the same polarity of the one or more permanent magnets pass to create a repulsive force which pushes the one or more permanent magnets along the guide means to propel the permanent magnets.

[0011] In a third embodiment the North polarity end of each of the one or more permanent magnets can be used to activate an electromagnet having an opposite South polarity causing an attractive pull on each of the permanent magnets, while the opposite South polarity end of each permanent magnet can activate an adjacent electromagnet of the same polarity to simultaneously create a repulsive pushing force, the combination of pushing and pulling forces providing a propulsion of the magnet in one direction around the guide means.

[0012] The power generation apparatus uses an activating means for activating each electromagnet. Preferably, the activating means is a light sensitive switch and a light source. The switch is activated or turned on by blockage by the permanent magnet or interruption of the light source. When the switch is activated the electromagnetic field of the corresponding electromagnet coil will be turned on. Preferably there is one switch or light source for activating all of the electromagnets and this switch may be activated by a single dedicated light source. In order to provide a way for the light to pass from the light source to the switch, a cutout slit, slot or opening or transparent material can be provided on a side of the guide path such that the light can pass from one side of the guide path to the switch on the opposite side of the guide path as the magnet is moving. Preferably the light source is a LED (in order to reduce power draw), laser or polarized light source or any defined wavelength of light. It may be desirable to isolate the switches from any ambient light or to have the switches respond to only polarized light or a predetermined wavelength. In one embodiment, each central coil has a large diameter encircling the guide path with small gaps to provide a space to allow support devices to hold the guide means in place without it impacting the central coil. These spaces are intended to be small which allows more turns of wire in each of the central coils; this has a direct impact on the amount of power generated. Each central coil is preferably made of one continuous conductive wire that is connected to and terminates at the battery or power source.

[0013] In order for the light source to transmit light to the switch, in an on/off action, they can be placed inside the central coils and made very small not to interfere with the ability to generate electricity or alternatively the switch and light source can be placed outside and between the central coils preferably attached to the support devices. In one embodiment the guide means is a tubular ring, the tubular ring will also be made to allow the light to pass being made of clear or transparent material. In this embodiment, the one or more permanent magnets should be slightly arcuately shaped so that it matches a small portion of the corresponding guide path of the ring such that both ends at the north and south poles are slightly curved having the same axial center as the ring. The permanent magnets preferably are shaped in cross section and curved longitudinally to precisely slide within the radius of curvature of a guide rail built into the ring. The tubular ring preferably has an elongated open or hollow cross section with bottom having a protruding guide rail to correspondingly accept a recess on the magnets or vice versa. These protrusions and recesses form the guide rails to locate each permanent magnet and allow them to glide along. Each permanent magnet either has or is connected to a guide structure with corresponding exterior surfaces, each guide structure has at least portions of a concave surface that fit against and partially over the inside circumferential surfaces of the protruding guide rails of the ring to locate and guide the one or more permanent magnets. Preferably the permanent magnet guide structure and the guide rails of the ring are coated or otherwise made to be of low friction surfaces such as Teflon or similar material. Alternatively, and especially when cylindrical permanent magnets are used, the tubular ring may form guide channels without rails.

[0014] In another embodiment, the entire ring portion of the system will be evacuated of any air; this helps reduce air resistance, friction and inertia dramatically, especially when the magnets are racing through at high speeds. Alternatively, this device can be used in space in the absence of gravity wherein the permanent magnet and all of the mechanisms are within a housing such that the movement can be created and repeated in such a zero gravity environment. The moving permanent magnets simply rely on the attractive or repulsive magnetic forces or combinations of both to provide movement and power generation. The objective is to use a minimal amount of electromagnetic force at each electromagnet requiring minimal use of electricity and that the activating means should be of minimal electricity consumption such that the power generated exceeds the amount of energy consumed in such a fashion that the battery can be charged or create excess electricity for other purposes. The invention expects that the amount of power generated far exceeds the power expenditure consumed by switches and electromagnets.

[0015] It is anticipated that the electricity generated in the central core will itself help re-magnetize the moving permanent magnet by the appropriate direction of the windings in central coil. This will eliminate the need to replace or re-magnetize the magnet at required intervals. This continuous process of re-magnetizing eliminates the interruption of the generation of electricity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. **1** is a perspective view showing an exemplary apparatus made according to the present invention.

[0017] FIG. **2** is a perspective exploded view of the exemplary apparatus of FIG. **1** with the top cover removed to show inside the lower housing of the apparatus.

[0018] FIG. **3** is a perspective view of the internally stored power generating apparatus with the outer housing portions removed taken from FIG. **1**.

[0019] FIG. **4** is a perspective view of the apparatus showing the tubular ring assembly of FIG. **3** with the central coils removed.

[0020] FIG. **5**A is an exploded view of the tubular ring assembly.

[0021] FIG. **5**B is an exploded view of a tubular ring assembly according to an alternate embodiment of the present invention.

[0022] FIG. **6** is a top view of the exemplary apparatus of FIG. **1** with the top cover housing removed showing the assembly as mounted in the lower housing.

[0023] FIG. **7** is a partial view of the apparatus of FIG. **6** with the central core removed and with a motion detection means shown for detecting the moving permanent magnet.

[0024] FIG. **8** is a cross sectional view of the exemplary apparatus of FIG. **1**.

[0025] FIG. **9** is a partial perspective lower view of the ring assembly showing the electromagnets supporting the tubular ring.

[0026] FIG. **10** is a partial perspective upper view showing a portion of the detection means.

[0027] FIG. **11** is an enlarged view of an electromagnet showing the bend of the top end of the core.

[0028] FIGS. **12**A, **12**B and **12**C illustrate a magnet prior to entering a coil, as it enters a coil and as it leaves a coil, thus illustrating the effects of the magnetic field generated on the coil as the magnet traverses through the coil.

[0029] FIGS. **13**A, **13**B and **13**C illustrate an alternative embodiment coil configuration where a coil wound in one direction is internally inserted in an external coil wound in an opposite direction.

[0030] FIG. **13**A shows a magnet prior to entering the coil.

[0031] FIG. **13**B shows the magnet as it enters the coil.

[0032] FIG. **13**C shows the magnet as it leaves the coil, in this alternative embodiment the combination of two coils results in a nulling action on the magnetic field of the internal and external coils.

[0033] FIG. **14**A illustrates a magnet entering a coil accelerator, this coil accelerator is a coil having a fewer layers at the entrance where the magnet enters and multiple windings of the coil at the exit, where the magnet leaves the coils. In this fashion the magnetic fields are stronger at the exit than they are at the entrance the resulting effect is shown in FIGS. **14**B and **14**C which creates an acceleration of the magnet toward the distal end of the coil and especially as it leaves the coil.

[0034] FIG. **14**B the magnet is shown entering the coil having the fewest windings at the entrance and as shown in **14**C the magnet is leaving the coil having multiple windings at the exit.

[0035] FIG. **15** is a partial plan view which shows the magnets moving internal of the device as they are entering coils. As shown, the sensor picks up the initial or leading portion of a magnet and the magnets are positioned such that the electromagnets are activated creating a south polarity pushing on the south end of the magnets; this causes a repulsive or pushing action driving the magnets around the internal mechanism of the device.

[0036] FIG. **16** is a partial plan view showing the magnets moving internal of the device wherein the sensor picks up the magnet prior to the location of an electromagnet **20** thus creating a pulling action on that magnet and simultaneously as the magnet continues past the electromagnets a pushing action is created as shown on the right hand magnet wherein the south pole of the electromagnet is pushing on the south pole of the magnet; this creates a pushing force added to a pulling force simultaneously. The electromagnets are set up so that as the magnet leaves the coil it is pulled from the exiting coil towards the electromagnet **20** on the left hand side of the view and on the right hand side of the view an electromagnet is positioned such that it pushes the magnet into the coil **40** as illustrated. This pushing and pulling action is an alternative embodiment to provide additional driving force for the mechanism.

DETAILED DESCRIPTION OF THE INVENTION

[0037] The following language is of the best presently contemplated mode or modes of carrying out the invention. This description is made for the purpose of illustrating the general principles of the invention and should not be taken in a limiting sense. The scope of the invention is best determined by reference to the appended claims. The reference numerals as depicted in the drawings are the same as those referred to in the specification. For purposes of this application, the various embodiments illustrated in the figures each use the same reference numeral for similar components. The structures employ basically the same components with variations in location or quantity thereby giving rise to the alternative constructions in which the inventive concept can be practiced.

[0038] A circular self-powered magnetic generator apparatus **100** of an exemplary first embodiment of the invention is illustrated in FIGS. **1-5**A, **6-10**. As shown in FIG. **1**, the circular generator apparatus **100** has an external housing **120** made of two pieces, an upper housing **121** and a lower housing **122**. In the center of the upper housing **121** is a central control assembly **140**. This assembly **140** shows an on/off switch **141**, four plug outlets **142** and a pair of power indicator status lights **146**, **147** which are covered by a circular cover plate **145** with fastener openings **149** as shown in FIG. **2**. The cover plate **145** is held in place by a plurality of screws **148**. The plate **145** has several openings **143** for the various components to pass through upon assembly. The entire apparatus **100** rests on a plurality of feet **66**, the feet **66** preferably being made of an elastomer to dampen any vibrations as shown in FIG. **8**.

[0039] As shown in FIG. **2**, the generator apparatus **100** has the upper housing **121** removed from the lower housing **122** exposing the internally stored components.

[0040] The upper housing **121** has opening **123**, **124** and **125** to allow the switch **141**, the plug outlets **142** and the indicator lights **146**, **147** to pass. The plug outlets **142** are attached to the plate **145** by fasteners **148** and the plate **145** is similarly attached to the upper housing **121** at threaded holes **127** by fasteners **148**. The wires connecting the outlet plugs **142** are not illustrated or shown attached to a power source for clarity. The upper housing **121** and lower housing **122** have complimentary interlocking portions **64** that can be snapped together to complete the housing assembly **120** as shown in FIG. **8**. These portions **64** allow easy access to the internal components of the apparatus **100** as shown in FIGS. **2** and **8**.

[0041] When the power generator **100** is switched on, the apparatus **100** will start generating power which will be sent to one or more batteries **50** when the permanent magnet is moved to a position to block switch sensor means **30** to activate the electromagnet, which can be accomplished manually by tilting the assembly or preferably by using an external magnet. The batteries **50** will be charged electrically and once charged can be used to power electric appliances attached to the apparatus through the outlet plugs **142**. The generator **100** will indicate a standby condition showing a light indicator **146** when lit and shows a charging condition when a light **147** is lit showing a green light when the apparatus **100** is ready for use, the indicator lights **146**, **147** being red or green respectively to reflect a status. Once the status level reached a charged state a green light shows a sufficient amount of power is being created to operate externally attached appliances or equipment.

[0042] The above description is simply one of several examples of the uses for the apparatus **100** of the present invention.

[0043] As further shown in FIG. **2**, the power generation is all created in the assembly of components stored in the lower housing **122**. In the center of the device is shown a power supply assembly **200** including one or more batteries **50** (shown in dashed lines) stored in the cylindrical housing **202** and an electronic power conversion assembly **220** for converting direct current generated by the apparatus **100** to an alternating current (if desired). The power conversion assembly **220** includes a circuit board, rectifiers and other electronic components to achieve the desired power conversion as is well understood in the art. The power conversion assembly further includes a one-way current flow diode **221** or equivalent device which only allows the coils **40** to pass current into the power conversion assembly **220** and prevents current from the battery to back flow a current into the coils. In this way the coils only have a current generated as a magnet passes through the coil.

[0044] The power generation assembly **102** is used to create the power to charge the batteries **50** as shown in dashed or phantom lines. The annular power generation assembly **102** has a plurality of central coils **40** which capture moving magnetic fields **17** as shown in FIG. **7**, and convert this power into an electric current which is fed back to the batteries **50** to charge them, as is discussed in greater detail as follows.

[0045] With reference to FIGS. **3**, **4**, **5**A, **6** and **8**, the exemplary power generating assembly **102** for the apparatus **100** is shown.

[0046] As shown in FIG. **3**, the assembly **102** is connected to the power supply assembly **200** via each central coil **40**. In FIG. **4**, a ring **2** is shown supported on a plurality of electromagnets **20**. Each electromagnet **20** is powered by and connected to a battery **50** in the central power supply assembly **200**.

[0047] As shown in FIG. **5**A and the cross sectional view in FIG. **8**, one or more permanent magnets **10**, preferably a plurality of permanent magnets **10** are positioned inside a hollow tubular annular or circular ring **2**. The circular ring **2** is hollow preferably of a modified cross section having a unique design adapted to fit the one or more permanent magnets **10** in a fashion to locate and guide the magnets **10** within the hollow circular ring **2** with the least friction possible. Encircling the annular ring **2** is a plurality of central coils **40** as shown in FIGS. **2** and **3** connected in a parallel sequence, each central coil **40** being connected directly to a power source or one or more batteries **50**, using conductive wire **42** which is wound about the ring **2** as shown in FIGS. **2**, **3**, **4** and **10** and connected at one end **41** to a positive terminal **52** of a battery **50** and thereafter encircles the annular ring **2** and continuing to a terminal end **43** connected to a negative post **54** of the battery **50**. Between each central coil **40** there is provided a plurality of helical gaps at spaced locations **45** along the ring **2** as shown in FIGS. **9** and **10**. At each spaced gap location **45** there is provided an electromagnet **20** which has an outer coil **22** and a central iron core **24** as shown in FIG. **11**. The central iron core **24** preferably is adapted to fit against the annular ring **2** to provide support. Also shown are a plurality of supports **60** as shown in FIG. **8** on the upper housing **120** positioned around the ring **2** and extending opposite the electromagnets **20** which provide a secure positioning and locating of the annular ring **2** such as to hold the annular ring **2** firmly between the supports **60** and against the central iron core **24** of the electromagnets **20**. These gap locations **45** can be the positions for one or more activating means **30**, as shown in FIGS. **7**, **15** and **16**. Alternatively the activating means **30** can be simply directed between the wire **42** spacing in the central coils **40** as illustrated. Each switch **30** can be connected to the battery **50** and to a single electromagnet **20**. Each switch **30** is light sensitive having a detector **31** on one side of the ring **2** and on the opposite side of the annular ring **2** is a light source **32** that is also connected to the battery **50** to complete a circuit. In the preferred embodiment as illustrated, one switch **30** is designed to activate all the electromagnets **20** simultaneously. In large generators **100** one switch may activate an electromagnet **20** with numerous central coils **40** spaced between electromagnets **20**, not simply one coil **40** between pairs of electromagnets. This augments the power output by several fold, while reducing the power drain substantially.

[0048] With reference to FIG. **5**B an exploded view of a second alternative embodiment of the device is shown wherein the device is housed in two annular rings of hemispherical cross sections such that when the rings are attached they form a circular cross section. The magnets **10** are shown having north and south polarities. At the north polarity the ends of the magnets are cone shaped while the south polarity has a flat or truncated end as illustrated. These magnets are designed to fit over a split wire ring **18** as illustrated this split ring **18** has the magnets moved to precise locations around the circumference of the wire **18** as illustrated. The magnets **10** are then secured in this position by fasteners **19** inserted through set screw fasteners **19** which are then threaded into holes **13** to fix the location of the magnets. Once placed on the split wire rings **18** and put through one end and positioned as indicated, the final magnet **10** is assembled wherein the ends of the wire **18** are inserted in the front and aft end of the magnet **10** and the set screws **13** are inserted locking the magnet **10** in place to form a continuous ring. Alternatively, the wire **18** can be a plurality of wires and each wire having an exact arcuate shape to position the magnets **10**. In any event the principle is that the wires provide an equidistant spacing of the magnets **10** such that the magnets **10** can operate inside the cylindrical housing **2**A and **2**B and assembled as shown. There are no guide rails or other devices believed necessary as the device will hold its center fundamentally inside the tubular ring that is created. This creates a tubular housing **2**A, **2**B of almost a toroidal-shaped wheel upon which the coils can then be positioned around the device to create the final product. The advantage of using a fine wire as illustrated having an arcuate shape enables the mass to be greatly reduced, further the resistance created by the moving mass is fundamentally eliminated. The wire can be made out of carbon fiber, fine metal (like the music wire) bent properly to shape, or even glass tubes if so desired. This alternative device operates precisely the same was as the device in FIG. **5**A although it is believed to be somewhat simpler in construction. As such the description that applies to the embodiment of FIG. **5**A equally applies to this second alternative embodiment of FIG. **5**B throughout the remainder of this disclosure.

[0049] With reference to FIG. **7**, the central coils **40** have been removed exposing the annular ring **2** and showing one of the electromagnets **20** positioned on an underside of a portion of the annular ring **2**. A top portion of the annular ring **2** is cut away to expose one of the one or more permanent magnets **10** which has a first end **11** and a second end **12**. Preferably the first end **11** is a North pole and a second end **12** is a South pole. The magnet **10** is positioned in the annular ring **2** such that the first end **11** as it approaches an electromagnet **20** activates a switch **30** such that the electromagnet **20** is turned on for a short period of time. This electromagnet **20** generates an electromagnetic field **21** preferably creating an attractive force on the end **11** of each permanent magnet **10**; this generates a pulling force on the magnet **10** and helps advance it inside the circular ring **2**. Accordingly, an electromagnetic field **21** as shown in dashed lines is produced which has an opposite polarity relative to a magnetic field **17** emitting from the end **11** of magnet **10** as it approaches. Prior to each magnet **10** reaching one of the electromagnets **20**, the electromagnetic field **21** remains switched off so as to avoid slowing the moving magnets **10**. As the one or more magnets **10** inside the circular ring **2** further advances about the axis of rotation of the annular ring **2** another magnet **10** passes the switch **30** which will turn on the adjacent electromagnetic coil **22** creating an additional attractive force. This process is repeated continuously as the one or more magnets **10** move within the hollow ring **2**. This continuous creation of electromagnetic force fields **21** having attractive forces with the end **11** of the magnet **10** creates a pulling effect and continuously accelerates the one or more magnets **10** until it or they reach a sustainable velocity. At this point the one or more magnets **10** are moving within the annular ring **2** in a very rapid fashion inside each central coil **40** and each of the moving magnets **10** creates an electric current in each of the central coils **40** and the current when connected to one or more batteries **50** then permits the batteries **50** to be continuously charged. This movement of the magnets **10** preferably generates more electricity than is used in activating electromagnets **20**, the light sensitive switches **30** with the light **32** and detector **31** are used to activate the electromagnetic coils **22** producing fields **21**. If the number of controls required to operate the system is considerably less than the number of coils **40** generating electricity, it is hoped that relatively more power is generated than is consumed. As a result, the apparatus **100** generates power to charge the batteries **50** and the excess power can be used to provide a power source for other devices if so desired.

[0050] In the above described apparatus **100** the use of a single magnet **10** moving inside the circular ring **2** dictated that one switch **30** is needed to activate each electromagnetic coil **20** as the magnet **10** moves along its circular guide path.

It was determined that if the number of magnets **10** matched the number of electromagnets **20** and if each magnet **10** was precisely arcuately spaced equidistantly relative to each of the other magnets **10** then as one of the magnets **10** passed the one switch **30** at a single location, then each electromagnet **20** could be simultaneously activated by the single switch **30** to create several magnetic fields **20** simultaneously attracting each magnet **10** towards the nearest electromagnet **20** and also switched off simultaneously at a single switch **30**. This preferred structure is shown in FIGS. **3**, **4**, **6**, **7** **15** and **16** and eliminates multiple switches required when using a single magnet **10**. This assembly is best illustrated in FIGS. **7**, **15** and **16**.

[0051] With further reference to FIG. **8** a cross section is shown wherein the magnet **10** is shown directly above the electromagnet **20** and inside the hollow annular ring **2**. The annular ring **2** has a unique hollow cross section. At the bottom of the annular ring **2**, a protruding surface is formed such that the protruding surface forms an annular groove **3** in the bottom, as such the inside of the annular ring **2** is provided with the groove **3** to provide guide rails **5** for guiding and receiving the permanent magnet **10**. Preferably, these guide rails **5** can be coated with a low friction surface **6** such that the magnet **10** can move very freely within the annular ring **2**. The groove **3** being on one half of the bottom of the ring **2** provides a location on the other half of the bottom wherein an end **25** of the central core **24** of the electromagnets **20** can be positioned to support the ring **2**. The groove **3** can also be used to help secure the ring **2** between the electromagnets and the supports **60**. As shown, the annular ring **2** is preferably made of a partially or totally transparent material. The primary material for the annular ring **2** requires that it be very passive to electromagnetic fields **21** and magnetic fields **17** and this is important in that for the electromagnet fields **21** to move the magnet **10** these fields **21** must be free to pass through the ring **2** and to pull the magnet **10**. Conversely, the magnets **10** must generate a magnetic field **17** as they move through each of the central coils **40** and that magnetic field **17** must be used to generate electricity within the coil **40**. Therefore it is important that the ring **2** be adapted to permit the transfer of magnetic fields **21** across the thickness of the ring **2**. Most preferably, as shown in FIG. **11**, electromagnet **20** has the core **24** bent or oriented so that it can be facing toward the front end **11** of the permanent magnet **10** in substantially or almost straight-facing orientation to more powerfully direct the electromagnetic field **21** toward the field **17** of the permanent magnets **10**. Plexiglass or clear plastics work exceptionally well for this purpose. As shown, the ring **2** can be sealed and evacuated so that there is no air internal to the ring **2**; this further reduces some of the frictional drag. Similarly the ring **2** can be operated in a zero gravity environment such as outer space as a power propulsion or power generating system. In such a zero gravity condition the rails **5** within the ring **2** help guide the magnet **10** without requiring additional support.

[0052] With reference to FIG. **5**A, a view is shown wherein the magnet **10** is shaped arcuately to match the diameter of the annular ring **2** therefore able to arcuately fit within a short portion of the ring **2** and smoothly pass. As shown, the magnets **10** have a cross section that has a protrusion **14** at bottom surfaces, this forms a rail **15** adapted to match the groove **3** side surface or guide rail **5** of the tubular ring **2**. As such, when the magnet **10** is inserted inside the tubular ring **2**, the magnet **10** will be located and positioned to freely slide within the tubular ring **2**.

[0053] As shown, the magnet **10** can be coated with Teflon or other low friction material **18** to help facilitate its movement within the hollow ring **2**. The inner lip of the rail **15** of the permanent magnets **10** may be truncated so as to reduce contact and thus aid ease of movement along the guide rails **5** of the ring **2**. As shown, outer surfaces of the rail **15** of the magnet **10** are in contact with the rail **5** of the ring **2**. The outer side surfaces of the magnet **10** can be gapped from the ring slightly by providing a clearance and as a result these surfaces never need to contact the annular ring **2** as the magnet **10** is moving rapidly within the ring **2** generating electric currents transmitted to and through the central coil **40** to the battery **50**. As shown in the cross section of FIG. **8**, the magnets **10** are shown to be snugly fitting in the hollow opening of the ring **2** nevertheless, adequate clearance must be provided to allow the magnets to move freely inside the ring **2**. As shown in FIG. **5**A, the ring **2** is preferably made in two annular pieces that can be snapped or glued together, an upper ring piece **2**A and a lower ring piece **2**B. This facilitates assembly of the magnets **10**.

[0054] As further shown in FIG. **5**A, the magnets **10** are preferably assembled with a connecting structure, as shown the connecting structure is a plurality of transparent arcuate pieces **62** having a flat end **64** and a "V" shaped end **63** to hold the flat end **12** and "V" shaped end **11** of the magnet. When assembled, the pieces **62** and **10** form a complete ring that can fit into the ring **2**. This connecting structure can be adhesively glued to the magnets **10** or simply tightly fitted together. As shown, the connecting pieces **62** have a similar cross-section as the magnets **10** and provide portions of the guide rail **15** so when assembled, the guide rail **5** is a uniform ring of low friction surfaces to ride against the guide rail **5** of the annular ring **2**. In order to reduce vibrations this assembled ring of connection structure and permanent magnets **10** is preferably balanced about its own axis of rotation. The connecting structure **61** can be any structure that rigidly fixes the spacing of the magnets **10** and can simply be a ring to which the magnets are affixed as opposed to separate pieces **62** if so desired, the purpose being to ensure a precise spacing and balance of the magnets as they propel inside the hollow ring **2**. In any event the connecting pieces must allow the light from switches **30** to pass as well as the electromagnetic fields **21**.

[0055] As shown in FIGS. **7**, **10**, **15** and **16**, the timing of the switches **30** is critical to the activation of the electromagnetic fields **21**. The switches **30** must be positioned in advance of the electromagnet **20** which is being activated when using attractive force propulsion. As the magnet **10** moves and comes into alignment with the light source **32** and the switch **30**, the light is blocked and the switch **30** activates the electromagnet **20** while in advance of the approaching permanent magnet **10** as this electromagnet field **21** is only generated for a short duration of time. This pulse of electromagnetic field **21** creates a pulling effect on the magnet **10** and as such draws the magnet **10** rapidly towards the source of the field **21** as this advancing movement occurs the field **21** drops off and the magnet **10** moves to the next switch **30** which will then activate the next adjacent electromagnet **20** in advance of the approaching permanent magnet **10**. Again the next electromagnetic field **21** is generated and this process is repeated continuously as the magnet **10** moves about this circular path within the annular ring **2**. In principle the electromagnets **20** are simply positioned in such a fashion that a regular intermittent electromagnetic fields **21** are generated in advance of the approaching permanent magnet **10**; nevertheless these electromagnetic fields **21** are only on for a short duration demanding very little amount of energy to be consumed from the battery **50**. The light source is shielded preferably encased in an opaque chamber with narrow slit only a sliver of light impinges the switch detector **31** and this sliver of light is interrupted or otherwise blocked by the moving permanent magnet **10** which turns on the switch **30** to activate the electromagnet **20**. At rest, the light sensitive switch **30** is in the off condition and the interruption of light turns on the switch **30**. Preferably the movement of the magnet **10** is such that the amount of electricity generated in the coils **40** far exceeds the amount of electricity consumed in each revolution around the annular ring **2** as a result the battery **50** is constantly being charged and recharged in such a fashion that excess electrical energy being generated can be stored to provide power for other devices.

[0056] It is envisioned that this apparatus **100** can be used to power small appliances or other electrical equipment or simply to charge batteries. More aggressive applications include using several units in tandem for power generation capability to power electric motors to drive and propel vehicles potentially depending on the amount of energy that can be generated in the electric coil is simply a matter of the size of the cross section of the ring **2** and the diameter of the ring **2**, size and power of the magnet **10**, the number of central coils **40** and the amount of windings one can achieve around the central coil **40**. As envisioned, each central coil **40** would provide a means for converting the magnetic energy of a moving magnetic force field inside the central coil **40** in such a fashion that a significant amount of electric current is generated during each revolution of the one or more magnets **10**.

[0057] In an alternative embodiment as shown in FIG. **15**, the electromagnet **20** instead of using opposite polarities as relative to the ends **11**, **12** of the permanent magnet **10** moving can use the same polarity. In this embodiment, the one or more magnets **10** would move in an opposite direction wherein the end **11** would be pushed by repulsive forces causing a rotation in an opposite or counterclockwise direction around the axis of the annular ring **2**. In such a case the winding of the central coil **40** may need to be wound in an opposite direction. It is important that the windings of the coil **40** are appropriate to create a constant recharging of the one or more magnets **10** accordingly as the magnets move in the opposite direction using the repulsive forces of the same polarities of the electromagnets **20**, each magnet **10** is effectively pushed around the annular ring **2** as opposed to being pulled as was described in the preferred embodiment. In this embodiment the pushing action occurs basically in the same way with the concept that as each magnet **10** approaches, but in this case passes an electromagnet **20** with the aft end **12** of the magnet **10**, the switch **30** is activated and the electromagnet **20** in close proximity to, but slightly behind that end **12** is activated such that magnet **10** is pushed rapidly away from the electromagnetic field **21**. Again the electromagnetic field **21** is only generated for a short duration of time creating a pushing action on the one or more magnets **10** in a counterclockwise direction. As such again the magnet **10** will generate electricity and electromagnetic current will feed into the central coils **40** to charge a battery **50** in a similar fashion. It is believed that the attractive forces may be easier to generate as was described in the earlier preferred embodiment, however, it is equally possible to use repulsive forces to create a movement of the magnet **10** inside the hollow ring **2**. Optionally as shown in FIG. **15**, the electromagnets **20** can be moved such that they are positioned at the exit end of the coils **40** around the ring such that as the magnet passes and leaves one coil, the electromagnet **20** will fire when the magnet **10** triggers the photosensor or light **30** breaking the light firing the electromagnet to create a south polarity on the electromagnet that will push on the aft end of the magnet **10** which similarly has a south polarity. In this configuration the movement of the magnets **10** as shown is counter-clockwise and as the magnet **10** is entering into a coil as illustrated, the electromagnets are providing an additional push. This is advantageous as will be seen later with regard to electromagnetic resistance created by the magnets, movement through the coils **40**.

[0058] As another additional alternative embodiment shown in FIG. **16** it is possible that a combination of electromagnets **20** can be used such that one electromagnet **20** can use attractive force in advance of the magnet **10** and second electromagnet **20** creates a repulsive force on the aft end of the one or more magnets **10** and to use both these fields to simultaneously create force fields **21** to create the push and pull combination as the magnet **10** advances through the annular ring **2**. This is believed to be slightly more complex than the straightforward push or pull action; however the timing is such that it can easily be handled using a microprocessor. As such this combination is believed to be within the scope of the present invention as an alternative configuration which may be able to generate a more rapid movement of the magnet and thus generate even more power potentially. As further shown in FIG. **16**, the electromagnets **20** are actually equally positioned between the adjacent coils **40** such that the electromagnets **20** can be fired to create a south polarity which pushes at one end of a magnet as it is entering the coil and actually attracts another magnet as it is exiting the coil. This is clearly illustrated in FIG. **16**. This positioning enables both the attractive and the repulsive forces to be utilized in an advantageous manner described above, this creates the opportunity to pull the magnet **10** as it leaves through the coil **40** and to push a magnet **10** as it is entering into a coil **40**. This again has an advantageous effect in reducing magnetic field losses that can be generated by the transfer of the magnet into the coil **40** as will be described hereafter.

[0059] With reference to FIGS. **12**A, **12**B and **12**C, as the magnet **10** moves toward a coil **40** as shown in FIG. **12**A the magnet approaches the coil in such a fashion that there is no electric current generated within the coil **40**. At the time at which the magnet **10** first enters the coil **40** as soon as the magnet **10** is in position as shown in FIG. **12**B traversing into the coil, the magnetic field of the coil **40** is initiated as a result of the moving magnet **10** passing through the coil **40** creating an electric current. This electric current moving through the coil **40** itself creates a small magnetic field having a north end and a south end as shown when the coil **40** is wound in the direction of the arrows as illustrated. As shown in FIG. **12**A the entire cylinder is shown and therefore the arrows are facing downward as they are being wound in a relative clockwise direction from the left side to the right side as illustrated. When cut in section as shown in FIG. **12**B this means that you are looking at the inside of the coil **40** and the windings on that side are actually facing upward; however, the direction of coil winding is the same as illustrated in FIG. **12**A. This results in a magnetic field being generated that is substantially uniform across the coil. The north magnetic field actually creates a slight inertial drag or a drag on the magnet **10** as it enters into the coil **40** because the north field of the coil is creating a repulsive action to the movement of the magnet **10** as the magnet **10** enters further into the coil **40** it is the north end of the magnet **10** is being pulled dramatically by the south polarity of the coil to assist in leaving the coil. This field of the coil **40** is also helping to push on the south end of the magnet inside the coil as it leaves. These are all beneficial, however the initial drag upon entrance creates a loss that can create a dampening effect on the movement of the entire magnetic ring as it passes inside its cylindrical housing ring. For purpose of this illustration, the housing ring **2** is eliminated to provide clarity and it is understood that these magnets **10** are actually moving within a housing that are also inside the magnetic coil **40**, however, as you recall the housings are designed to allow magnetic fields to pass through clearly and freely being made of either a translucent plastic or other non magnetic material as illustrated. The point is that by eliminating these, the magnetic fields of the coils **40** more easily enable the magnets **10** to move. These coil field-induced losses as illustrated can be reduced or neutralized by clever designing of the coils as will be discussed below.

[0060] With regard to FIGS. **13**A, **13**B and **13**C, a multiple coil arrangement is illustrated wherein as an alternative embodiment the device has a coil **40**A internal of an external coil **40**B. The device actually comprises two coils one coil **40**A wound in a clockwise direction internal of an external coil **40**B which is wound in a counterclockwise direction from left to right as illustrated. The external coil **40**B entirely encircles the internal coil **40**A. As a result, as the magnet **10** approaches the coil assembly **40**A, **40**B, the north magnetic field which creates a slight resistance is also somewhat nullified by a south facing field of the opposite coil. As a result, there is a lowering action of the electromagnetic fields created as the magnet **10** enters as shown in FIG. **13**B or as it exits the coils **40**A, **40**B as shown in FIG. **13**C. As a result there is a neutralizing effect on the magnetic coil field losses created by the movement of the magnet through the coils **40**A and **40**B. This is believed to be more efficient in that this type of winding will help assist in minimizing any magnetic field losses due to the movement of a magnet **10** through the coil.

[0061] In yet another alternative embodiment, as illustrated in **14**A, **14**B and **14**C, the coil **40**C is illustrated which as shown has windings in a clockwise direction from the left hand side of the figures to the right hand side of the figures. In this embodiment however as the wires of the coils **40**C are wound so they progressively narrow or are reduced to substantially fewer layers at the entrance where the magnet **10** will enter as shown in FIGS. **14**A, **14**B and **14**C such that the magnetic field generated in **14**B is substantially less than the magnetic field at the opposite south end of this coil **40**C. The south end of the coil **40**C has substantially more layers of winding and as a result, the magnetic field at the larger end of the coil is greater in size and magnitude. This accomplishes an accelerating effect that can be beneficially used as the magnet enters the coil **40**C and leaves the coil. The initial repulsive force on the magnet **10** wherein the north pole is actually pushing against the north pole as shown in **14**B is minimized by the use of less layers. As the magnet **10** enters into the coil **40**C, the larger south pole field attractive forces on the north end of the magnet greatly assist in accelerating the magnet **10** through the coil **40**C and as the magnet **10** accelerates once it penetrates the coil **40**C it is then moving rapidly as it then exits the coil **40**C. Upon exiting as shown, a large south repulsive force is created that by being somewhat larger helps create a stronger pushing action as the south pole of the magnet **10** is exiting.

[0062] In the manufacture of this device used for power generation it is believed that any one of these type of coils **40**, **40**A and **40**B, or **40**C can be used throughout the system. In other words the standard coil **40** as shown in FIG. **12**A-C can be used exclusively in the system recognizing there will be some magnetic field losses or alternatively all the coils can be created as the alternatives shown in **13**A-B wherein coils **40**A are nested inside a coil **40**B having opposite directional windings such that coils **40**A and **40**B create a nulling action wherein the magnetic field loss is reduced or the alternative accelerator coils **40**C can be used wherein the magnets **10** movement can be accelerated through the coil **40**C by having the windings excessively large on an exit end and smaller on an entrance end. Any of these combinations can be used together either in one or a plurality depending on the design preferred.

[0063] Ideally each of the apparatuses described above can be enclosed in the housing **120** structure to create a compact power generation unit. Each housing **120** can be equipped with power outlets to connect electrical charger devices or other appliances to power these pieces of equipment. Direct current or alternating current can be produced by the addition of known components to create the desired electrical outputs.

[0064] In a fourth embodiment of the present invention, the apparatus **100** as shown in FIGS. **3**, **9**, **10** and **11** is made very large and having numerous central coils **40**. The guide means are constructed of either top and bottom guide rails **5** or a single guide rail **5** with the permanent magnets **10** mounted in a complimentary guide rail surface **15** adapted to slide freely along the guide rails **5** with a low or no friction contact, preferably the guide rail surfaces **15** and the guide rails **5** move around the guide path without contact similar to the first embodiment.

[0065] In principle this larger device operates as previously described, but with the capacity to produce large quantities of electricity for commercial purposes.

[0066] The apparatus can be made using only one permanent magnet **10** in combination with one electromagnet or multiple electromagnets, and one central coil **40** or multiple central coils **40**, or one permanent magnet **10** with multiple electromagnets; or any suitable combination thereof. Furthermore, while one switch **30** is shown the apparatus may employ a plurality of switches **30** depending on the application. The annular ring **2** can be circular or alternatively oval in shape to form a loop as long as the magnets and connecting structures can be pivoted to adapt to straight and curved paths.

[0067] It is believed that super conductive coils designed to be used at room temperature can replace conventional materials to minimize energy losses as they become available.

[0068] Variations in the present invention are possible in light of the description of it provided herein. While certain representative embodiments and details have been shown for the purpose of illustrating the subject invention, it will be apparent to those skilled in this art that various changes and modifications can be made therein without departing from the scope of the subject invention. It is, therefore, to be understood that changes can be made in the particular embodiments described which will be within the full intended scope of the invention as defined by the following appended claims.

1. A power generating apparatus comprises:

a guide means;

one or more moving permanent magnets each permanent magnet having a north polarity at a first end and a south polarity at the opposite second end located and guided along a guide path by the guide means;

a plurality of electromagnets, each having a coil and a central core, each electromagnet being positioned in proximity to the guide means and spaced about the circumference of the guide means, when activated each of the electromagnets provide an attractive force of the opposite polarity relative to the respective end of the nearest permanent magnet;

one or more activating means for each or several electromagnets;

a plurality of central coils encircling the guide means and the permanent magnet; and

a battery or a series of batteries connected to the plurality of central coils, and wherein the one or more permanent magnets are moved approaching toward each electromagnet and as the N or S end of the magnet approaches the electromagnets of an opposite polarity, the one or more switches turns on one electromagnet, creating an attractive electromagnetic field pulling the one or more permanent magnets in a forward direction towards the next adjacent electromagnet and switching the power off of the one electromagnet and thereafter switching the power on of the next adjacent electromagnet, creating another attractive magnetic field in a repeating action around the circumference of the guide means to pull the one or more magnets in a continuous forward direction, the movement of the one or more permanent magnets generating an electric current in the central coils to charge the battery.

2. The power generation apparatus of claim **1** wherein the activating means comprises:

one or more switches; and

a means for activating the one or more switches.

3. The power generation apparatus of claim **1** wherein the means for activating the one or more switches is a light source, each switch being activated by blockage of illumination from the light source and the switch being activated by interruption or blockage of the light source to send current to the coil of an electromagnet.

4. The power generation apparatus of claim **3** wherein the moving permanent magnet passes between and blocks the light emitted from the light source to the switch.

5. The power generation apparatus of claim **3** wherein the light source is an LED, laser, polarized light or any defined wavelength of light.

6. The power generation apparatus of claim **1** wherein each of the one or more permanent magnets is arcuately shaped having an axis of origin corresponding to the axis of the guide means.

7. The power generation apparatus of claim **1** wherein the plurality of central cores encircles most of the guide means.

8. The power generation apparatus of claim **7** wherein the plurality of central coils are spaced to form a plurality of gaps for supports to extend for holding the guide means.

9. The power generation apparatus of claim **6** wherein the one or more permanent magnets is arcuately shaped complimentary to a portion of the path of the guide means.

10. The power generation apparatus of claim **6** wherein the guide means includes a hollow tubular ring having a cross section of an elongated protrusion at bottom correspondingly forms a groove inside of the ring at bottom, the surface of protrusion forms a guide rail to guide and locate the one or more permanent magnets.

11. The power generation apparatus of claim **6** wherein each of the one or more permanent magnets has a cross-section with a protruding bottom surface, forming a guide rail to fit in the groove of the tubular ring.

12. The power generation apparatus of claim **6** wherein one or more ends of the one or more permanent magnets are aerodynamically rounded.

13. The power generation apparatus of claim **1** wherein the guide means has one or more guide rails, each guide rail forming a closed loop.

14. The power generating apparatus of claim **13** wherein the closed loop is oval or circular.

15. The power generating apparatus of claim **11** wherein each permanent magnet is fixed relative to other permanent magnets by a connecting structure.

16. The power generating apparatus of claim **15** wherein the number of permanent magnets is equal to or greater than the number of electromagnets.

17. The power generating apparatus of claim **15** wherein the number of permanent magnets is equal to or less than the number of electromagnets.

18. The power generating apparatus of claim **16** wherein each permanent magnet is spaced equidistantly on the connecting structure.

19. The power generating apparatus of claim **1** wherein the central coils further comprise one or more central coils having an internal coil and an encircling external coil, the internal coil being wound in an opposite direction than the external coil.

20. The power generating apparatus of claim **1** wherein the central coils further comprise one or more coil accelerators, each coil accelerator having more coil windings at one end relative to the opposite end.

21. A power generating apparatus comprises:

a guide means;

one or more moving permanent magnets each permanent magnet having a north polarity at a first end and a south polarity at the opposite second end located and guided along a guide path by the guide means;

a plurality of electromagnets, each having a coil and a central core, each electromagnet being positioned in proximity to the guide means and spaced about the circumference of the guide means, when activated each of the electromagnets provides a repulsive force of the same polarity relative to the respective end of the nearest permanent magnet;

one or more activating means for each or several electromagnets;

a plurality of central coils encircling the guide means and the permanent magnet; and

a battery or series of batteries connected to the plurality of central coils, and wherein the one or more permanent magnets are moved approaching toward each electromagnet and as the N or S end of the magnet approaches the electromagnets of a similar polarity, the one or more switches turns on one electromagnet, creating a repulsive electromagnetic field pushing the one or more permanent magnets in a forward direction towards the next adjacent electromagnet and switching the power off of the one electromagnet and thereafter switching the power on of the next adjacent electromagnet, creating another repulsive magnetic field in a repeating action around the circumference of the guide means to push the one or more magnets in a continuous forward direction, the movement of the one or more permanent magnets generating an electric current in the central coils to charge the battery.

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