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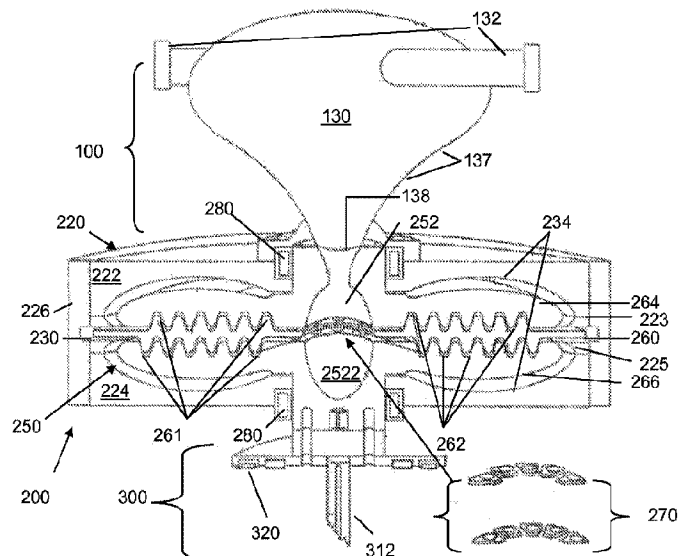
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(54) **Titre : SYSTEME ET METHODE DE SEPARATION DE FLUIDES**

(54) **Title: SYSTEM AND METHOD FOR SEPARATING FLUIDS**



(57) **Abrégé/Abstract:**

A system and method in at least one embodiment for separating fluids including liquids and gases into subcomponents by passing the fluid through a vortex chamber into an expansion chamber and then through at least a portion of a waveform pattern present between at least two rotors and/or disks. In further embodiments, a system and method is offered for harnessing fields created by a system having rotating rotors and/or disks having waveform patterns on at least one side to produce current within a plurality of coils. In at least one embodiment, the waveform patterns include a plurality of hyperbolic waveforms axially aligned around a horizontal center of the system.

Abstract

A system and method in at least one embodiment for separating fluids including liquids and gases into subcomponents by passing the fluid through a vortex chamber into an expansion chamber and then through at least a portion of a waveform pattern present between at least two rotors and/or disks. In further embodiments, a system and method is offered for harnessing fields created by a system having rotating rotors and/or disks having waveform patterns on at least one side to produce current within a plurality of coils. In at least one embodiment, the waveform patterns include a plurality of hyperbolic waveforms axially aligned around a horizontal center of the system.

SYSTEM AND METHOD FOR SEPARATING FLUIDS

[0001] This application claims priority from U.S. Patent Application Serial No. 61/376,438, filed August 24, 2010, and U.S. Patent Application Serial No. 13/213,452, filed August 19, 2011.

I. Field of the Invention

[0002] The present invention relates to a system and method for processing a fluid to dissociate fluid in one or more embodiments and for dissociating components of the fluid in one or more embodiments. More particularly, the system and method of at least one embodiment of the present invention provides rotating hyperbolic waveform structures and dynamics that may be used to controllably affect the fundamental properties of fluids and/or fields for separation of gases and/or power generation.

II. Background of the Invention

[0003] Current gas separation systems for the production of industrial gases using air separation rely on pressure swing adsorption (PSA) and vacuum pressure swing adsorption (VPSA) processes. In both of these processes, compressed air is pumped through a fixed bed of adsorbent that absorbs one of the main constituents contained in the compressed air resulting in a stream of air containing the non-adsorbed constituents for collection. As the adsorbent becomes saturated, the adsorbent is purged and the discharged gas is collected. There is continued development work in improving the efficiencies of these processes both in terms of production and power requirements.

[0004] In systems that make use of a vortex tube, the gas being separated is inlet into the tube at a point along the height of the vortex tube to allow for lighter particles to flow up and heavier particles to drop. Typically, the vortex created is using mechanical forces within the vortex tube.

[0005] Power generation systems typically include a rotor and stator and include a set of coils and magnets. Either the coils or the magnets are present on the rotor with the other present on the stator. Electrical power is generated from the creation of a magnetic field in the coils from the rotation of the rotor. The rotor is typically rotated with the use of mechanical forces from, for example, falling water, rising steam, and blowing wind.

III. Summary of the Invention

[0006] In at least one embodiment, this invention provides a system including a housing having at least one feed inlet, a vortex chamber in fluid communication with the at least one feed inlet; a plurality of waveform disks in fluid communication with the vortex chamber, the plurality of waveform disks forming an axially centered expansion and distribution chamber; at least one coil array in magnetic communication with the plurality of waveform disks; at least one rotating disk rotatable about the housing, wherein the disk includes an array of magnets; and a drive system engaging the plurality of waveform disks.

1 **[0007]** In at least one embodiment, this invention provides a system including a vortex induction
2 chamber; a housing in communication with the vortex induction chamber, wherein the housing includes an
3 upper case having a paraboloid shape formed on at least one face, a lower case having a parabolic shape
4 formed on at least one face, and a peripheral side wall connecting the upper case and the lower case such
5 that a paraboloid chamber is formed; an arrangement of disks disposed within the casing, wherein at least
6 one of the disks includes an opening in the center in fluid communication with the vortex induction chamber;
7 and a drive system connected to the arrangement of disks.

8
9 **[0008]** In at least one embodiment, this invention provides a system including a vortex induction
10 chamber, a case connected to the vortex induction chamber, the case including a chamber having multiple
11 discharge ports, a pair of rotors in rotational connection to the case, the rotors forming at least a portion of
12 an expansion and distribution chamber, at least one waveform channel exists between the rotors, and a
13 motor connected to the rotors; and a fluid pathway exists from the vortex induction chamber into the
14 expansion and distribution chamber through the at least one waveform channel to the case chamber and
15 the multiple discharge ports.

16 **[0009]** In at least one embodiment, this invention provides a system including at least one feed inlet; a
17 plurality of waveform disks in fluid communication with the at least one feed inlet, the plurality of waveform
18 disks each having an opening passing therethrough forming an axially centered expansion chamber; at
19 least one coil array in magnetic communication with the plurality of waveform disks; at least one magnet
20 plate rotatable about the feed inlet, wherein the disk includes an array of magnets where one of the at least
21 one coil array is between one of the at least one magnet plate and the plurality of waveform disks; and a
22 drive system engaging the plurality of waveform disks.

23 **[0010]** In at least one embodiment, this invention provides a system including an intake chamber; a
24 housing connected to the intake chamber, wherein the housing includes an upper case having a paraboloid
25 shape formed on at least one face, a lower case having a paraboloid shape formed on at least one face,
26 and a peripheral side wall connecting the upper case and the lower case such that a chamber that is at
27 least one of a paraboloid and toroid is formed; a disk-pack turbine disposed within the housing, the disk-
28 pack turbine includes at least one disk having an opening in the center in fluid communication with the
29 intake chamber; and a drive system connected to the disk-pack turbine.

30 **[0011]** In at least one embodiment, this invention provides a system including a vortex induction
31 chamber, a housing connected to the vortex induction chamber, the housing including a chamber having
32 multiple discharge ports, a pair of rotors in rotational connection to the housing, the rotors forming at least
33 a portion of an expansion chamber, disk mounted on each of the rotors, at least one disk chamber exists
34 between the disks, and a motor connected to the rotors; and a fluid pathway exists from the vortex induction
35 chamber into the expansion chamber through the at least one waveform channel to the housing chamber
36 and the multiple discharge ports.

[0012] In at least one embodiment, this invention provides a system including a housing having at least one feed inlet, a vortex chamber in fluid communication with the at least one feed inlet; a disk-pack turbine having an expansion chamber axially centered and in fluid communication with the vortex chamber, wherein the disk-pack turbine includes members having waveforms formed on at least one surface; a first coil array placed on a first side of the disk-pack turbine; a second coil array placed on a second side of the disk-pack turbine; an array of magnets in magnetic communication with the disk-pack turbine; and a drive system engaging the disk-pack turbine.

[0013] In at least one embodiment, this invention provides a disk array for use in a system manipulating at least one fluid, the disk array including at least one pair of mated disks, the mated disks are substantially parallel to each other, each disk having a top surface, a bottom surface, a waveform pattern on at least one surface of the disk facing at least one neighboring disk such that the neighboring waveform patterns substantially form between the neighboring disks in the pair of mated disks a passageway, at least one mated disk in each pair of mated disks includes at least one opening passing through its height, and a fluid pathway exists for directing fluid from the at least one opening in the disks through the at least one passageway towards the periphery of the disks; and each of the waveform patterns includes a plurality of at least one of protrusions and depressions.

[0014] In at least one embodiment, this invention provides a method for generating power including driving a plurality of disks having mating waveforms, feeding a fluid into a central chamber defined by openings passing through a majority of the plurality of disks with the fluid flowing into spaces formed between the disks to cause the fluid to dissociate into separate components, and inducing current flow through a plurality of coils residing in a magnetic field created between the waveform disks and at least one magnet platform rotating through magnetic coupling with the waveform disks.

IV. Brief Description of the Drawings

[0015] The present invention is described with reference to the accompanying drawings. In the drawings, like reference numbers indicate identical or functionally similar elements. The use of cross-hatching and shading within the drawings is not intended as limiting the type of materials that may be used to manufacture the invention.

[0016] FIG. 1 illustrates a block diagram in accordance with present invention.

[0017] FIG. 2 illustrates a top view of an embodiment according to the invention.

[0018] FIG. 3 illustrates a cross-sectional view of the system illustrated in FIG. 2 taken at 3-3.

[0019] FIG. 4 illustrates an exploded and partial cross-sectional view of the system illustrated in FIG. 2.

[0020] FIG. 5 illustrates a partial cross-sectional view of the system illustrated in FIG. 2.

[0021] FIGs. 6A and 6B illustrate side and perspective views of another embodiment according to the invention.

[0022] FIGs. 7A and 7B illustrate an example disk-pack turbine according to the invention.

[0023] FIGs. 8A-8C illustrate another example disk-pack turbine according to the invention.

1 [0024] FIG. 9A illustrates a side view of another embodiment according to the invention. FIG. 9B
2 illustrates a top view of the system illustrated in FIG. 9A. FIG. 9C illustrates a partial cross-section of an
3 embodiment according to the invention take at 9C-9C in FIG. 9B.

4 [0025] FIG. 10 illustrates a cross-sectional view of the embodiment taken at 10-10 in FIG. 9B.

5 [0026] FIG. 11 illustrates a cross-sectional view of the embodiment taken at 11-11 in FIG. 9B.

6 [0027] FIG. 12 illustrates a top view of another embodiment according to the invention.

7 [0028] FIG. 13 illustrates a side view of the system illustrated in FIG. 12.

8 [0029] FIG. 14 illustrates a cross-sectional view of the system illustrated in FIG. 12 taken at 14-14 in FIG.
9 12.

10 [0030] FIGs. 15A-15D illustrate another example disk-pack turbine according to the invention.

11 [0031] FIG. 16 illustrates a side view of another embodiment according to the invention.

12 [0032] FIG. 17 illustrates a side view of another embodiment according to the invention.

13 [0033] FIG. 18 illustrates a side view of another embodiment according to the invention.

14 [0034] FIGs. 19A-19E illustrate another example disk-pack turbine according to the invention.

15 [0035] FIG. 20 illustrates a perspective view of another example disk according to the invention.

16 [0036] FIG. 21A-21D illustrate another example disk-pack turbine according to the invention.

17 [0037] FIG. 22 illustrates another example disk-pack turbine according to the invention.

18 [0038] Given the following enabling description of the drawings, the invention should become evident to
19 a person of ordinary skill in the art.

20 V. Detailed Description of the Drawings

21 [0039] The present invention, in at least one embodiment, provides a highly efficient system and method
22 for processing fluid to harness the energy contained in the fluid and the environment and/or to dissociate
23 elements of the fluid. In order to accomplish the results provided herein, in at least one embodiment the
24 present invention utilizes elegant, highly-specialized rotating hyperbolic waveform structures and dynamics.
25 It is believed these rotating hyperbolic waveform structures and dynamics, in at least one embodiment, are
26 capable of efficiently propagating at ambient temperature desired effects up to the *fifth state of matter*, i.e.,
27 the etheric/particle state, and help accomplish many of the functional principles of at least one embodiment
28 of the present invention. More particularly, in at least one embodiment, the system of the present invention
29 is capable of producing very strong field energy at ambient temperatures while using relatively minimal
30 input energy to provide rotational movement to the waveform disks. As will be more fully developed in this
31 disclosure, the waveform patterns on facing disk surfaces form chambers (or passageways) for fluid to
32 travel through including towards the periphery and/or center while being exposed to a variety of pressure
33 zones that, for example, compress, expand and/or change direction and/or rotation of the fluid particles.

34 [0040] In this disclosure, waveforms include, but are not limited to, circular, sinusoidal, biaxial, biaxial
35 sinucircular, a series of interconnected scallop shapes, a series of interconnected arcuate forms,
36 hyperbolic, and/or multi-axial including combinations of these that when rotated provide progressive, disk

1 channels with the waveforms being substantially centered about an expansion chamber. The waveforms
2 are formed by a plurality of ridges (or protrusions or rising waveforms), grooves, and depressions (or
3 descending waveforms) in the waveform surface including the features having different heights and/or
4 depths compared to other features and/or along the individual features. In some embodiments, the height
5 in the vertical axis and/or the depth measured along a radius of the disk chambers vary along a radius as
6 illustrated, for example, in FIG. 15D. In some embodiments, the waveforms are implemented as ridges that
7 have different waveforms for each side (or face) of the ridge. In this disclosure, waveform patterns (or
8 geometries) are a set of waveforms on one disk surface. Neighboring rotor and/or disk surfaces have
9 matching waveform patterns that form a channel running from the expansion chamber to the periphery of
10 the disks. In this disclosure, matching waveforms include complimentary waveforms, mirroring geometries
11 that include cavities and other beneficial geometric features. FIGs. 3-5, 7A-7B, 8B, 8C, 9C-11, 14, 15B-
12 15D, and 19A-22 illustrate a variety of examples of these waveforms.

13 **[0041]** In this disclosure, a bearing may take a variety of forms while minimizing the friction between
14 components with examples of material for a bearing including, but are not limited to, ceramics, nylon,
15 phenolics, bronze, and the like. Examples of bearings include, but are not limited to, bushings and ball
16 bearings.

17 **[0042]** In this disclosure, examples of non-conducting material for electrical isolation include, but are not
18 limited to, non-conducting ceramics, plastics, Plexiglass, phenolics, nylon or similarly electrically inert
19 material. In some embodiments, the non-conducting material is a coating over a component to provide the
20 electrical isolation.

21 **[0043]** In this disclosure, examples of non-magnetic (or very low magnetic) materials for use in housings,
22 plates, disks, rotors, and frames include, but are not limited to, aluminum, aluminum alloys, brass, brass
23 alloys, stainless steel such as austenitic grade stainless steel, copper, beryllium-copper alloys, bismuth,
24 bismuth alloys, magnesium alloys, silver, silver alloys, and inert plastics. Examples of non-magnetic
25 materials for use in bearings, spacers, and tubing include, but are not limited to, inert plastics, non-
26 conductive ceramics, nylon, and phenolics.

27 **[0044]** In this disclosure, examples of diamagnetic materials include, but are not limited to, aluminum,
28 brass, stainless steel, carbon fibers, copper, magnesium, other non-ferrous material alloys some of which
29 containing high amounts of bismuth relative to other metals.

30 **[0045]** The present invention in at least one embodiment provides a novel approach to the manipulation
31 and harnessing of energy and matter, resulting in, for example: (a) systems and methods for economical,
32 efficient, environmentally positive separation, expansion, dissociation, combination, transformation, and/or
33 conditioning of liquids and gases for applications such as dissociation of water for energy, elemental
34 restructuring and rendering of pure and complex gases, and the production of highly energetic gases for
35 direct, dynamic application; and (b) systems and methods for the production, transformation, and/or
36 conversion of mass/matter to highly energetic electrical, magnetic, diamagnetic, paramagnetic, kinetic,

1 polar and non-polar fluxes and fields. The present invention provides, in one or more embodiments,
2 systems and methods that are beneficial for electrical power generation.

3 **[0046]** The systems and methods of the present invention in at least one embodiment include an intake
4 chamber and a disk-pack turbine having an expansion and distribution chamber (or expansion chamber) in
5 fluid communication with the intake chamber, and disk chambers formed between the rotors and/or disks
6 that form the expansion chamber as illustrated, for example, in FIG. 1. The intake chamber serves to draw
7 charging media, i.e., liquids and/or gases (hereinafter collectively referred to as "fluid" or "media" or
8 "material") into the system before passing the charging media into the expansion chamber. The expansion
9 chamber is formed by two or more stacked rotatable rotors and/or disks having an opening in their center.
10 The stacked rotatable rotors and/or disk(s) are centered axially such that one or more openings are aligned
11 whereby the aligned openings form the expansion chamber. The expansion chamber may include a variety
12 of shapes, ranging from a horizontal substantially cylindrical shape to varying degrees of converging and
13 diverging structures. However, in at least one embodiment, the expansion chamber includes both a
14 convergent structure and a divergent structure designed to first compress, and then expand the media.
15 The disks in at least one embodiment also include one or more patterns of waveform structure which may
16 be highly application specific. In an alternative embodiment, the system draws in fluid from the periphery
17 in addition or in place of the intake chamber.

18 **[0047]** In some embodiments the intake chamber may be formed as a vortex induction chamber that
19 creates a vertical vortex in the charging media, which in most embodiments is a fluid including liquid and/or
20 gas, in order to impart desired physical characteristics on the fluid. Examples of how the charging media
21 is provided include ambient air, pressurized supply, and metered flow. The vertical vortex acts to shape,
22 concentrate, and accelerate the charging media into a through-flowing vortex, thereby causing a decrease
23 in temperature of the charging media and conversion of heat into kinetic energy. These effects are realized
24 as the charging media is first compressed, then rapidly expanded as it is drawn into the expansion chamber
25 by the centrifugal suction/vacuum created by the dynamic rotation and progressive geometry of the disks.
26 The vortex also assists the fluid in progressing through the system, i.e., from the vortex induction chamber,
27 into the expansion chamber, through the disk chambers formed by the patterns and channels created by
28 the waveforms such as hyperbolic waveforms on the disks, and out of the system. In some embodiments,
29 there may also be a reverse flow of fluid within the system where fluid components that are dissociated flow
30 from the disk chambers to the expansion chamber back up (i.e., flow simultaneously axially and
31 peripherally) through the vortex chamber and, in some embodiments, out the fluid intakes. Media (or
32 material) tends toward being divided relative to mass/specific gravity, with the lighter materials discharging
33 up through the eye of the vortex while simultaneously discharging gases/fluids of greater mass at the
34 periphery. While progressing through the waveform geometries, the charging media is exposed to a
35 multiplicity of dynamic action and reactionary forces and influences such as alternating pressure zones and

changing circular, vortex and multi-axial flows of fluid as the fluid progresses over the valleys and peaks and highly variable hyperbolic and/or non-hyperbolic geometries.

[0048] The number and arrangement of disks can vary depending upon the particular embodiment. Systemic effects may be selectively amplified by the incorporation of geometries as well as complimentary components and features that serve to supplement and intensify desired energetic influences such as sympathetic vibratory physics (harmonic, sympathetic and/or dissonant, electrical charging, polar differentiation, specific component isolation, i.e., electrical continuity, and magnetism-generated fixed/static permanent magnetic fields, permanent dynamic magnetic fields, induced magnetic fields, etc.). Examples of the various disk arrangements include paired disks, multiple paired disks, stacked disks, pluralities of stacked disks, multi-staged disk arrays, and various combinations of these disk arrangements as illustrated, for example, in FIGs. 3, 7A, 8A-8C, 9C, 10, 11, 15D, 19E, and 22. Further examples add one or more rotors to the disks. A disk-pack turbine is a complete assembly with rotors and/or disks being elements within the disk-pack turbine. In at least one embodiment, the bottom rotor (or disk) includes a parabolic/concave rigid feature that forms the bottom of the expansion chamber.

[0049] As the highly energized charging media passes from the vortex induction chamber into the expansion chamber, the charging media is divided and drawn into channels created by the waveforms on the stacked disks. Once within the rotating waveform patterns, the media is subjected to numerous energetic influences, including sinusoidal, tortile, and reciprocating motions in conjunction with simultaneous centrifugal and centripetal dynamics. See, e.g., FIGs. 5. These dynamics in at least one embodiment include a multiplicity of multi-axial high pressure centrifugal flow zones and low pressure centripetal flow zones, the majority of which are vortexual in nature.

a. Overview

[0050] FIG. 1 provides a broad overview of an example of a system according to the present invention. This overview is intended to provide a basis for understanding the principles and components of the various embodiments of the present invention that will be discussed in more detail below. The system as illustrated in FIG. 1 includes an intake module 100 with an intake chamber 130 and a disk-pack module 200 having an expansion and distribution chamber (or expansion chamber) 252 and a disk-pack turbine 250. To simplify the discussion, the optional housing around the disk-pack turbine 250 is not included in FIG. 1. The expansion chamber 252 is formed by openings and the recess present in the rotors and/or disk(s) that form the disk-pack turbine 250. See, e.g., FIGs. 3 and 4. The rotatable rotors and/or disks are stacked or placed adjacent to each other such that a small space of separation remains between the adjacent members to form disk chambers. The intake chamber 130 is in fluid communication with the expansion chamber 252. A drive system 300 is connected to the disk-pack turbine 250 to provide rotational movement to the disk-pack turbine 250.

[0051] The drive system 300 in at least one embodiment is connected to the disk-pack turbine 250 through a drive shaft 314 or other mechanical linkage 316 (see, e.g., FIGs. 4 and 6A) such as a belt, and

1 in a further embodiment the drive system 300 is connected directly to the disk-pack turbine 250. In use,
2 the drive system 300 rotates the plurality of rotors and/or disks in the disk-pack turbine 250. In at least one
3 embodiment, the rotation of which creates a centrifugal suction or vacuum within the system that causes a
4 charging media to be drawn into the intake chamber 130 via inlets 132 and in further embodiments the fluid
5 is drawn in from a periphery of the disk-pack turbine 250.

6 **[0052]** The intake chamber 130 concentrates (compresses) and passes the charging media into the
7 expansion chamber 252. The expansion chamber 252 causes the compressed charging media to quickly
8 expand and distribute through the disk chambers 262 and over the surfaces of the disk-pack turbine
9 members towards a periphery via the disk chambers 262 and in some embodiments back towards the
10 expansion chamber 252. In at least one embodiment, components of the fluid reverse course through the
11 system, for example, lighter elements present in the fluid that are dissociated from heavier elements present
12 in the fluid. In at least one embodiment, the system includes a capture system for one or more of the
13 dissociated fluid elements. See, e.g., FIGs. 6A and 6B. The media is conditioned as it passes between
14 the rotating disks from the center towards the periphery of the disks. In at least one embodiment, the intake
15 chamber 130 is omitted.

16 **b. Fluid Conditioning**

17 **[0053]** FIGs. 2-4 provide various views of an example embodiment of the present invention that is useful
18 in the conditioning, separating, dissociating, and/or transforming liquids, gases and/or other matter. FIGs.
19 2 and 3 illustrate an embodiment of the fluid conditioning system according to the present invention. In
20 accordance with this embodiment, the system includes a fluid intake module 100 with a vortex induction
21 chamber (or vortex chamber) 130 and a disk-pack module 200 with a housing 220, and a disk-pack turbine
22 250 with an expansion and distribution chamber (or expansion chamber) 252. The fluid intake module 100
23 acts as a source of the charging medium provided to the disk-pack module 200.

24 **[0054]** Charging media enters the vortex chamber 130 via fluid inlets 132. The fluid inlets 132 may also
25 be sized and angled to assist in creating a vortex in the charging media within the vortex chamber 130 as
26 illustrated, for example, in FIG. 2. The vortex chamber 130 provides the initial stage of fluid processing.
27 The housing 220 illustrated in FIGs. 3 and 4 is around the disk-pack turbine 250 and is an example of how
28 to collect fluid components that exit from the periphery of the disk chambers 262.

29 **[0055]** FIGs. 3 and 4 illustrate, respectively, a cross-section view and an exploded view of the fluid
30 conditioning system in accordance with an embodiment illustrated in FIG. 2. The housing 220 around the
31 disk-pack turbine 250 provides an enclosure in which the disk(s) 260 and rotors 264, 266 are able to rotate.
32 The following disclosure provides an example of how these modules may be constructed and assembled.

33 **[0056]** The fluid intake module 100 includes a vortex chamber (or intake chamber) 130 within a housing
34 120 having fluid inlets 132 in fluid inlets in at least one embodiment are sized and angled to assist in creating
35 a vortex in the charging medium within the vortex chamber 130. The vortex chamber 130 is illustrated as
36 including an annular mounting collar 125 having an opening 138. The collar 125 allows the intake chamber

130 to be connected in fluid communication with the expansion chamber 252. The fluid intake module 100 sits above the disk-pack module 200 and provides the initial stage of fluid processing. In at least one embodiment, the vortex chamber 130 is stationary in the system with flow of the charging media through it driven, at least in part, by rotation of the disk-pack turbine 250 present in the housing 220. In another embodiment, a vortex is not created in the charging media but, instead, the vortex chamber 130 acts as a conduit for moving the charging media from its source to the expansion chamber 252.

[0057] The disk-pack module 200 includes at least one disk-pack turbine 250 that defines at least one expansion chamber 252 in fluid communication with the vortex chamber 130. The fluid exits from the vortex chamber 130 into the expansion chamber 252. The expansion chamber 252 as illustrated is formed by a rigid feature 2522 incorporated into a lower rotor (or lower disk) 266 in the disk-pack turbine 250 with the volumetric area defined by the center holes in the stacked disks 260 and an upper rotor 264. In at least one embodiment, there are multiple expansion chambers within the disk-pack turbine each having a lower disk 266 with the rigid feature 2522. See, e.g., FIGs. 9 and 10 and the next section of this disclosure.

[0058] As illustrated, the disk-pack turbine 250 includes an upper rotor 264, a middle disk 260, and a lower rotor 266 with each member having at least one surface having a waveform pattern 261 present on it. The illustrated at least one rotatable disk(s) 260 and rotors 264, 266 are stacked or placed adjacent to each other such that a small space of separation remains between the adjacent disk/rotor to form disk chambers 262 through which the charging media will enter from the expansion chamber 252. The disk chambers 262 are lined with waveforms 261 that are complementary between adjacent rotor/disk(s) as illustrated, for example, in FIGs. 8A-8C, 15A, and 15B. In at least one embodiment, the waveforms include no angles along any radius extending from a start of the waveform pattern to the end of the waveform pattern. In FIG. 4, the illustrated waveform patterns 261 are a series of concentric circles, but based on this disclosure it should be understood that the concentric circles can be replaced by other patterns discussed in this disclosure and depicted in the figures. The illustrated rotors 264, 266 and disk(s) 260 are spaced from each other to form disk chambers 262 between them that are in fluid communication with the expansion chamber 252. One way to space them apart is illustrated in FIGs. 3 and 4, where impellers 270 such as ceramic spacers are used to separate them and also to interconnect them together so that they rotate together. Alternative materials besides ceramics that would work include materials that do not conduct electrical current to electrically isolate the illustrated rotors and disk from each other and the system. In further embodiments one or more of the upper rotor 264, the middle disk 264, and the lower rotor 266 are electrically connected. Another way they may be separated is using support pieces fixedly attached to support bolts running between the top and lower rotors 264, 266. The illustrated lower rotor 266 includes a parabolic/concave rigid feature 2522 that forms the bottom of the expansion chamber 252. In an alternative embodiment, the rotors 264, 266 and the disk(s) 260 are attached on their peripheries.

[0059] The upper rotor 264 and the lower rotor 266 include shoulders 2642, 2662 extending from their respective non-waveform surface. The upper rotor 264 includes a raised shoulder 2642 that passes

1 through an opening 2222 in the upper case 222 of the disk-pack module 200 to establish a fluid pathway
2 connection with the intake chamber 130. In the illustrated embodiment, the upper rotor shoulder 2642 is
3 ringed by a bearing 280 around it that rests on a flange 2224 of the upper case 222 and against the inside
4 of the collar 125 of the intake chamber housing 120. The lower rotor shoulder 2662 passes through an
5 opening 2262 in a lower case 226 to engage the drive shaft 314. The lower rotor shoulder 2662 is
6 surrounded by a bearing 280 that rests against the flange 2264 of the lower case 226. In an alternative
7 embodiment, the upper rotor 264 and the lower rotor 266 include a nesting hole for receiving a waveform
8 disk where the nesting hole is defined by a periphery wall with gaps for receiving a connection member of
9 the waveform disk. See, e.g., FIG. 15D.

10 **[0060]** In at least one embodiment, the center disk 260 will begin to resonate during use as it spins
11 around the central vertical axis of the system and fluid is passing over its surface. As the center disk 260
12 resonates between the upper and lower rotors 264, 266, the disk chambers 262 will be in constant flux,
13 creating additional and variable zones of expansion and compression in the disk chambers 262 as the
14 middle disk resonates between the upper and lower rotors 264, 266, which in at least one embodiment
15 results in varied exotic motion. The resulting motion in at least one embodiment is a predetermined
16 resonance, sympathy, and/or dissonance at varying stages of progression with the frequency targeted to
17 the frequency of the molecules/atoms of the material being processed to manipulate through
18 harmonics/dissonance of the material.

19 **[0061]** In at least one embodiment, one or more of the disk-pack turbine components may be
20 prepared/equipped with a capacity for the induction of specifically selected and/or differentiated electrical
21 charges which may be static or pulsed at desirable frequencies from sources 320. Examples of how
22 electrical charges may be delivered to specific components include electrical brushes or electromechanical
23 isolated devices, induction, etc., capable of delivering an isolated charge to specific components such as
24 alternately charging disks within a rotor with opposite/opposing polarities. In addition to inducing electrical
25 charges to rotating disk-pack turbine components, electrical charging can also be a useful means of
26 affecting a polar fluid, i.e., when it is desirable to expose a subject charging medium to opposing attractive
27 influences or, in some cases, pre-ionization of a fluid. For example, passing in-flowing media through a
28 charged ion chamber for pre-excitation of molecular structures prior to entry into the vortex chamber,
29 followed by progression into the expansion and distribution chamber may enhance dissociative efficiencies.

30 **[0062]** The housing 220 includes a chamber 230 in which the disk-pack turbine 250 rotates. As illustrated
31 in FIGs. 3 and 4, the housing chamber 230 and the outside surface of the disk-pack turbine 250 in at least
32 one embodiment have complementary surfaces. The illustrated housing 220 includes the upper case 222,
33 the bottom case 226, and a peripheral case 224. The illustrated housing 222 also includes a pair of flow
34 inhibitors 223, 225 attached respectively to the upper case 222 and the bottom case 226. Based on this
35 disclosure, it should be appreciated that some components of the housing 220 may be integrally formed
36 together as one piece. FIG. 3 also illustrates how the housing 220 may include a paraboloid feature 234

1 for the chamber 230 in which the disk-pack turbine 250 rotates. The paraboloid shape of the outside surface
2 of the disk-pack turbine 250, in at least one embodiment, assists with obtaining the harmonic frequency of
3 the rotors 264, 266 and disk(s) 260 themselves as they spin in the chamber 230, thus increasing the
4 dissociation process for the fluid passing through the system. In at least one embodiment, the rotors 264,
5 266 have complementary outer faces to the shape of the chamber 230.

6 **[0063]** The upper case 222 includes an opening 2222 passing through its top that is aligned with the
7 opening in the bearing 280. As illustrated in FIGs. 3 and 4, a bearing 280 is present to minimize any friction
8 that might exist between the shoulder 2642 of the top rotor 264 and the housing collar 125 and the upper
9 case 222. The bearing 280, in at least one embodiment, also helps to align the top 2524 of the expansion
10 chamber 252 with the outlet 138 of the vortex chamber 130. Likewise, the lower case 226 includes an
11 opening 2262 passing through its bottom that is lined with a bearing 280 that surrounds the shoulder (or
12 motor hub) 2662 of the lower disk 266.

13 **[0064]** The peripheral case 224 includes a plurality of discharge ports 232 spaced about its perimeter.
14 The discharge ports 232 are in fluid communication with the disk chambers 262. The flow inhibitors 223,
15 225 in the illustrated system, in at least one embodiment, assist with routing the flow of fluid exiting from
16 the periphery of the disk-pack turbine 250 towards the discharge ports (or collection points) 132 in the
17 housing 220. In at least one embodiment, there is a containment vessel 900 (see, e.g., FIGs. 6 and 7)
18 around the housing 220 to collect the discharged gas from the system.

19 **[0065]** Additional examples of electrical isolation components include the following approaches. The
20 drive system/spindle/shaft is electrically isolated via the use of a large isolation ring made of non-conductive
21 material, which creates discontinuity between the drive shaft and ground. In at least one embodiment, all
22 disk-pack turbine components are electrically isolated from one another utilizing, for example, non-
23 conducting tubes, shims, bushings, isolation rings, and washers. The main feed tube (or intake chamber)
24 is also electrically isolated from the top rotor via the use of an additional isolation ring. The feed tube and
25 support structure around the system are electrically isolated via the use of additional isolation elements
26 such as nylon bolts. In most cases, there is no electrical continuity between any components, from drive
27 shaft progressing upward through all rotating components to the top of the vortex chamber and support
28 structures. There are, however, occasions when electrical continuity is desirable as described previously.

29 **[0066]** In at least one embodiment, the vortex chamber 130 shapes the inflowing charging media into a
30 through-flowing vortex that serves to accumulate, accelerate, stimulate, and concentrate the charging
31 media as it is drawn into the expansion chamber 252 by centrifugal suction. As the rotating compressed
32 charging media passes through the base opening 138 of the vortex chamber 130, it rapidly expands as it
33 enters into the revolving expansion chamber 252. Once within the expansion chamber 252, the charging
34 media is further accelerated and expanded while being divided and drawn by means of a rotary vacuum
35 into the waveform disk channels 262 of the rotors 264, 266 and disk(s) 260 around the expansion chamber
36 252. While progressing through the waveform geometries of the rotors and disks around the expansion

1 chamber 252, the charging media is exposed to a multiplicity of dynamic action and reactionary forces and
2 influences which work in concert to achieve desired outcomes relative to conditioning, separation, and/or
3 transformation of liquids and gases and/or other matter.

4 **[0067]** FIG. 5 illustrates a partial cutaway view of the embodiment illustrated in FIGs. 2-4. FIG. 5 provides
5 an example of the fluid flow dynamics within the disks in accordance with the present invention. Waveforms
6 channels are formed in the disk chambers 262 by the geometric patterns 261 on the rotors 264, 266 and
7 disk(s) 260. FIG. 5 illustrates how stepped waveform harmonics cause high and low pressure zones to
8 form in the channels with the circulation of the flow illustrated from the top to the bottom of the zones by the
9 C's (clockwise) and backward C's (counterclockwise) that reflect the circulation. These pressure zones
10 and tortile reciprocating motion allow the charging media and material to flow within the channels and to
11 break the bonds between atoms in at least one embodiment. As the disk-pack turbine 250 rotates the
12 charging media within the expansion chamber 252, the charging media flows from the center of the disk-
13 pack turbine 250 through the disk chambers 262 towards the periphery of the disk-pack turbine 250. As
14 the charging media passes through the disk chambers 262 the media is conditioned, separated,
15 dissociated, and/or transformed based on controllable variables such as construction materials, waveform
16 geometry, tolerances, numbers of progressions, waveform diameters, disk stack densities, internal and
17 external influences and charging media composition.

18 **[0068]** FIGs. 6A and 6B illustrate an embodiment having a plurality of gas collection conduits 902, 904,
19 906, 908 for further separating gases based on weight. The illustrated system includes a containment
20 vessel 900 that encloses the disk-pack module 200A. Also illustrated is an example of motor 310A driving
21 the driveshaft 312A with a belt 316A and a work surface (or bench/platform) 910. The illustrated
22 embodiment shares some similarities with the previous embodiment including the presence of an intake
23 module 100A with an intake 132A and a disk-pack module 200A.

24 **[0069]** The illustrated system includes at least five points for removal of gas and other material from the
25 system. Extending out from the containment vessel 900 is a separation conduit 902 that branches twice
26 into a first branch conduit 904 and a second branch conduit 906. The first branch conduit 904 provides
27 three points at which fluid may be withdrawn from the system through valves 930, 931, 932. The second
28 branch conduit 906 leads to valve 933. Extending from the intake module 100A is a third branch conduit
29 908 that leads to valve 934. Based on this disclosure, it should be appreciated that the separation conduits
30 can take a variety of forms other than those that are illustrated in FIGs. 6A and 6B. The gases (or fluids)
31 are separated in at least one embodiment using at least one of the following: specific gravity, exit velocity,
32 opposite-attractors installed along the conduit or proximate to a valve, electric and/or magnetic for matter
33 with positive/negative or North/South polar predominance. In at least one embodiment the waveform disks
34 illustrated in FIGs. 7A and 7B were used to in a gas separation designed system. In at least one
35 embodiment, it was found that when the waveform disks illustrated in FIGs. 7A and 7B were rotated
36 between 3,680 and 11,000 RPM that hydrogen was separated out from environmental air.

1 **[0070]** FIG. 7A illustrates a pair of disks 260Z installed in a top rotor 264Z and a bottom rotor 266Z,
2 respectively, that have been found to be beneficial for a gas separation embodiment. The illustrated disks
3 260Z include matched waveform patterns with two sets of hyperbolic waveforms 2642Z and three sets of
4 substantially circular waveforms 2646Z. FIGs. 7A and 7B illustrate an alternative embodiment that includes
5 exit ports including multiple convergent exit ports 2649Z and multiple divergent exit ports 2648Z that pair
6 together to form convergent/divergent ports. FIG. 7B illustrates an example of a waveform changing height
7 as it travels around the disk (2611Z represents the low level and 2612Z represents the high level). FIG. 7B
8 illustrates an example of how the waveforms may vary in width (2613Z represents a wide segment and
9 2614Z represents a thinner segment).

10 **[0071]** For various applications, it may be desirable to have an internal geometry conducive to hyper-
11 expansion of the charging media followed by reduction/diminishing flow tolerances for the purpose of
12 compression or reconstitution of the charging media. This secondary compression cycle is useful for
13 producing concentrated, highly energetic, molecularly reorganized charging media for applications such as
14 fuel formulation.

15 **[0072]** One cool, moist morning prior to starting a testing session with a system built according to the
16 invention similar to the fluid intake module 100A and the disk-pack module 200A illustrated in FIG. 6A, a
17 system valve 132A in fluid communication with the containment vessel (or housing) 900 was pulled open.
18 This resulted in a relatively loud thump/energetic reaction/*phoom*. On the next day, another individual was
19 asked to pull the valve 132A open for verification. The reactionary *phoom* occurred again. It was
20 understood that the moisture content in the air, itself, was being dissociated, with the lighter material being
21 contained in the upper, domed part of the sealed vessel and trapped therein by a cushion of air. For
22 verification, all valves were closed and the system was allowed to run at 2700 RPM in this closed condition
23 for 5 minutes. A valve 132A was slowly pulled open and a flame applied to the discharging material, which
24 resulted in the valve erupting in a momentary pale blue flame. Further testing and refinement of the process
25 included the introduction of higher moisture/water concentrations in the form of atomized mist and water
26 injection. Simple vessel valve and tubing arrangements were set up for rudimentary gas product division
27 and capture as illustrated in FIGs. 6A and 6B. Utilizing a small biaxial configuration for the disk-pack turbine,
28 which included just an upper rotor 264A and a lower rotor 266A, was sufficient to establish repeatable,
29 verifiable dissociation achieved through hyperbolic rotary motion alone. An example of the rotors 264A,
30 266A of the disk-pack turbine 250A is illustrated in FIGs. 8A-8C. FIG. 8A illustrates the top of the disk-pack
31 turbine 250A, FIG. 8B illustrates the bottom face of the upper rotor 264A, and FIG. 8C illustrates the top
32 face of the lower rotor 266A. The illustrated waveform pattern includes a sinusoidal ridge 2642A and a
33 circular ridge 2646A. The lower rotor 266A includes a circular outer face ridge 2668A. Also, illustrated is
34 an example of mounting holes 2502A for assembling the disk-pack turbine 250A. In an alternative
35 embodiment, the wave patterns are switched between the upper rotor 264A and the bottom rotor 266A.

1 Stoichiometric gas concentrations capable of sustaining flame were achieved through broad variations in
2 systemic configuration and operating conditions.

3 **c. Multi-stage Systems**

4 **[0073]** FIGs. 9A-11 illustrate different embodiments of a multiple stage system that includes disk-pack
5 turbines 250B-250D for each stage of the system. The illustrated disk-pack turbines are different, because
6 the waveform disks are conical shape with circular waveform patterns. FIGs. 9A and 9B illustrate a common
7 housing 220B, intake module 100B, and discharge port 232B. Each disk-pack turbine includes at least one
8 expansion chamber 252B-252D that routes fluid into the at least one disk chamber 260 of the disk-pack
9 turbine 250B-250D. In the illustrated examples, each disk-pack turbine 250B-250D includes a top rotor
10 264B-264D that substantially provides a barrier to fluid exiting the periphery from flowing upwards above
11 the disk-pack turbine to assist in routing the exiting fluid to the next stage or the at least one discharge port.
12 In a further embodiment, the at least one discharge port is located along the periphery of the last disk-pack
13 turbine instead of or in addition to the illustrated bottom discharge port 232B in FIGs. 10 and 11. These
14 figures illustrate the disk-pack module housing 220B with only a representative input illustrated to represent
15 the vortex chamber (or alternatively an intake chamber that is substantially cylindrical) that feeds these
16 illustrated systems.

17 **[0074]** When the discharge port is at the bottom of the housing, the driveshaft (not illustrated) passes up
18 through the discharge port to engage the lowest rotor. Between the individual disk-pack turbines there are
19 driveshafts such as those illustrated in FIG. 9C that extend through the top rotating rotor/disk of the lower
20 disk-pack turbine to the bottom rotor of the higher disk-pack turbine or alternatively there are a plurality of
21 impellers between each pair of disks that are not mounted to the housing. The driveshafts 312B will connect
22 to the rotating disk via support members to allow for the flow of fluid through the expansion chamber. FIG.
23 9C illustrates a partial cross-section of a multi-stage system with a disk-pack turbine 250D' and a second
24 disk-pack turbine 250B' that are similar to the disk-pack turbines discussed in connection with FIGs. 10 and
25 11 except there is no flange depicted on the top rotor and the bottom of the expansion chambers is provided
26 by a concave feature 3122B and 3214B incorporated into the driveshaft 312B. Below each disk-pack
27 turbine is a discharge module that includes discharge ports 232' in a top surface to funnel the captured gas
28 through discharge outlet 2322' into the next stage or the discharge port of the system.

29 **[0075]** FIG. 10 illustrates a cross-sectional and conceptual view of an example of a multi-stage stacked
30 waveform disk system in accordance with an embodiment of the present invention. The illustrated multi-
31 stage system includes a plurality of stacked disk-pack turbines 250B-250D that are designed to first
32 expand/dissociate and then compress/concentrate the charging media through the expansion chamber and
33 the disk chambers in each disk-pack turbine. In an alternative embodiment, additional ports are added
34 around the periphery at one or more of the stages to allow material (or fluid) to be added or material to be
35 recovered/removed from the system.

[0076] Disk-pack turbine 250B is an expansive waveform disk-pack turbine and includes multiple waveform channels. Disk-pack turbine 250C is a second stage concentrating/compressive waveform disk-pack turbine. Disk-pack turbine 250B is a third stage concentrating/compressive waveform disk-pack turbine that provides an example of just a pair of rotors. The illustrated system includes an intake chamber 130B in fluid communication with the expansion chamber 252B. The expansion chamber 252B is formed by openings in the center of the plurality of rotors 264B, 266B and disks 260B that form disk-pack turbine 250B. The bottom rotors 266B-266D in disk-pack turbines 250B-250D, respectively, are solid and do not have an opening in the center, but instead include a bottom concave feature 2522B, 2522C, 2522D that forms the bottom of the expansion chamber 252B. The solid bottom rotors 266B-266D prevent fluid from flowing completely through the center of the disk-pack turbine 250B-250D and encourage the fluid to be distributed into the various disk chambers 262 within the disk-pack turbines 250B-250D such that the fluid flows from the center to the periphery. Each of the top rotors 264B-264D in disk-pack turbines 250B-250D includes lips 2646 that substantially seal the perimeter of the top disk with a housing 220. The lips 2646 thereby encourage fluid to flow within discharge channels 253B-253D. Discharge channel 253B connects disk-pack turbine 250B and the expansion chamber of disk-pack turbine 250C in fluid communication. Discharge channel 253C connects disk-pack turbine 250C and the expansion chamber 252B of disk-pack turbine 250B in fluid communication. Discharge channel 253D connects disk-pack turbine 250D in fluid communication with fluid outlet 232B. In an alternative embodiment, the top rotors do not rotate and are attached to the housing to form the seals.

[0077] FIG. 11 illustrates a cross-sectional view of another example of a multi-stage stacked waveform disk system in accordance with an embodiment of the present invention. The multi-stage system of this embodiment includes a plurality of disk-pack turbines. The illustrated disk-pack turbines 250D, 250C, 250B are taken from the previous embodiment illustrated in FIG. 10 and have been reordered to provide a further example of the flexibility provided by at least one embodiment of the invention.

[0078] The charging media may also be externally pre-conditioned or "pre-sweetened" prior to entering the system. The pre-conditioning of the charging media may be accomplished by including or mixing into the charging media desirable material that can be molecularly blended or compounded with the predominant charging media. This material may be introduced as the media enters into and progresses through the system, or at any stage within the process. Polar electrical charging or excitation of the media may also be desirable. Electrical charging of the media may be accomplished by pre-ionizing the media prior to entering the system, or by exposing the media to induced frequency specific pulsed polar electrical charges as the media flows through the system via passage over the surface of the disks.

d. Power Generation

[0079] These objectives are accomplished, for example, via the harnessing and utilization of transformational dynamics and forces propagated as the result of liquids, gases, and/or other forms of matter and energy progressing through and/or interacting with rotating hyperbolic waveform structure.

1 **[0080]** In at least one embodiment the present invention provides a system and method for producing
2 and harnessing energy from ambient sources at rates that are over unity, i.e., the electrical energy produced
3 is higher than the electrical energy consumed (or electrical energy out is greater than electrical energy in).
4 The system and method in at least one embodiment of the present invention utilize rotating waveforms to
5 manipulate, condition, and transform mass and matter into highly energetic fields, e.g., polar flux, electrical,
6 and electro-magnetic fields. The present invention, in at least one embodiment, is also capable of
7 generating diamagnetic fields as strong forces at ambient operational temperatures.

8 **[0081]** FIGs. 12-15D illustrate an example embodiment of the present invention that is useful in
9 generating electrical energy. The illustrated system uses as inputs environmental energies, air and
10 electrical energy to drive a motor to rotate the disk-pack turbine and, in a further embodiment, it harnesses
11 the environment around the system to form magnetic fields. The present invention in at least one
12 embodiment is capable of producing very strong field energy at ambient temperatures while using relatively
13 minimal input electrical energy compared to the electrical energy production. FIGs. 15A-15D illustrate a
14 pair of waveform disks that can be mated together with a pair of rotors. The illustrated waveform disks are
15 depicted in FIG. 14. FIG. 15A illustrates the top of a disk-pack turbine 250E with a top rotor 264E with an
16 opening into the expansion chamber 2522E. FIGs. 15B and 15C illustrate a pair of mated disks for use in
17 power generation according to the invention. The disks are considered to be mated because they fit
18 together as depicted in FIG. 15D, because a disk channel 262E is formed between them while allowing
19 fluid to pass between the disks 260E. FIG. 15D illustrates an example of the mated disks 260E placed
20 between a top rotor 264E and a bottom rotor 266E with bolts attaching the components together around
21 the periphery. As mentioned earlier, the bolts in at least one embodiment pass through a nylon (or similar
22 material) tube and the spacers are nylon rings.

23 **[0082]** The creation of a magnetic field to generate electrical current results from the rotation of a disk-
24 pack turbine 250E and at least one magnet disk 502 that is on an opposite side of the coil disk from the
25 disk-pack turbine. In at least one embodiment, the coil disk 510 includes a plurality of coils 512 that are
26 connected into multiple-phase sets. The disclosure that follows provides additional discussion of the
27 embodiment illustrated in FIGs. 12-15D; as an example, starting with the chamber 130E and proceeding
28 down through the system. As with the previous embodiments, the chamber 130E feeds the charging media
29 to the disk-pack turbine 250E during operation of the system and in at least one further embodiment the
30 chamber 130E is omitted as depicted in FIGs. 16 and 17. In the embodiments depicted in FIGs. 16 and
31 17, the intake occurs through the feed housing 126E and/or the periphery of the disk-pack turbine 250E.

32 **[0083]** In at least one embodiment, the intake chamber 100E includes a cap 122E, a housing 120E
33 connected to an intake port 132E, a lower housing 124E around a bearing 280E as illustrated, for example,
34 in FIG. 14. In an alternative embodiment, one or more of the intake chamber components are integrally
35 formed together. The housing 120E includes a vortex chamber 130E that includes a funnel section that
36 tapers the wall inward from the intake ports 132E to an opening that is axially aligned with the feed chamber

1 136E. The funnel section in at least one embodiment is formed by a wall that has sides that follow a long
2 radial path in the vertical descending direction from a top to the feed chamber 136E (or other receiving
3 section or expansion chamber). The funnel section assists in the formation of a vortex flow of charging
4 medium downward into the system.

5 **[0084]** Below the main part of the chamber 130E is a tri-arm centering member 602 that holds in place
6 the system in axial alignment with the drive shaft 314E. The vortex chamber 130E is in fluid communication
7 with feed chamber 136E present in feed housing 126E. The feed housing 126E passes through a collar
8 housing 125E and a magnet plate 502, which is positioned and in rotational engagement with the collar
9 housing 125E. The feed housing 126E is in rotational engagement through bearings 282E with the collar
10 housing 125E. The collar housing 125E is supported by bearing 282E that rides on the top of the lower
11 feed housing 127E that is connected to the disk-pack turbine 250E. The feed chamber 136E opens up into
12 a bell-shaped section 138E starting the expansion back out of the flow of the charging medium for receipt
13 by the expansion chamber 252E. The intake housing components 120E, 122E, 124E together with the
14 feed housing 138E in at least one embodiment together are the intake module 100E.

15 **[0085]** The magnet plate 502 includes a first array of six magnets (not shown) attached to or embedded
16 in it that in the illustrated embodiment are held in place by bolts 5022 as illustrated, for example, in FIG. 14.
17 In another embodiment, the number of magnets is determined based on the number of phases and the
18 number of coils such that the magnets of the same polarity pass over each of coils in each phase-set
19 geometrically at the exact moment of passage. The magnet plate 502 in at least one embodiment is
20 electrically isolated from the feed housing 126E and the rest of system via, for example, electrically
21 insulated/non-conducting bearings (not shown). The upper plate 502 is able to freely rotate about the
22 center axis of the disk-pack turbine 250E by way of the collar housing 125E made from, for example,
23 aluminum which is bolted to the top of the upper round plate 502 and has two centrally located ball bearing
24 assemblies, an upper bearing 282E and a lower bearing 283E, that slide over the central feed housing
25 126E, which serves as a support shaft. The distance of separation between the magnet plate 502 and the
26 top of the disk-pack turbine 250E is maintained, for example, by a mechanical set collar, shims, or spacers.

27 **[0086]** During operation, the first array of magnets is in magnetic and/or flux communication with a
28 plurality of coils 512 present on or in a stationary non-conductive disk (or platform) 510. The coil platform
29 510 is supported by support members 604 attached to the frame 600 in a position between the array of
30 magnets and the disk-pack turbine 250E. The platform 510 in the illustrated embodiment is electrically
31 isolated from the rest of the system. In at least one embodiment, the platform 510 is manufactured from
32 Plexiglas, plastic, phenolic or a similarly electrically inert material or carbon fiber.

33 **[0087]** A disk-pack turbine 250E is in rotational engagement with the feed chamber 138E. As with the
34 other embodiments, the disk-pack turbine 250E includes an expansion chamber 252E that is in fluid
35 communication with the intake chamber 130E to establish a fluid pathway from the inlets to the at least one
36 disk chamber 262E (two are illustrated in FIGs. 14) in the disk-pack turbine 250E. The illustrated

embodiment includes two pairs of mated disks 260E sandwiched by a pair of rotors 264E, 266E where the disks 260E and the top rotor 264E each includes an opening passing therethrough and the bottom rotor 266E includes a rigid feature 2522E that together define the expansion chamber 252E. The disk chambers 262 in the illustrated embodiment are present between the two disks in each mated pair with slightly paraboloid shaped surfaces (although they could be tapered or flat) being present between the neighboring disks, where the bottom disk of the top mated disk pair and the top disk of the bottom mated disk pair are the neighboring disks. Each disk 260E of the mated pairs of disks is formed of complimentary non-magnetic materials by classification, such that the mated pair incorporating internal hyperbolic relational waveform geometries creates a disk that causes lines of magnetic flux to be looped into a field of powerful diamagnetic tori and repelled by the disk. An example of material to place between the mated disk pairs is phenolic cut into a ring shape to match the shape of the disks.

[0088] In the illustrated embodiment, the bottom rotor 266E provides the interface 2662E with the drive system 314E. In at least one embodiment, the rotors will be directly connected to the respective disks without electrically isolating the rotor from the nested disk. In another embodiment, the disks are electrically isolated from the rotor nesting the disk. The illustrated configuration provides for flexibility in changing disks 260E into and out of the disk-pack turbine 250E and/or rearranging the disks 260E.

[0089] A lower coil platform 510' may also be attached to the frame 600 with a plurality of support members 604. The lower platform 510' includes a second array of coils 512' adjacent and below the disk-pack turbine 250E. An optional second array of six magnets (not shown) present in magnet plate 504 are illustrated as being in rotational engagement of a drive shaft 314E that drives the rotation of the disk-pack turbine 250E, but the bottom magnet plate 504 in at least one embodiment is in free rotation about the drive shaft 314E using, for example, a bearing. The drive shaft 314E is driven by a motor, for example, either directly or via a mechanical or magnetic coupling.

[0090] Each of the first array of coils 512 and the second array of coils 512' are interconnected to form a phased array such as a three or four phase arrangement with 9 and 12 coils, respectively. Each coil set includes a junction box 5122 (illustrated in FIG. 12) that provides a neutral/common to all of the coils present on the coil disk 510 and provision for Earth/ground. Although not illustrated, it should be understood based on this disclosure that there are a variety of ways to interconnect the coils to form multiple phases in wye or delta or even a single phase by connecting coils in series or parallel. As illustrated, for each coil, there are a pair of junction points that are used to connect to common and positive and as illustrated the left box 5124 attaches to electrical power out while the right box 5126 connects to neutral/common.

[0091] In at least one embodiment with a three phase arrangement, the coils for each phase are separated by 120 degrees with the magnets in the magnet plate spaced every 60 degrees around the magnet plate. The first array of magnets, the first array of coils 512, the second array of coils 512', and second array of magnets should each be arranged in a pattern substantially within the vertical circumference of the disk-pack turbine 250E, e.g., in circular patterns or staggered circular patterns of a

1 substantially similar diameter as the disks 160E. In another embodiment, there are multiple coil platforms
2 and/or coil arrays between the disk-pack turbine and the magnet plate.

3 **[0092]** The lower magnet plate 504 has a central hub 5042 bolted to it which also houses two ball bearing
4 assemblies 282E, which are slid over the main spindle drive shaft 314E before the disk-pack turbine 250E
5 is attached. This allows the lower magnet plate 504 to freely rotate about the center axis of the system and
6 the distance of separation between the lower plate 504E and disk-pack turbine 250E is maintained, for
7 example, by a mechanical set collar, spacers, and/or shims or the height of the driveshaft 314E.

8 **[0093]** Suitable magnets for use in at least one embodiment of the invention are rare earth and/or
9 electromagnets. An example is using three inch disk type rare earth magnets rated at 140 pounds.
10 Depending on the construction used, all may be North magnets, South magnets, or a combination such as
11 alternating magnets. In at least one embodiment, all metallic system components, e.g., frame 600, chamber
12 housing 120E, magnet plates 502, 504, are formed of non-magnetic or very low magnetic material with
13 other system components, e.g., bearings, spacers, tubing, etc., are preferably formed of non-magnetic
14 materials. The system, including frame 600 and lower platform 504, in at least one embodiment are
15 electrically grounded (Earth). In a further embodiment, all movable components, particularly including
16 chamber housing 120E and individual components of the disk-pack turbine 250E, are all electrically isolated
17 by insulators such as non-conductive ceramic or phenolic bearings, and/or spacers.

18 **[0094]** In a further embodiment, the magnet plate(s) is mechanically coupled to the waveform disks. In
19 a still further embodiment, the magnet plate(s) is mechanically locked to rotate in a fixed relationship with
20 the disk-pack turbine through for example the collar housing 125E illustrated in FIG. 13. This results in
21 lower, but very stable and safe output values. In a further embodiment, one set of coil platform and magnet
22 plate are omitted from the illustrated embodiments of FIG. 12-17.

23 **[0095]** In use of the illustrated embodiment of FIGs. 12-14, the rotatable disk-pack turbine is driven by
24 an external power source. As the disk-pack turbine rotates a vacuum or suction is created in the system
25 according to at least one embodiment. This vacuum draws a charging media into the intake chamber 130E
26 via fluid inlets 132E. The intake chamber 130E transforms the drawn charging media into a vortex that
27 further facilitates passing the charging media into the expansion chamber. As the charging media passes
28 through the system, at least a portion of the through-flowing charging media is transformed into polar fluxes
29 which are discharged or emanated from specific exit points within the system. This magnetic polar energy
30 discharges at the center axis and periphery of the rotatable disk-pack turbine. For example, when the
31 magnetic polar energy discharged at the periphery is a North polar flow, the magnetic energy discharged
32 at the axis is a South polar flow. In this example, by introducing north-facing permanent magnets on magnet
33 plates 502, 504 into the north-flowing flux, repulsive forces are realized. By placing the North-facing polar
34 arrays at specific oblique angles, the rotatable disk-pack turbine is driven by the repelling polar flux. Utilizing
35 only the polar drive force and ambient environmental energies and air as the charging media, the system
36 is capable of being driven at a maximum allowed speed. Simultaneously, while generating polar flux

discharges at the axis and periphery of the disk-pack turbine 250E, powerful, high torque, levitative diamagnetic fields manifest through the top and bottom surfaces of the disk-pack turbine. The field strength of the diamagnetic fields is directly proportionate to the speed of rotation of the magnet arrays and magnet strength in relation to the rotating disk-pack turbine. Each of the mated pairs of rotatable waveform disks 160E is capable of producing very strong field energy at ambient temperatures while utilizing an extraordinarily small amount of input energy. As an example, each of the mated pairs of rotatable waveform disks 160E is capable of producing well over one thousand (1,000) pounds of resistive, repulsive, levitative field energy. That is, the system is capable of repeatedly, sustainably and controllably producing a profoundly powerful diamagnetic field at ambient temperatures while utilizing relatively minimal input energy.

[0096] In a further embodiment illustrated, for example, in FIG. 16, the chamber 120E above the tri-arm support member 602 is omitted and the expansion chamber pulls charging material from the atmosphere as opposed to through the intake chamber 120. In at least one embodiment, material is pulled from and discharged at the periphery of the disk-pack turbine 250E simultaneously.

[0097] FIG. 17 illustrates an alternative embodiment to that illustrated in FIG. 16. The illustrated embodiment includes a flux return 700 to restrain the magnetic fields and concentrate the magnetic flux created by the disk-pack turbine 250E and increase the flux density on the magnet plate 502 and coils 512. An example of material that can be used for the flux return 700 is steel. In at least one embodiment, the flux shield 600 is sized to match the outer diameter of the outer edge of the magnets on the magnet plate 502.

[0098] Another example embodiment of the present invention is illustrated in FIG. 18 and includes two disk-pack turbines 250F having a pair of rotors 264F, 266F sandwiching a pair of disks 260F, two sets of electrical coil arrays configured for the production of three-phase electrical power, and two bearing-mounted, free-floating, all North-facing magnetic arrays, along with various additional circuits, controls and devices. One difference with the previous embodiments is that the disk-pack turbines 250F are spaced apart leaving an open area between them.

[0099] Another difference for the power-generation embodiments from the other described embodiments is the omission of a housing around all of the rotating components. One reason for this difference is that the illustrated embodiment is directed at power generation, but based on this disclosure it should be understood that an alternative embodiment adds a collection/containment dome (or wall) to this illustrated system to provide a means of collecting and harnessing for application/utilization the profound additional environmental electrical fields/DC voltages and dramatic currents/field amperage as well as the collection of any fluid components that manifest as a result of the power generation processes.

[0100] The nature of electricity generated by this embodiment is substantially different as compared to conventional power generation. The waveform disks are manufactured as nesting pairs. Each waveform disk pair may be of like or dissimilar materials, depending on design criteria, i.e., aluminum and aluminum,

1 or, as example, aluminum, brass or copper. When a waveform disk pair is separated by a specific small
2 distance/gap and are electrically isolated from one another by means of no mechanical contact and non-
3 conducting isolation and assembly methods and elements like those described earlier, chambers are
4 formed between each disk pair that provide for highly exotic flow paths, motion, screening currents,
5 frequencies, pressure differentials, and many other actionary and reactionary fluid and energetic dynamics
6 and novel electrical and polar phenomena. Immediately upon energizing the drive motor to set the disk-
7 pack turbine rotor in motion, the inner disk hyperbolic geometries begin to interact with the magnetic fields
8 provided by the rotatable Rare Earth magnet arrays, even though there are no magnetic materials
9 incorporated into the manufacture of the disk-pack turbine. By the time the disk-pack turbine reaches the
10 speed of approximately 60 RPM, diamagnetic field effects between the disk-pack turbine faces and magnet
11 arrays are sufficient to establish a driving/impelling link between the disk-pack turbine and magnet array
12 faces.

13 **[0101]** A variety of magnetic polar fluxes and electrical currents begin to manifest and dramatically
14 increase in proportion to speed of rotation. Diamagnetism manifests as a profoundly *strong force* at the
15 upper and lower rotor faces as primarily vertical influences which, through repellent diamagnetic fields, act
16 to drive the magnet arrays while simultaneously generating a significant rotational torque component. It
17 has been determined that these strong force diamagnetic fields can be transmitted through/passed through
18 insulators to other metallic materials such as aluminum and brass. These diamagnetic fields, generated at
19 ambient temperatures, are always repellant irrespective of magnet polarity. Although mechanically
20 generated, these diamagnetic fields are, believed to be in fact, screening and/or eddy currents previously
21 only recognized as a strong force associated with magnetic fields as they relate to superconductors
22 operating at cryogenic temperatures. The system is configured to rotate on the horizontal plane, resulting
23 in the most profound magnetic field effects manifesting and emanating at an oblique, though near right
24 angle relative to the upper and lower rotor faces. The most profound electrical outputs in the system
25 emanate from the periphery of the disk-pack turbine and are measurable as very high field amperages and
26 atmospheric voltages. As an example, when attaching a hand held amp meter to any of the three structural
27 aluminum risers of the built system illustrated, for example, in FIG. 12, it is common to observe amperages
28 of over 150 amps per electrically isolated riser. Polar/magnetic fluxes are the primary fluid acting in this
29 system configured for electrical power generation. An additional component acting within the system is
30 atmospheric air. In certain implementations, allowing the intake, dissociation, and discharge of the
31 elements within atmospheric air as well as exposure to ambient atmospheric energies increases the
32 magnetic field effects and electrical power output potential by plus/minus 40%.

33 **[0102]** The diamagnetic fields utilized for electrical power generation make it possible to orient all
34 magnets within the magnet arrays to North, South, or in a customary North/South alternating configuration.
35 When all North or South facing magnets are configured in relation to the diamagnetic rotor fields, voltages
36 and frequencies realized are extremely high. With all North or South magnet orientation the diamagnetism,

1 which is both North and South magnetic loops, provides the opposite polarity for the generation of AC
2 electricity. By configuring the system with alternating magnetic polarities and minor power output
3 conditioning, it has been possible to practically divide the output values and bring the voltages and
4 frequencies into useful ranges. As an example, measuring combined upper coil array only, output values
5 of 900 volts at 60HZ with a rotor speed of 1200 RPM are typical. Based on research, it is believed the
6 magnetic fluxes behave like gasses/fluids and can act as such. The addition/intake/dissociation of air and
7 other ambient influences adds significantly to the process; however, with the presence of magnetic fields
8 interacting with the hyperbolic waveform structures alone, it is believed that both exotic, magnetic
9 phenomena as well as electricity are generated. It is believed it would be impossible to be generating these
10 profound diamagnetic fields without also simultaneously generating corresponding electrical currents. As
11 soon as a magnet, even handheld, is introduced above the disk surface and the diamagnetic repellent effect
12 is felt, electrical current is being produced, thereby creating the diamagnetic phenomena.

13 **e. Testing of Prototype**

14 **[0103]** At least one prototype has been built according to the invention to test the operation of the system
15 and to gather data regarding its operation. The prototype shown in FIGs. 12-18 include a three phase
16 arrangement of nine coils, three coils per phase using 16 gauge copper magnet wire with 140 turns and six
17 magnets (three North and three South magnets alternating with each other) above the disk-pack turbine
18 and coils. On the bottom side of the disk-pack turbine there is a four phase arrangement of 12 coils, three
19 coils per phase using 20 gauge copper magnet wire with 260 turns and six magnets. Based on this
20 disclosure, it should be appreciated that the gauge and material of the wire and the number of turns and of
21 coils can be modified and that the above descriptions are examples. The disk-pack turbine was assembled
22 with two pairs of mated disks between the top rotor and the bottom rotor as illustrated, for example, in FIG.
23 16. In this particular configuration the two top waveform disks were made of aluminum and the bottom two
24 waveform disks were made of brass. It has been found that alternating brass and aluminum disks, as
25 opposed to nesting like disks results in significantly higher magnetic and electrical values being produced.
26 In further testing when copper is used in place of brass, the voltages have stayed substantially equal, but
27 a much higher current has been produced. After one testing session, it was discovered that the brass disks
28 were not electrically isolated from each other and there was still excess electrical power generated
29 compared to the power required to run the motor. The feed tube (or intake chamber) is made of brass and
30 electrically isolated from the aluminum rotor face through use of a non-conductive isolation ring, which also
31 is present between the two mated disk pairs. The system was connected to a motor via a belt.

32 **[0104]** An interesting phenomenon has been noticed during operation of the prototype that indicates that
33 ambient atmospheric energies from the surrounding environment is being transformed and harnessed by
34 the system to create supplemental electrical current. There is a certain amount of background ionizing
35 radiation present all around us. The level of detected ionizing radiation decreases from background levels
36 when the system is in operation by an amount greater than the margin of error for the detector.

1 **[0105]** When the motor was not running, and the disk-pack turbine was slowly rotated by hand, even at
2 this very low speed, a diamagnetic field arose sufficient to engage the upper magnet plate (the magnet
3 plate was not mechanically coupled), resulting in the production of enough electricity to cause a connected
4 three-phase motor (2 HP, 230 V) to rotate as the disk-pack turbine was being turned by hand from the
5 current produced in the coil arrays.

6 **[0106]** The lower magnet disk rotated with the disk-pack turbine while the upper magnet disk was
7 magnetically coupled to the waveform disks. One way to illustrate the results will be to use classic power
8 generation formulas. One of the greatest points of interest is that, even though there is, mathematically
9 speaking, production of very high power readings as relates to watts, there is very little discernable heat
10 generated through the process, and this phenomenon extends to devices connected and driven by this
11 electricity, such as multiple three-phase high voltage electric motors. An example is prior to starting the
12 system, ambient temperatures for the induction coils and other associated devices were about 82°
13 Fahrenheit. After running the system for in excess of one hour, the temperature rise was as little as two or
14 three degrees and, at times, the temperature has been found to actually fall slightly. The temperature
15 measured at the core of the waveform rotor when measured always has dropped a few degrees over time.
16 The temperature of an unloaded three phase electric motor connected to the output will generally remain
17 within one or two degrees of coil temperature. The three phases of the upper generating assembly were
18 measured with each phase was producing plus/minus 200 volts at 875 RPM. Based on measurements,
19 each of the three coil sets in the three-phase system measure out at 1.8 ohms. Divide 200 volts peak-to-
20 peak by ohms equals about 111.11 Amps, times 200 volts equals about 22,222 Watts, times three phases
21 equals about 66,666 total Watts. The motor powering the system was drawing 10.5 Amps with a line
22 voltage of 230 volts, which yields us 2,415 Watts being consumed by the motor to produce this output of
23 about 66,666 Watts.

24 **[0107]** When the top magnet disk was locked with the waveform disks, the process was repeated. The
25 upper coil array produced about 540 Volts peak-to-peak between the three phases and about 60 Amps for
26 a power generation of about 32,400 Watts. With regard to the lower generator, the math is actually quite
27 different because there is a higher coil set resistance of approximately 3.7 Ohms per coil set of three (four
28 phases). So, with an output of 120 Volts peak-to-peak per phase divided by 3.7 Ohms equals 32.43 Amps
29 times 120 Volts equals 3,891.6 Watts per phase times four equals 15,566.40 Watts. These readings are
30 from running the system at a virtual idle of about 875. Testing has found that diamagnetic energy will really
31 start to rise at 1700 RPM and up as do the corresponding electrical outputs.

32 **[0108]** Changing the material used for the intake chamber in the built system from D2 steel to brass
33 improved the strength of the diamagnetic field and resulting power generation by approximately 30%.

34 **f. Discussion Regarding Diamagnetism**

35 **[0109]** Diamagnetism has generally only been known to exist as a strong force from the screening
36 currents that occur in opposition to load/current within superconductors operating at super low cryogenic

1 temperatures, i.e., 0 degrees Kelvin (0 K) or -273 degrees Celsius (-273 C). When a superconductor-
2 generated diamagnetic field is approached by a magnetic field (irrespective of polar orientation) a
3 resistive/repulsive force resists the magnetic field with ever-increasing repulsive/resistive force as distance
4 of separation decreases. The superconductor's resistive force is known to rise, in general, in a direct one-
5 to-one ratio relative to the magnetic force applied. A 100 pound magnet can expect 100 pounds of
6 diamagnetic resistance. A logical assumption would lead one to believe that this diamagnetic force, acting
7 upon a superconductor in this way, would result in increases in systemic resistance and net losses in
8 efficiency. The counter-intuitive reality is that this interaction results in a zero net loss to the system.

9 **[0110]** As described above, diamagnetism manifests as a strong force in superconductors due to the
10 screening currents that occur at cryogenic temperatures. As with superconductors, the system of the
11 present invention in at least one embodiment, utilizes screening currents working in concert with internal
12 oppositional currents, flows, counter-flows, reciprocating flows and pressures generated by hyperbolic
13 waveforms present on the rotatable waveform disks. These forces in combination with specific metallic
14 materials, material relationships, component isolation technologies, and charging media as discussed in
15 the example embodiments above manifest as profoundly powerful diamagnetic fields at the bottom and top
16 surfaces of the rotatable disk-pack turbine at ambient temperatures. The diamagnetic waveform disks are
17 fabricated from non-magnetic materials that are incapable of maintaining/retaining a residual electric field
18 in the absence of an applied charge. The diamagnetic fields created by the rotatable waveform disks are
19 a direct product of the specialized waveform motions, interaction with environmental matter and energies,
20 and a modest amount of through-flowing and centripitated ambient air.

21 **[0111]** The diamagnetic fields generated by the waveform disks can be utilized as a substitute for the
22 North or South magnetic poles of permanent magnets for the purpose of generating electricity. However,
23 unlike the North/South lines of force exhibited by common magnetic fields, diamagnetic fields manifest as
24 North/South loops or tori that spin around their own central axis. This distinction results in the diamagnetic
25 field not being a respecter of magnetic polarity and always repellent. The magnetic repellency allows one
26 pole of the north/south alternating magnetic fields to be substituted with the diamagnetic field generated by
27 the waveform disks. In use, the upper array of magnets and the lower array of magnets float freely and are
28 driven by the diamagnetic levitative rotational torque. As the all north-facing rare earth magnets cut a
29 circular right-angle path over the upper array of coils, and lower array of coils, electrical power is generated.

30 **[0112]** Systems utilizing this arrangement for electrical power generation, in at least one embodiment of
31 the present invention, have realized a multiplication in the production of voltage and current as compared
32 to an electrical power generation arrangement utilizing traditional North to South pole fluxuations. Further,
33 power input required to run the systems are extremely low while power production is accomplished with
34 minimal rise in heat or resistance, e.g., systems temperatures of less than five degrees over ambient
35 temperatures. Also, when a coil or circuit is placed into the diamagnetic field, the resistance drops to near
36 0 Ohms with actual repeatable readings being about 0.01.

1 **[0113]** Further, in at least one embodiment, the system of the present invention is capable of producing
2 at very low operational speeds powerful diamagnetic fields that are capable of functioning as an invisible
3 coupling between a rotating waveform disk and a rotatable magnetic array. The system drive side may be
4 either the magnetic array side of the system or the diamagnetic disk side of the system. The magnets may
5 move over the internal waveform geometries, thereby causing the fields to arise, or vise-versa. Actual
6 power/drive ratios are established via progressive waveform amplitude and waveform iterations. The
7 magnetic drive array will allow for the magnets to be dynamically/mechanically progressed toward periphery
8 as systemic momentum increases and power requirements decrease. Conversely, when loads increase,
9 the systemic driving magnets will migrate toward higher torque/lower speed producing geometries.

10 **g. Waveform Disks**

11 **[0114]** The previously described waveforms and the one illustrated in FIGs. 8B and 8C are examples of
12 the possibilities for their structure. The waveform patterns increase the surface area in which the charging
13 media and fields pass over and through during operation of the system. It is believed the increased surface
14 area as alluded to earlier in this disclosure provides an area in which the environmental fields in the
15 atmosphere are screened in such a way as to provide a magnetic field in the presence of a magnet. This
16 is even true when the waveform disk is stationary and a magnet is passed over its surface (either the
17 waveform side or back side of the waveform disk), and the ebbs and flow of the magnetic field track the
18 waveform patterns on the disk, manifesting in at least one embodiment as strong, geometric eddy
19 currents/geometric molasses .

20 **[0115]** As discussed above, the waveform disks include a plurality of radii, grooves and ridges that in
21 most embodiments are complimentary to each other when present on opposing surfaces. In at least one
22 embodiment, the height in the vertical axis and/or the depth measured along a radius of the disk chambers
23 vary along a radius as illustrated, for example, in FIG. 15D. In at least one embodiment, when a disk
24 surface with the waveforms on it is viewed looking towards the waveforms, the waveforms take a variety of
25 shapes that radiate from the opening that passes through (or the ridge feature on) the disk. In at least one
26 embodiment, the number of peaks for each level of waveforms progressing out from the center increases,
27 which in a further embodiment includes a multiplier selected from a range of 2 to 8 and more particularly in
28 at least one embodiment is 2.

29 **[0116]** In at least one embodiment, the disk surfaces having waveforms present on it eliminates almost
30 all right angles and flat surfaces from the surface such that the surface includes a continuously curved face.

31 **[0117]** In at least one embodiment, at least one ridge includes a back channel formed into the outer side
32 of the ridge that together with the complementary groove on the adjoining disk form an area having a vertical
33 oval cross-section.

34 **[0118]** FIGs. 19A-19E illustrate a variety of additional waveform examples. The illustrated plates include
35 two different waveforms. The first waveform is a circular waveform 2646G in the center and around the
36 periphery. The second waveform 2642G is a biaxial, sinocircular, progressive waveform located between

1 the two sets of circular waveforms. The illustrated disks mate together to form the disk channels discussed
2 previously. Each of the disks includes a plurality of assembly flanges 2629G for mounting impellers
3 between the disks.

4 **[0119]** FIG. 19A illustrates an example combination of biaxial, sinuocircular, progressive, and concentric
5 sinusoidal progressive waveform geometry on a disk 260G according to the invention. FIG. 19B and 19C
6 illustrate respectively the opposing sides of the middle disk 260G. FIG. 19D illustrates the top surface of
7 the bottom disk 260G. FIG. 19E illustrates how the three disks fit together to form the disk chambers 262G
8 and the expansion chamber 252G of a disk-pack turbine. In an alternative embodiment, one or more of the
9 circular waveforms is modified to include a plurality of biaxial segments.

10 **[0120]** FIG. 20 illustrates an example of a center disk incorporating varied biaxial geometries between
11 two sets of circular waveforms according to the invention.

12 **[0121]** FIGs. 21A-21D illustrate a two disk disk-pack turbine 250H. FIG. 21A illustrates the top of the
13 disk-pack turbine 250H with an expansion chamber 252H. FIG. 21B illustrates the bottom surface of the
14 top disk 264H. FIG. 21C illustrates the top surface of the bottom disk 266H including the concave feature
15 2522H that provides the bottom of the expansion chamber 252H in the disk-pack turbine 250H. FIG. 21D
16 illustrates the bottom of the disk-pack turbine 250H including an example of a motor mount 2662H. The
17 illustrated waveforms are circular, but as discussed previously a variety of waveforms including hyperbolic
18 waveforms can be substituted for the illustrated circular waveforms.

19 **[0122]** FIG. 22 illustrates another example of a disk-pack turbine 250I with a top rotor 264I, a disk 260I,
20 and a bottom rotor 266I. The top rotor 264I and the disk 260I are shown in cross-section with the plane
21 taken through the middle of the components. FIG. 22 also illustrates an embodiment where the components
22 are attached around the periphery of the opening that defines the expansion chamber 250I through
23 mounting holes 2502I. Each of the waveform patterns on the top rotor 264I, the disk 260I, and the bottom
24 rotor 266I includes two sets of circular waveforms 2646I and one set of hyperbolic waveforms 2642I.

25 h. Conclusion

26 **[0123]** While the invention has been described with reference to certain preferred embodiments,
27 numerous changes, alterations and modifications to the described embodiments are possible without
28 departing from the spirit and scope of the invention, as defined in the appended claims and equivalents
29 thereof. The number, location, and configuration of disks and/or rotors described above and illustrated are
30 examples and for illustration only. Further, the terms disks and rotors are used interchangeably throughout
31 the detailed description without departing from the invention.

32 **[0124]** The example and alternative embodiments described above may be combined in a variety of
33 ways with each other without departing from the invention.

34 **[0125]** As used above “substantially,” “generally,” and other words of degree are relative modifiers
35 intended to indicate permissible variation from the characteristic so modified. It is not intended to be limited
36 to the absolute value or characteristic which it modifies but rather possessing more of the physical or

1 functional characteristic than its opposite, and preferably, approaching or approximating such a physical or
2 functional characteristic.

3 **[0126]** The foregoing description describes different components of embodiments being “connected” to
4 other components. These connections include physical connections, fluid connections, magnetic
5 connections, flux connections, and other types of connections capable of transmitting and sensing physical
6 phenomena between the components.

7 **[0127]** The foregoing description describes different components of embodiments being “in fluid
8 communication” to other components. “In fluid communication” includes the ability for fluid to travel from
9 one component/chamber to another component/chamber.

10 **[0128]** Although the present invention has been described in terms of particular embodiments, it is not
11 limited to those embodiments. Alternative embodiments, examples, and modifications which would still be
12 encompassed by the invention may be made by those skilled in the art, particularly in light of the foregoing
13 teachings.

14 **[0129]** Those skilled in the art will appreciate that various adaptations and modifications of the
15 embodiments described above can be configured without departing from the scope and spirit of the
16 invention. Therefore, it is to be understood that, within the scope of the appended claims, the invention
17 may be practiced other than as specifically described herein.
18

I claim:

1. A system comprising:
 - a vortex chamber having at least one inlet;
 - a housing with a cavity;
 - a disk-pack-turbine inside said cavity of said housing and in fluid communication with said vortex chamber, said disk-pack turbine having
 - at least one pair of mated disks, said mated disks are substantially parallel to each other, each disk having
 - a top surface,
 - a bottom surface,
 - a waveform pattern on at least one surface of the disk facing at least one neighboring disk such that a passageway is formed by the neighboring waveform patterns of said neighboring disks in said pair of mated disks,
 - at least one mated disk in each pair of mated disks includes at least one opening passing through its center and its height that is in fluid communication with said vortex chamber, and
 - a fluid pathway exists for directing fluid from the at least one opening in said disks through the at least one passageway towards the periphery of the disks; and
 - each of said waveform patterns includes a plurality of protrusion rings having varying diameters around the at least one opening.
2. The system according to claim 1, wherein said disks each having an opening passing therethrough with at least two disks having openings with different diameters.
3. The system according to claim 1, wherein there are two pairs of mated disks with the top three disks each having at least one opening and said bottom disk having a fluid chamber bottom area aligned with the openings passing through the top three disks to form a fluid chamber.

4. The system according to claim 1, wherein there are at least two pairs of mated disks stacked on top of each,
each pair having one disk having a flat surface and a surface having the waveform pattern,
wherein the flat surface of the top pair of mated disks faces the flat surface of the bottom pair of mated disks.

5. The system according to claim 1, wherein each waveform pattern includes a plurality of rising waveforms as the protrusions and a plurality of descending waveforms as the depressions, said plurality of rising waveforms and descending waveforms traveling substantially around and substantially axially centered about the accessible opening of the at least one opening.

6. The system according to any one of claims 1-5, wherein the passageway formed between two mated disks provides a plurality of low pressure zones and high pressure zones during operation with the pressure zones alternating along the radius of the disks.

7. The system according to any one of claims 1-6, wherein each waveform pattern includes at least one biaxial waveform and at least one multiple axial sinusoidal waveform.

8. The system according to any one of claims 1-6, wherein said waveform patterns include hyperbolic waveforms.

9. The system according to any one of claims 1-6, wherein said waveform patterns include a plurality of rising waveforms as the protrusions and a plurality of descending waveforms as the depressions, said plurality of rising waveforms and descending waveforms traveling substantially around and substantially axially centered about the accessible opening of the disk array.

10. The system according to any one of claims 1-9, wherein the passageway formed between disks of each pair includes a substantial portion of the surface with the waveform pattern.

11. The system according to any one of claims 1-10, wherein each disk surface facing another disk includes the waveform pattern.

12. The system according to any one of claims 1-11, further comprising at least one additional disk between said disks of at least one mated pair, each additional disk includes
a top surface,
a bottom surface,
a waveform pattern on said top surface and said bottom surface such that a passageway is formed by the neighboring waveform patterns between said neighboring disks within said mated disks, and
an opening passing from said top surface to said bottom surface.

13. The system according to any one of claims 1-12, further comprising:
a top rotor attached to one mated disk,
a bottom rotor attached to second mated disk from a second pair of mated disks, and
wherein said at least one pair of mated disks numbers at least three pairs of mated disks.

14. The system according to any one of claims 1-13, wherein said vortex chamber includes a funnel section that tapers the chamber wall from said at least one inlet to an opening aligned with said disk-pack turbine.

15. The system according to claim 14, said funnel section has a long radial path in a vertical descending direction from said at least one inlet.

16. The system according to any one of claims 1-15, wherein said at least one inlet numbers two inlets.

17. The system according to any one of claims 1-16, further comprising a second disk-pack turbine spaced from the disk-pack turbine, the second disk-pack turbine including a pair of mated disks, said mated disks are substantially parallel to each other, each disk having
a top surface,
a bottom surface,
a waveform pattern on at least one surface of the disk facing at least one neighboring disk of said pair of mated disks such that a passageway is formed by the neighboring waveform patterns of said neighboring disks in said pair of mated disks,
each disk includes at least one opening passing through its center and its height, and
each of said waveform patterns includes a plurality of protrusion rings having varying diameters around the at least one opening.

18. The system according to any one of claims 1-17, wherein at least one of the at least one mated disk pair includes one disk with multiple convergent ports and/or one disk with multiple divergent ports.

19. The system according to any one of claims 1-17, wherein at least one of the at least one mated disk pair together define convergent/divergent ports.

20. The system according to any one of claims 1-19, wherein at least one waveform pattern includes at least one ring having varying widths in its thickness.

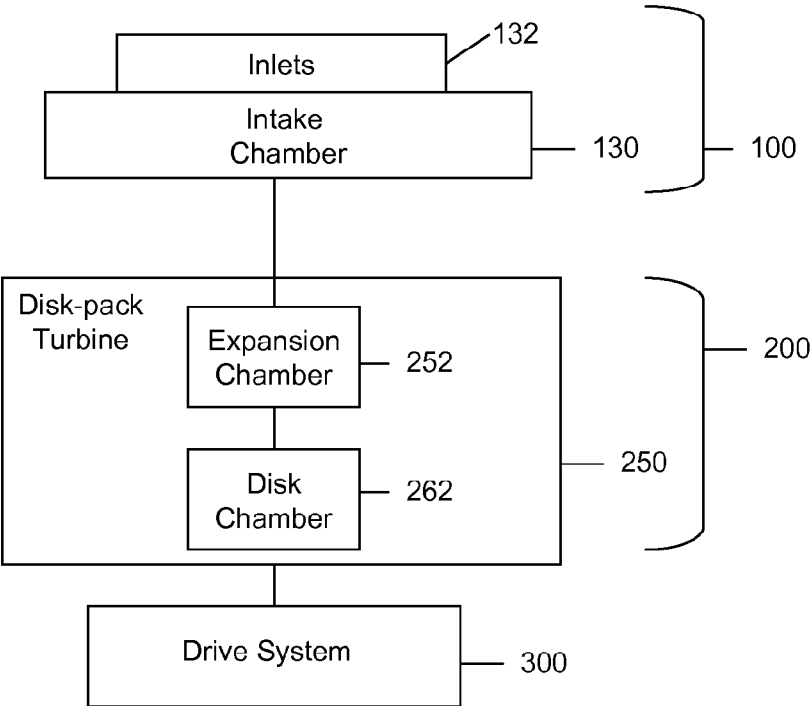


FIG. 1

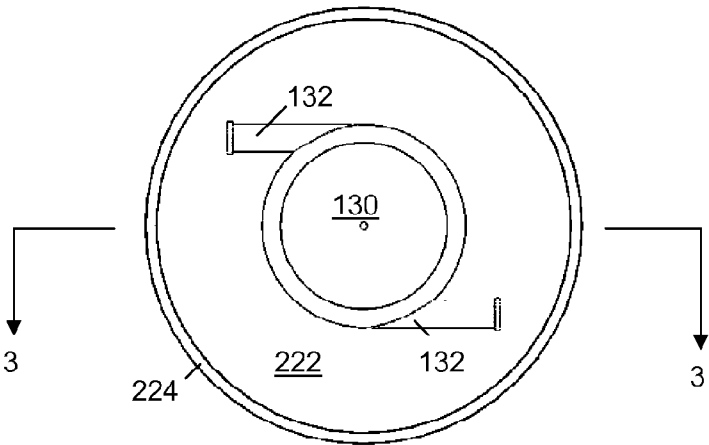


FIG. 2

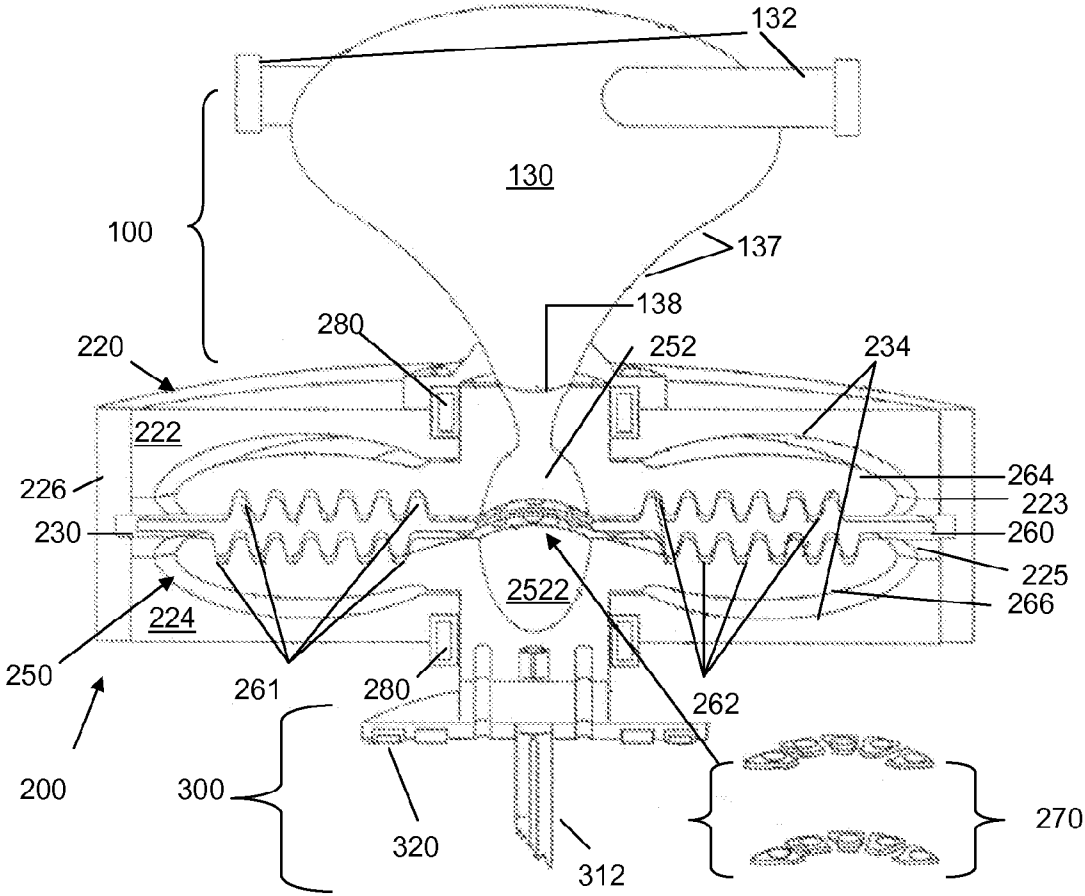


FIG. 3

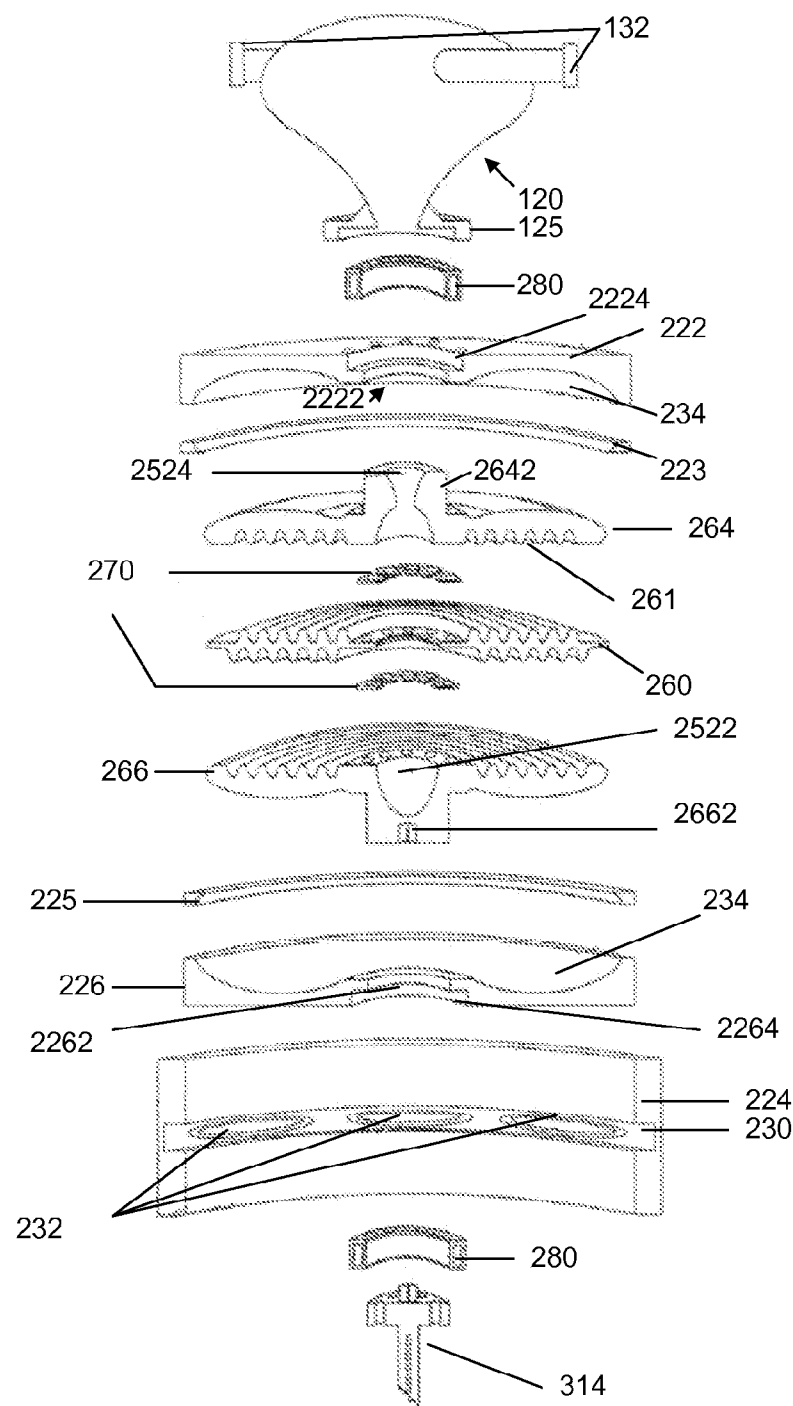


FIG. 4

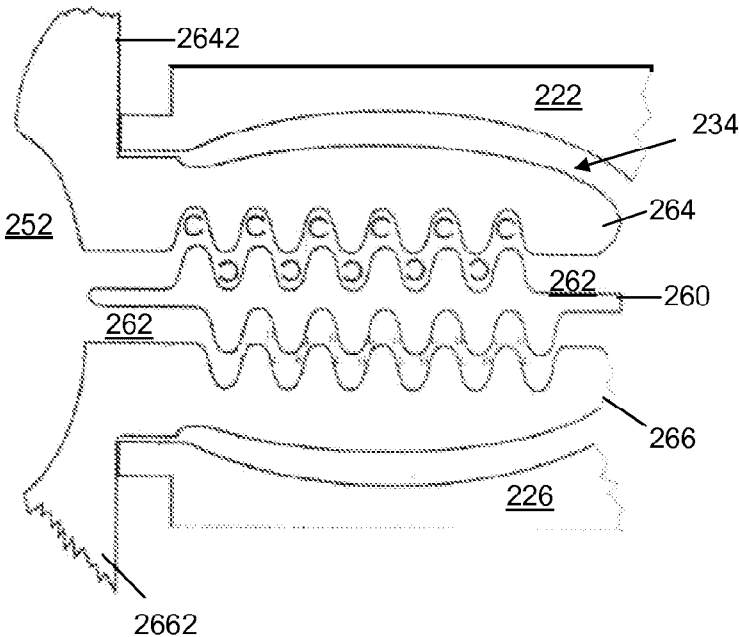


FIG. 5

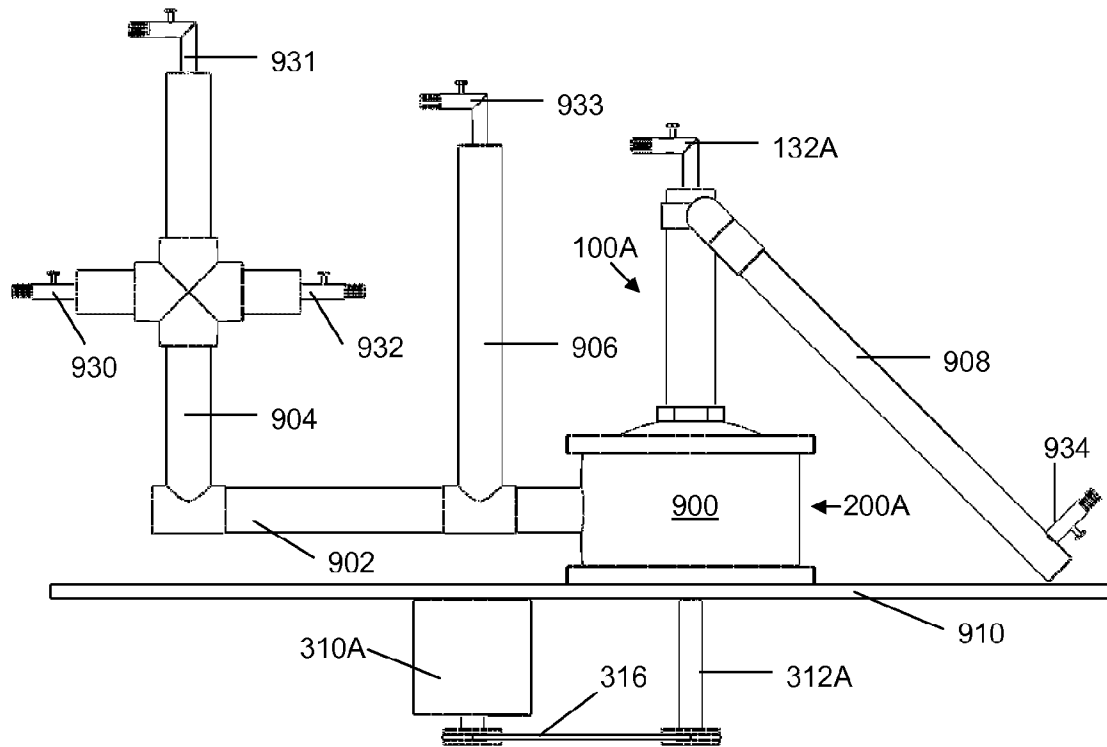


FIG. 6A

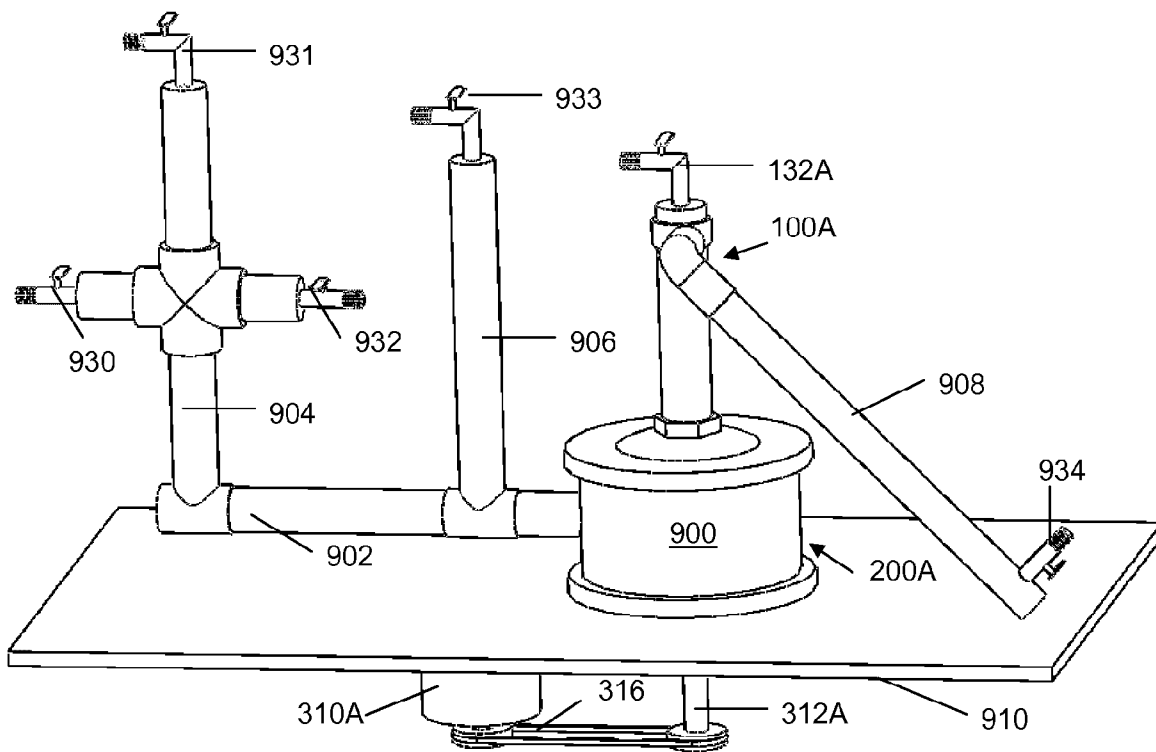


FIG. 6B

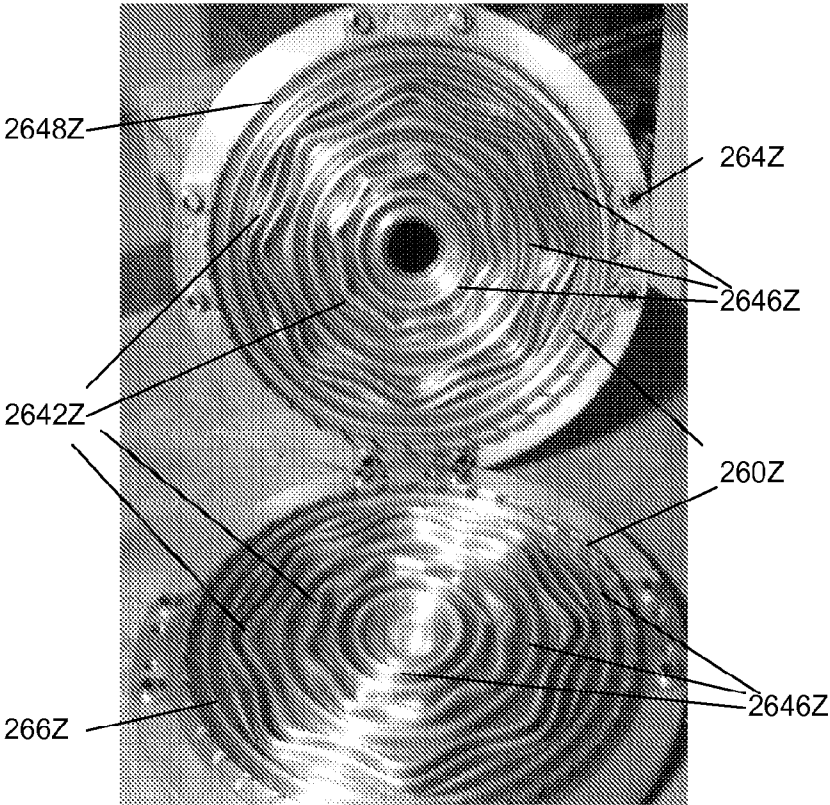


FIG. 7A

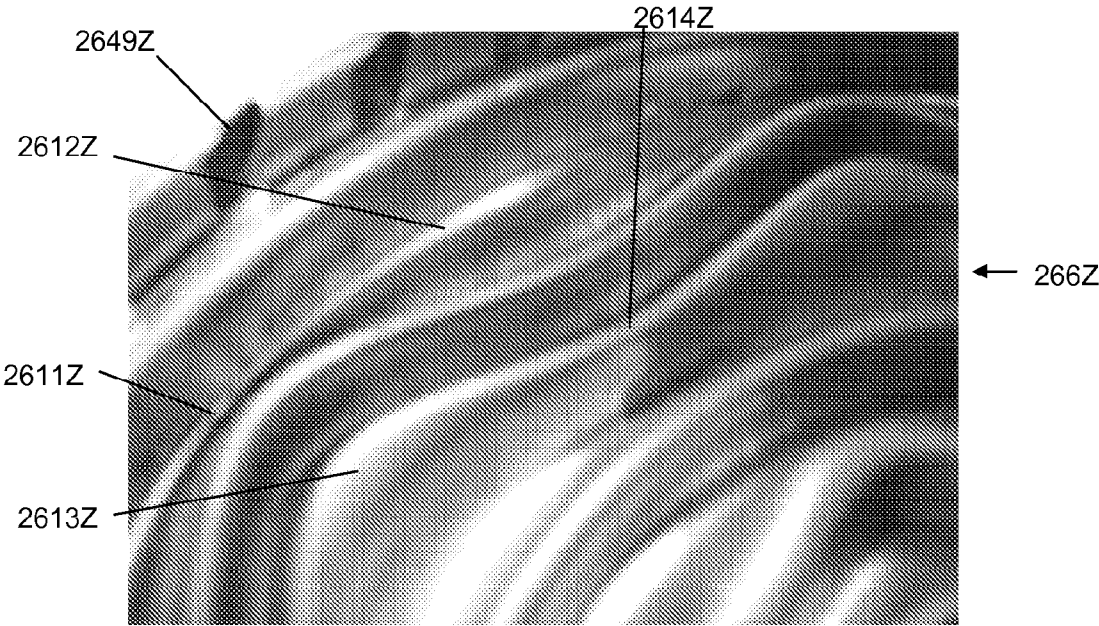


FIG. 7B

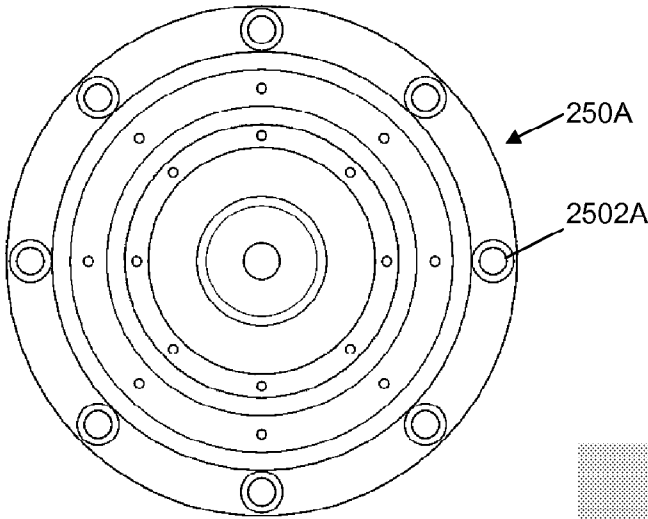


FIG. 8A

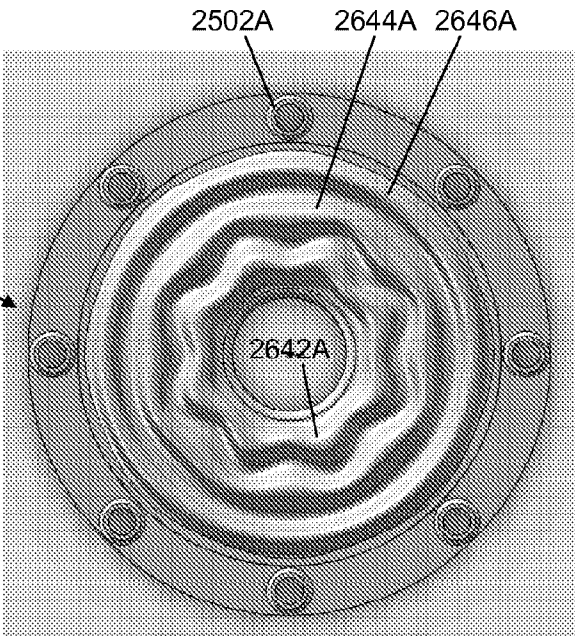


FIG. 8B

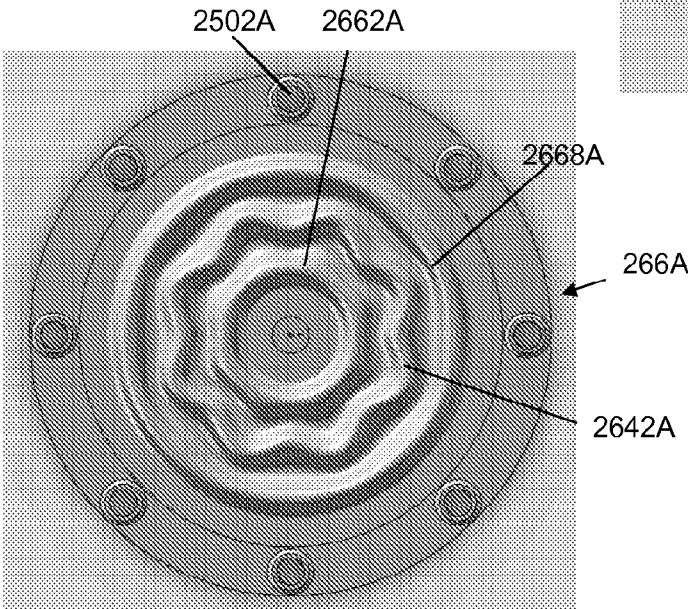


FIG. 8C

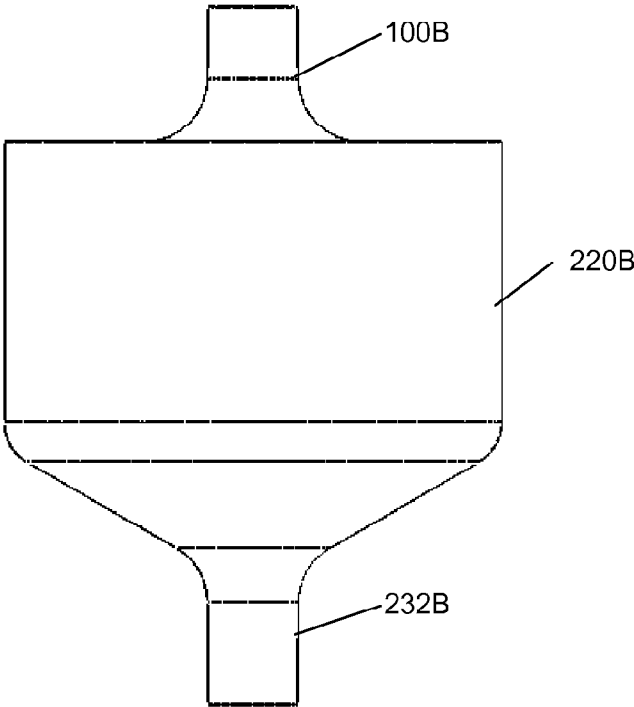


FIG. 9A

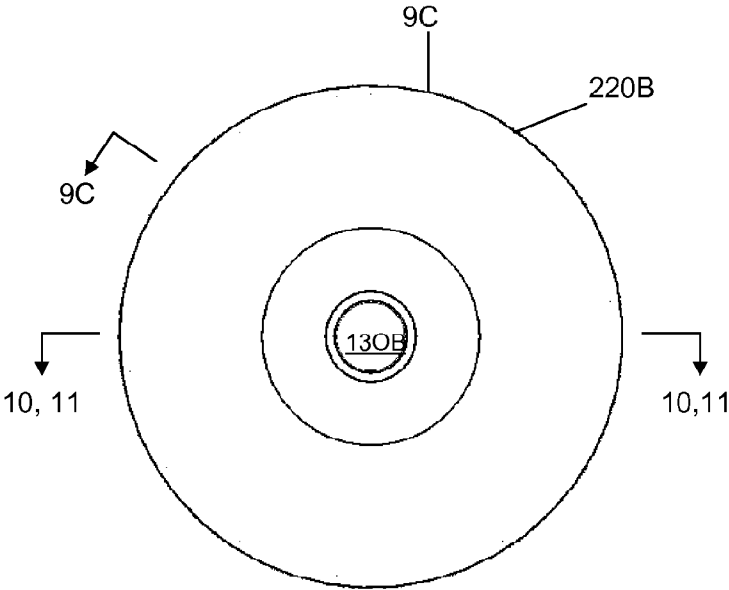


FIG. 9B

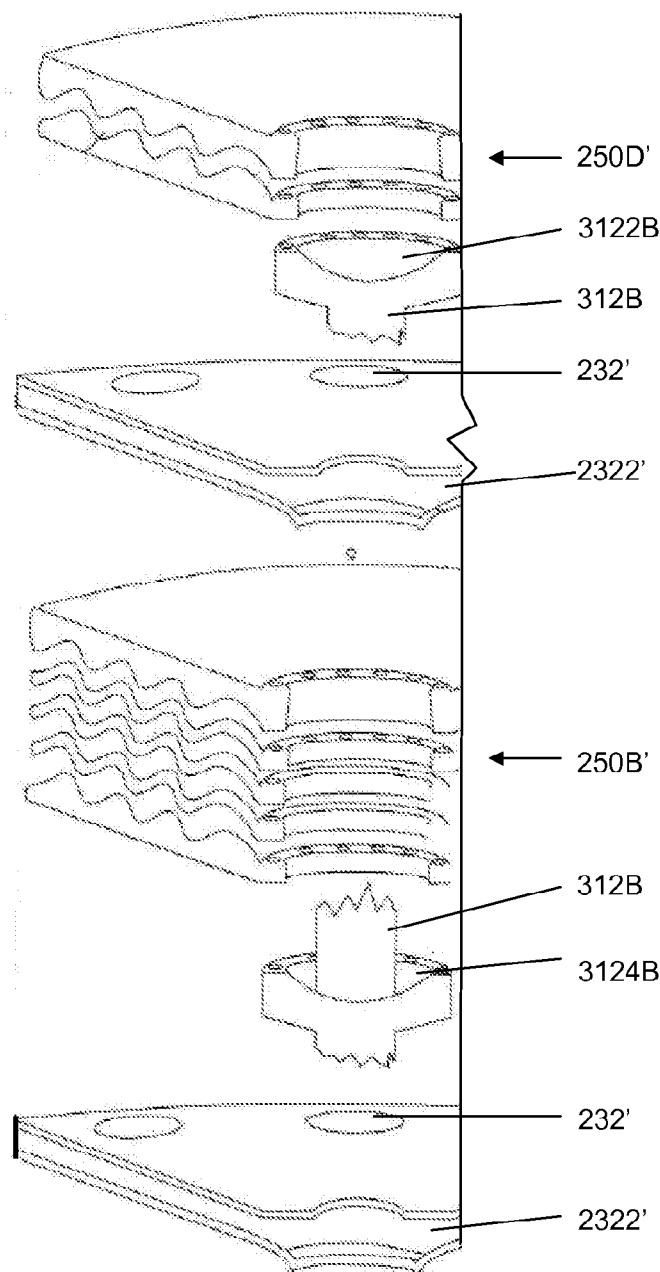


FIG. 9C

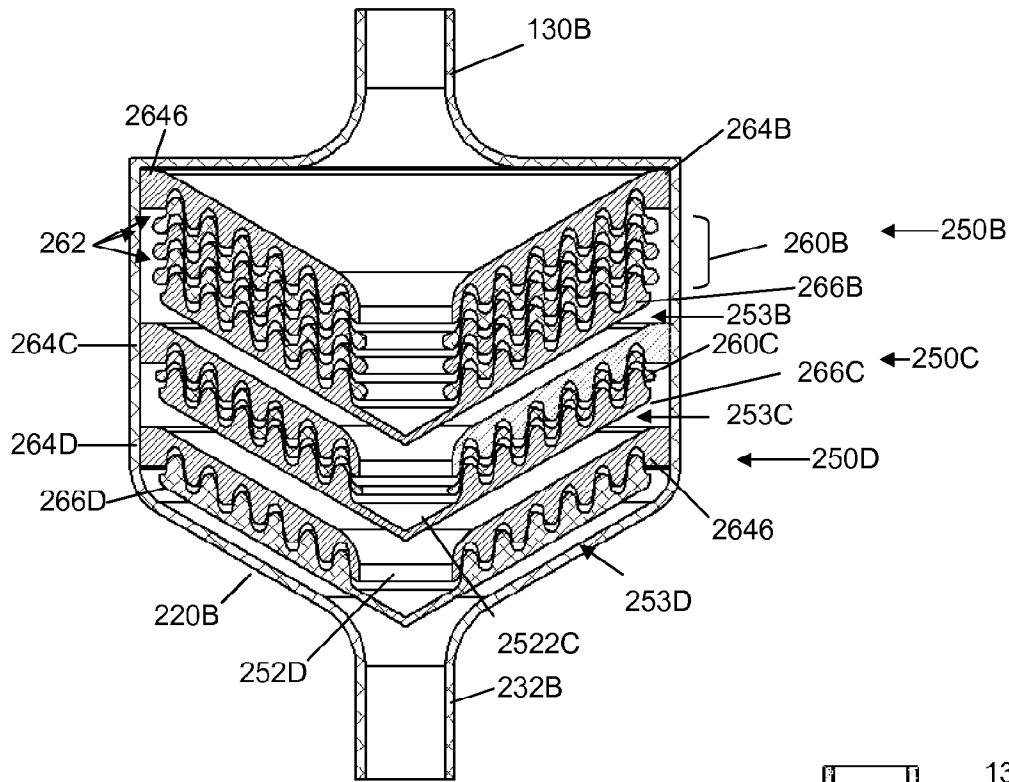


FIG. 10

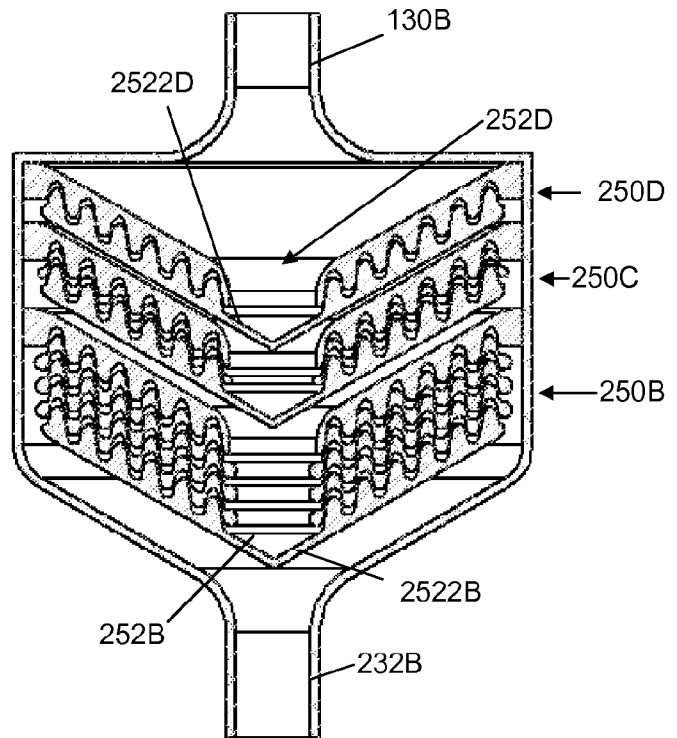


FIG. 11

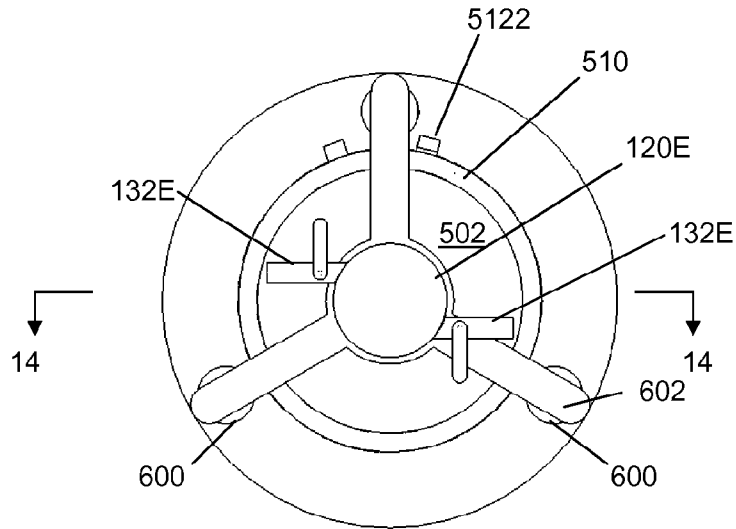


FIG. 12

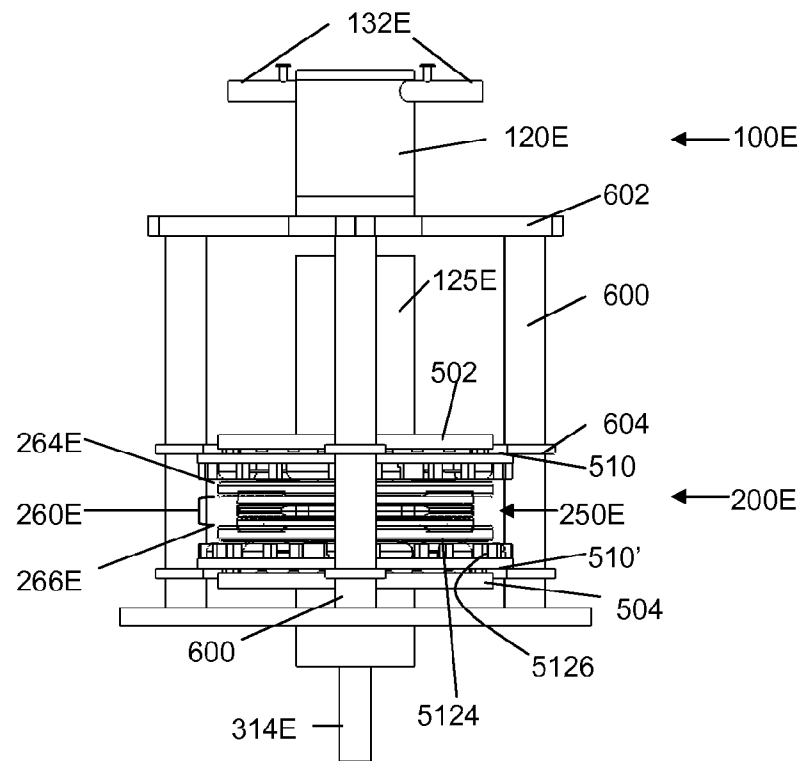


FIG. 13

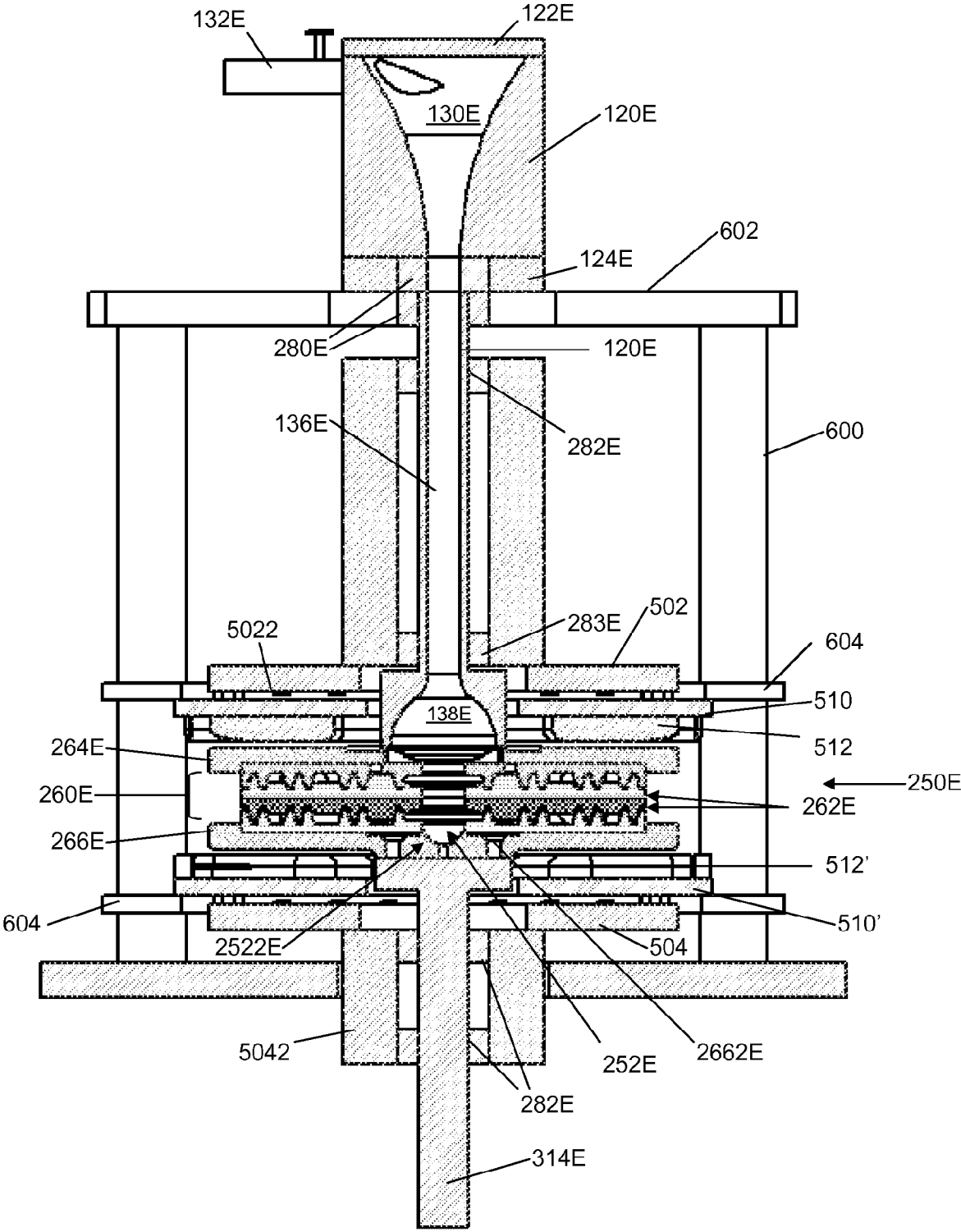


FIG. 14

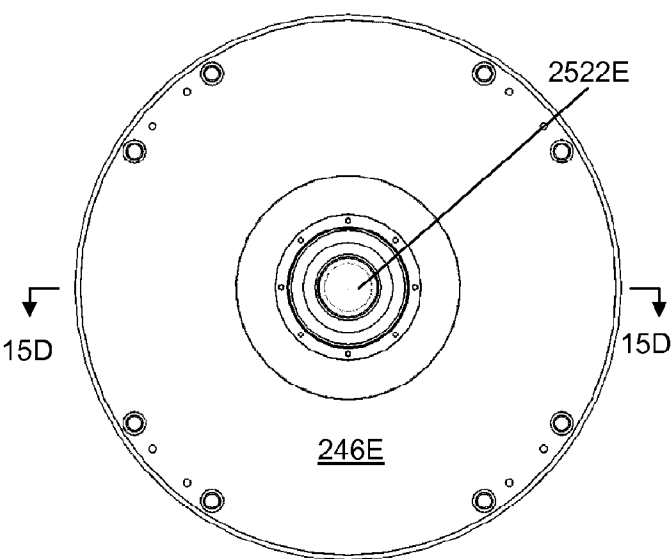


FIG. 15A

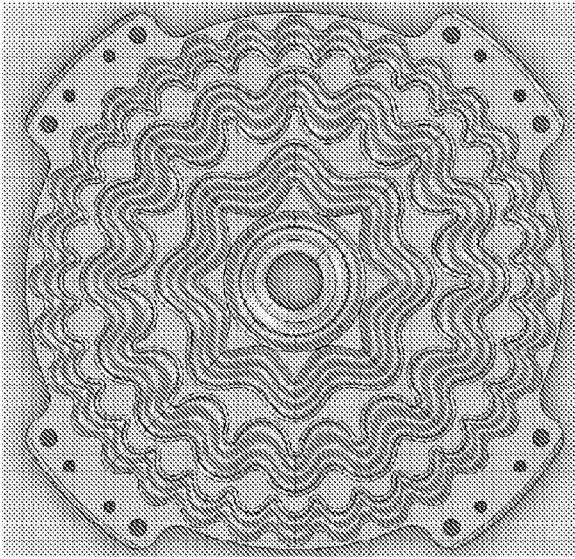


FIG. 15B

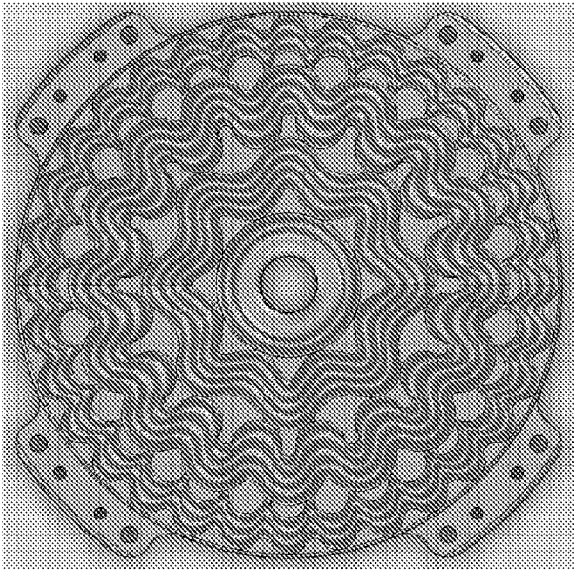


FIG. 15C

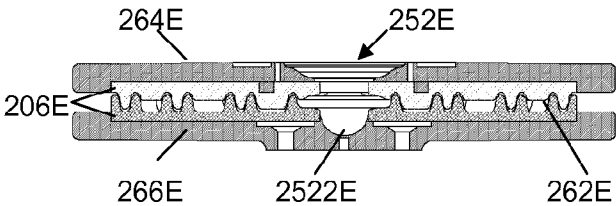


FIG. 15D

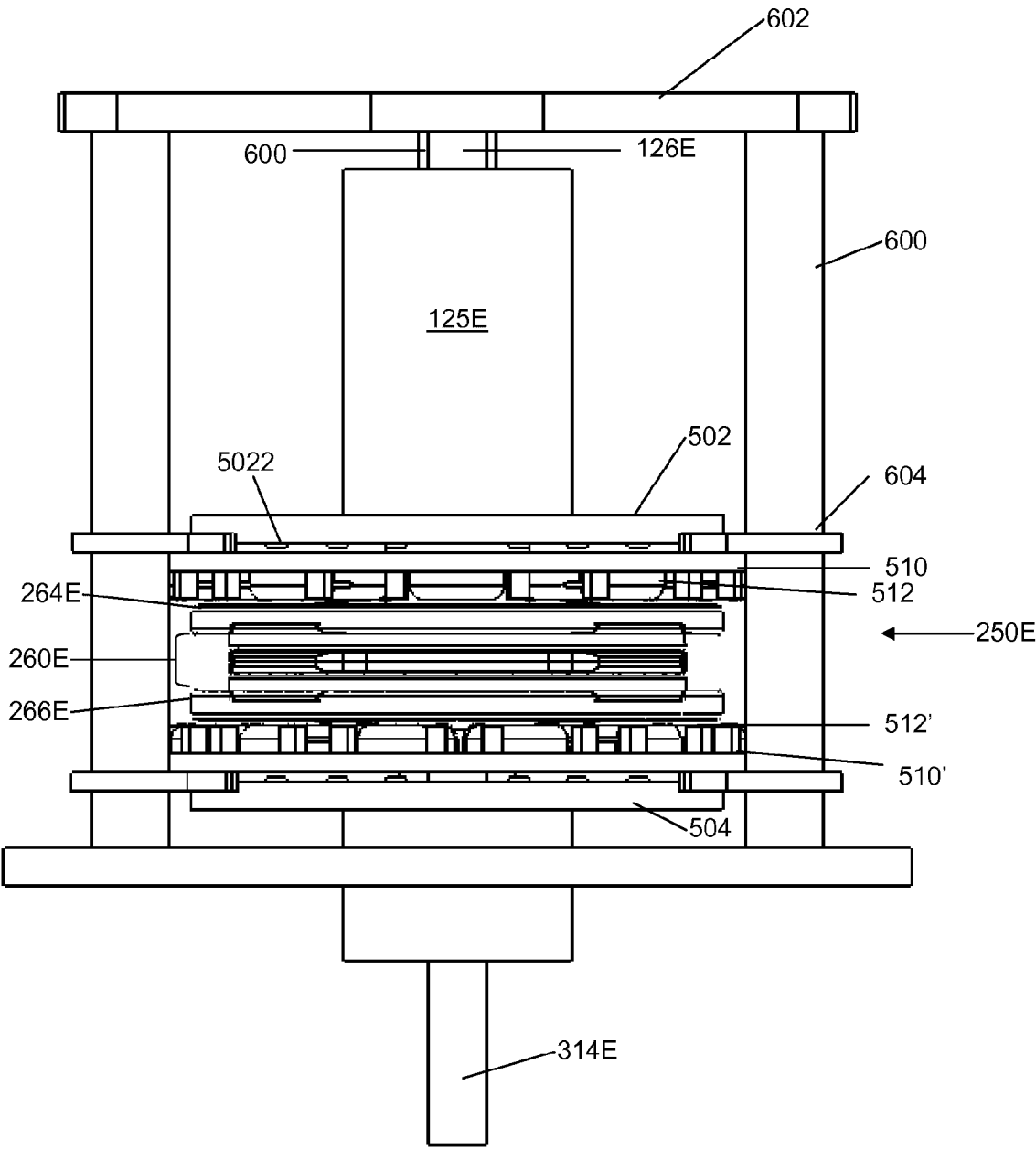


FIG. 16

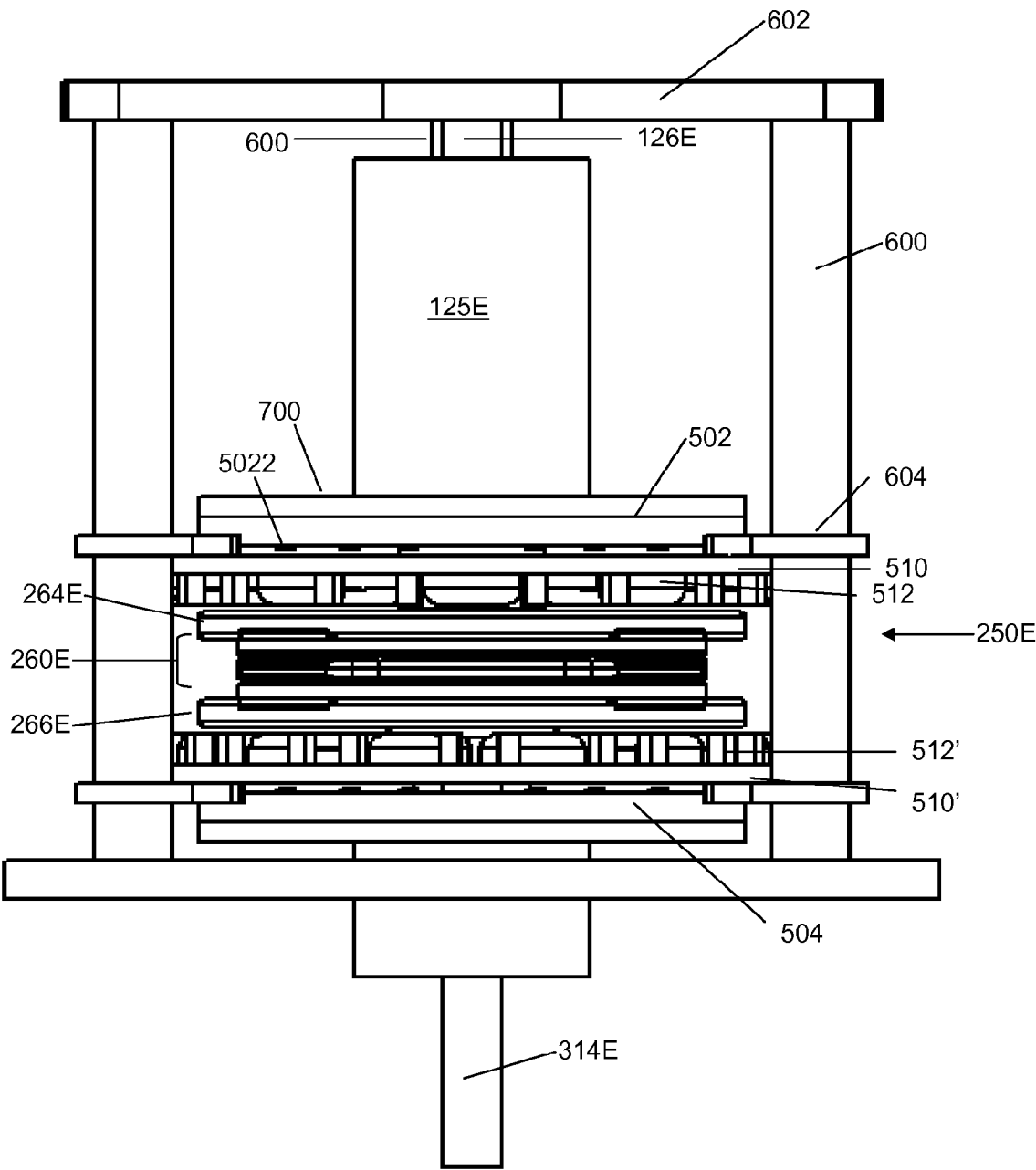


FIG. 17

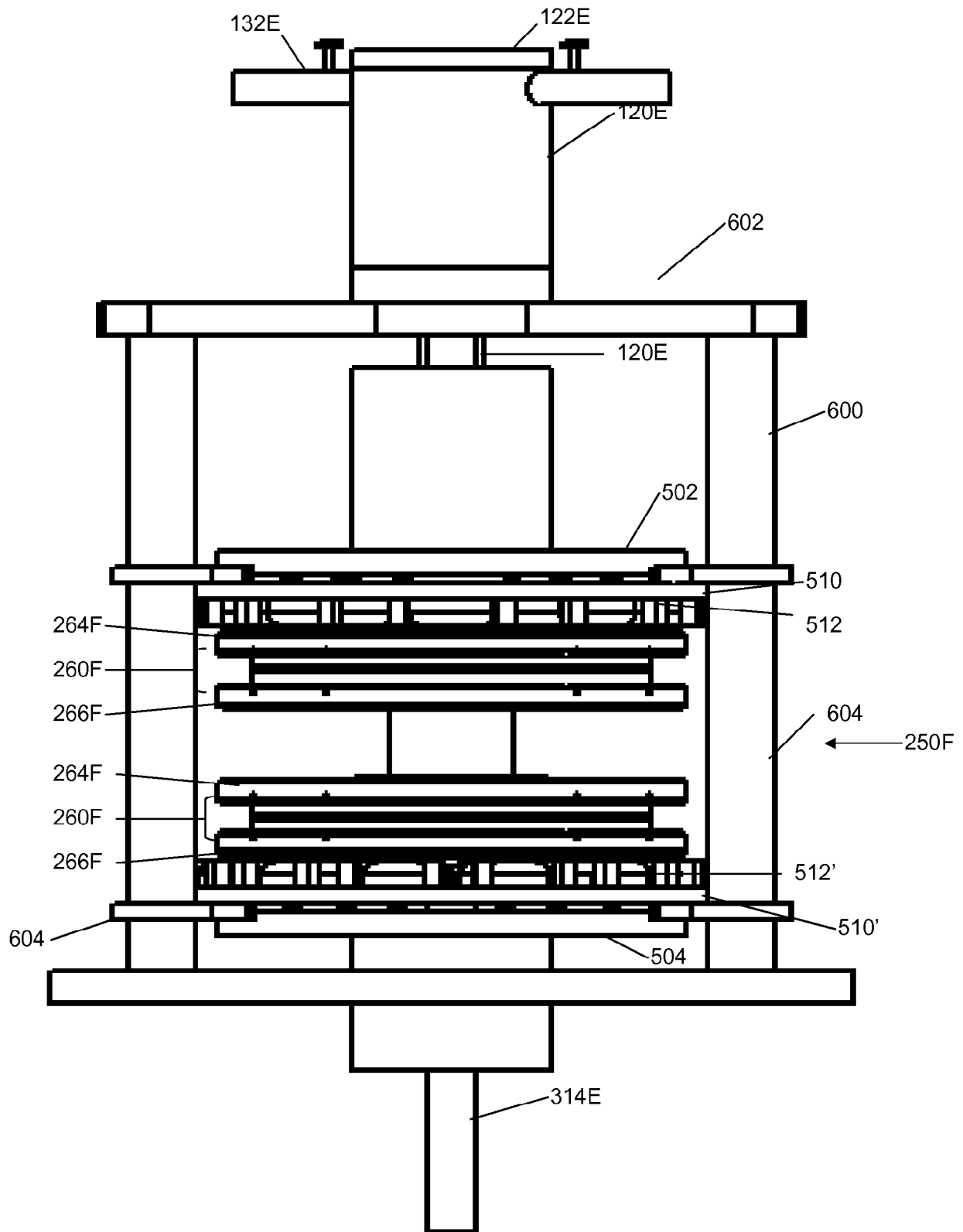


FIG. 18

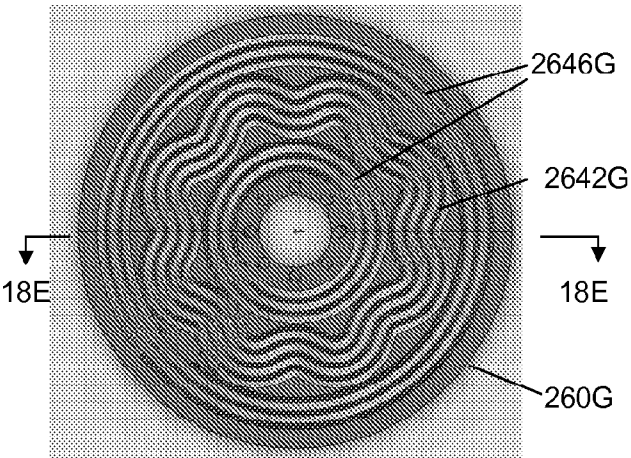


FIG. 19A

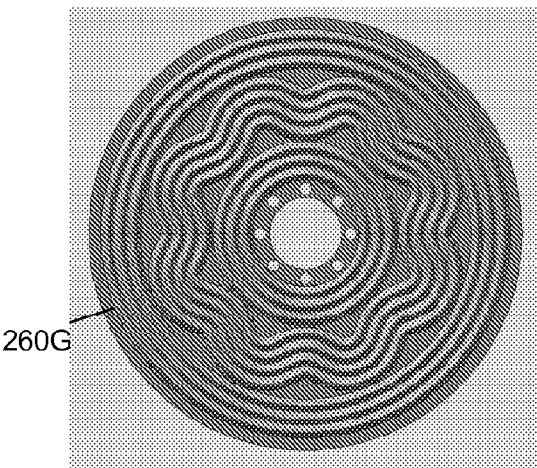


FIG. 19B

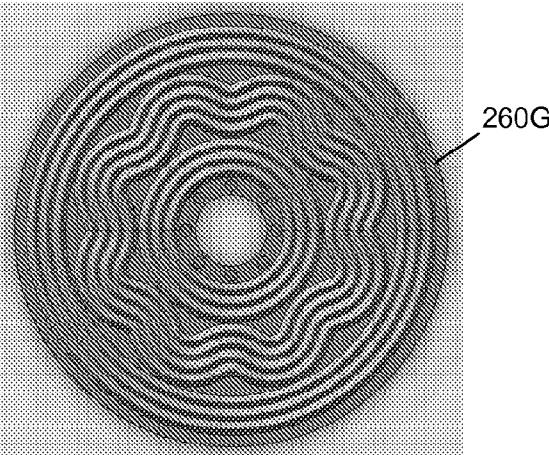


FIG. 19C

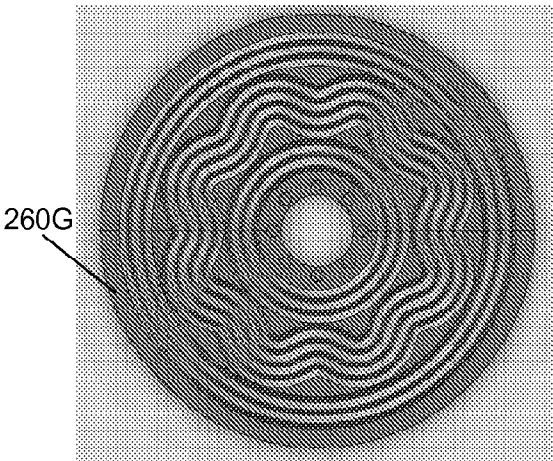


FIG. 19D

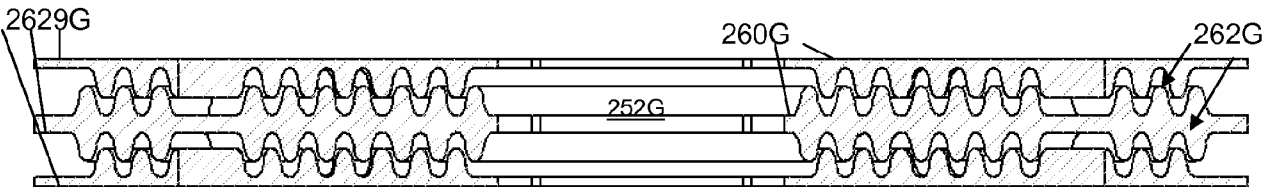


FIG. 19E

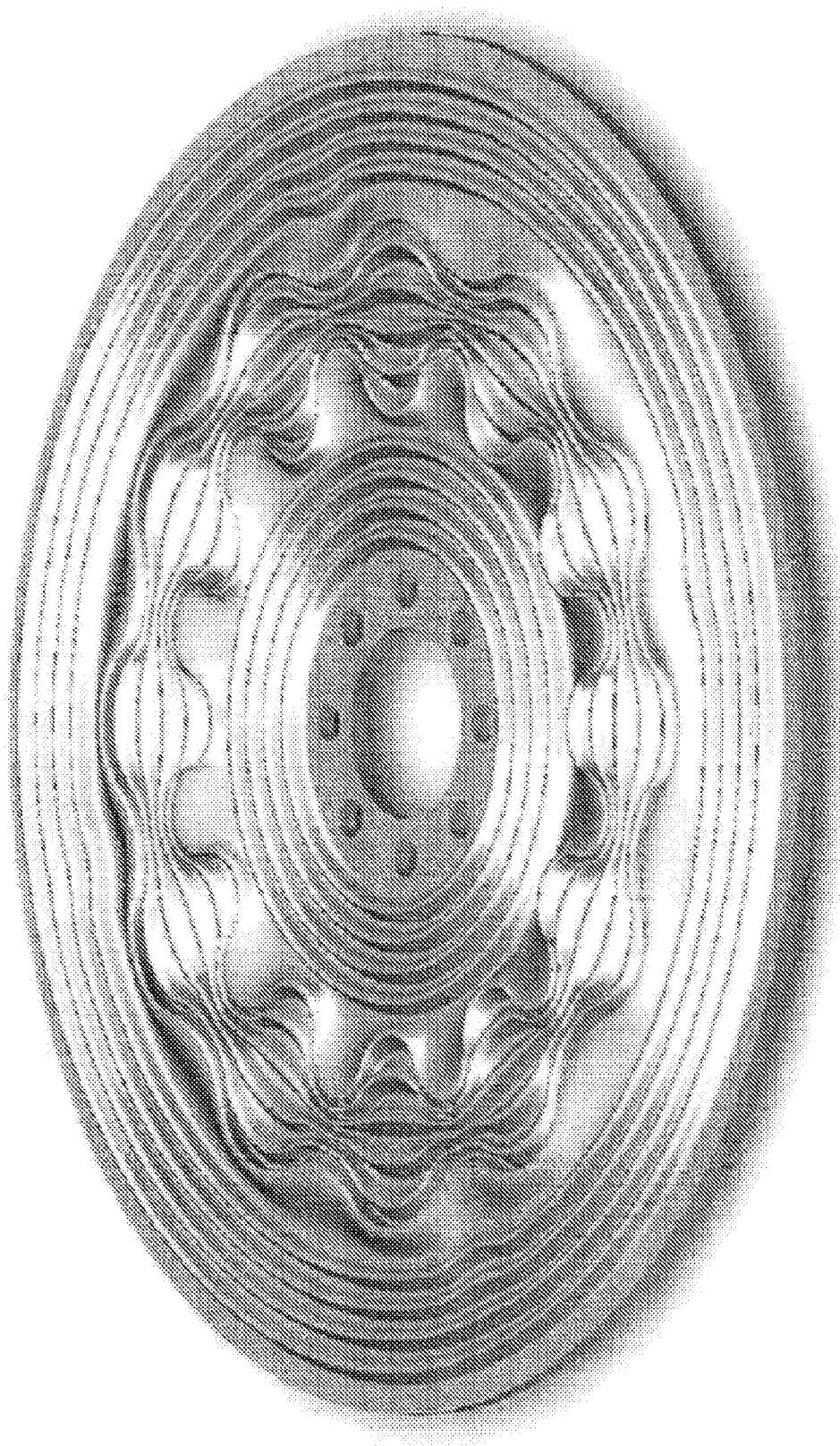


FIG. 20

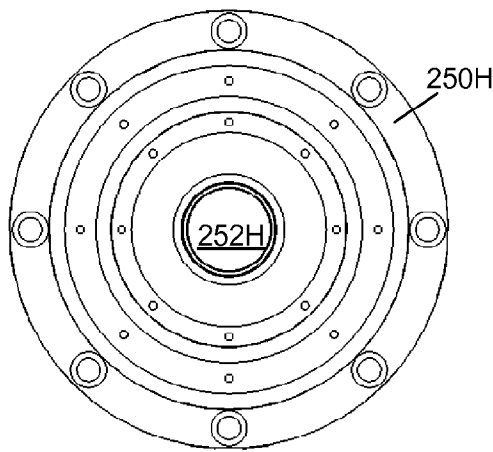


FIG. 21A

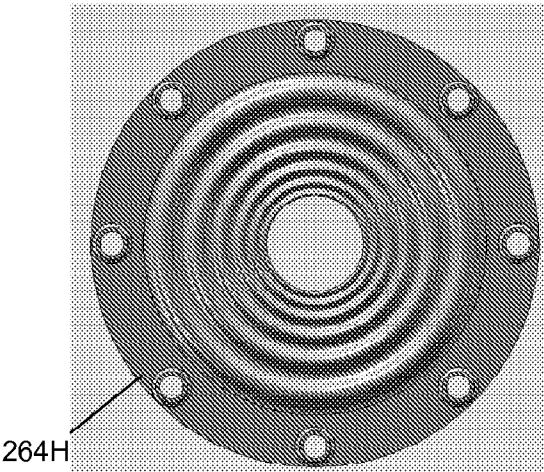


FIG. 21B

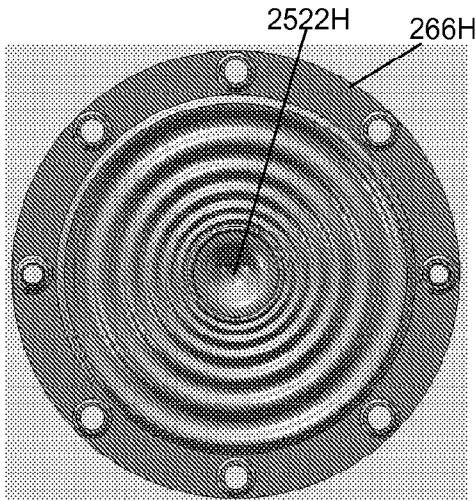


FIG. 21C

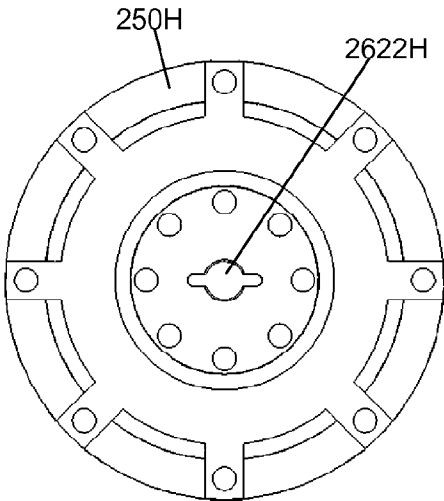


FIG. 21D

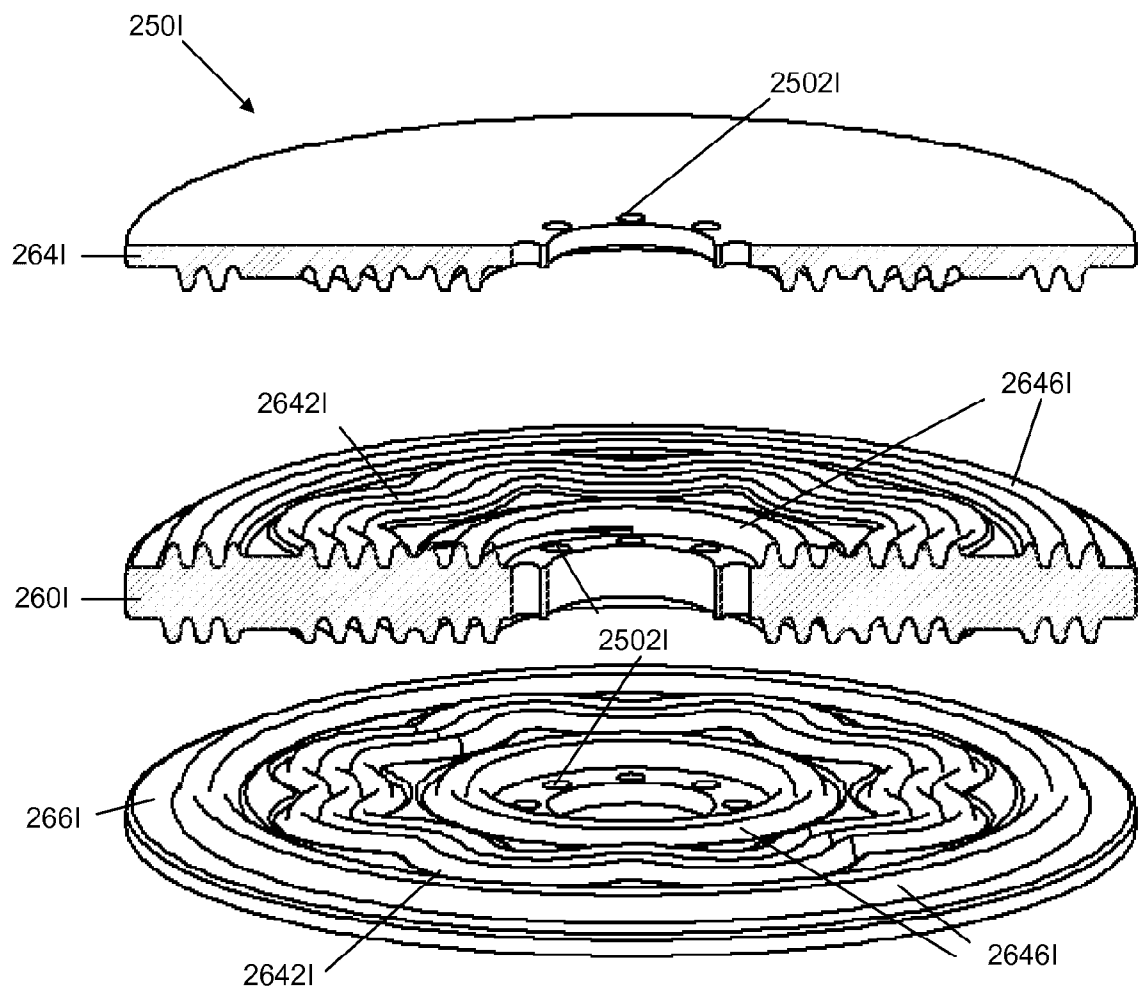


FIG. 22

