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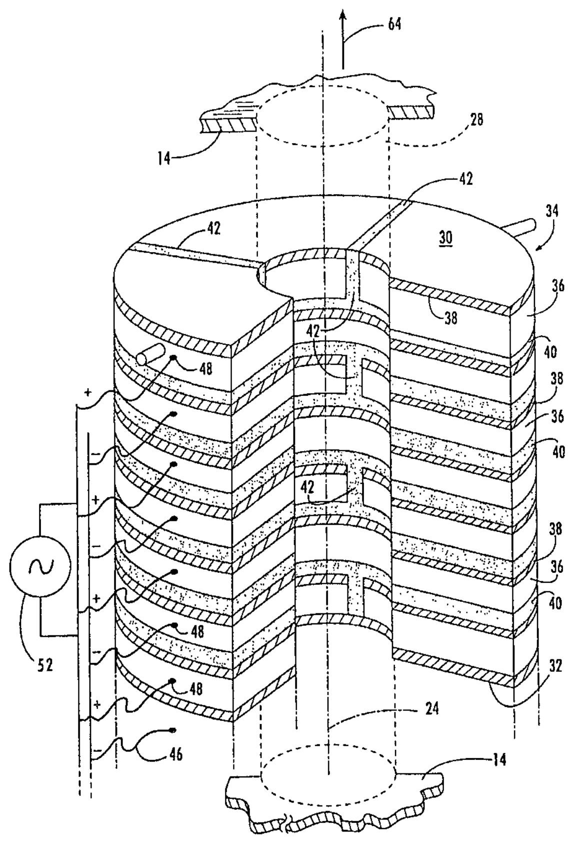
(54) Title: PROPULSION DEVICE AND METHOD EMPLOYING ELECTRIC FIELDS FOR PRODUCING THRUST

(57) Abstract

Thrust is provided to a vehicle (12) using a self-contained device (10) for producing the thrust through a preselected shaping of an electric field. The device (10) includes a core (28) carried by a housing (18), with both the core (28) and the housing (18) formed from a material having a high dielectric constant. A plurality of cells (22) are carried by the housing (18) and formed around the core (28), with each cell (22) having a high dielectric (36) sandwiched between an electrode (38) and a lower dielectric (40). Multiple plates (26) are stacked along a longitudinal axis (24) of the core (28) with the electric wire (46) carried through the high dielectric (36) for connection with the electrodes (38) of each plate (26). Positive and negative voltage is provided to adjacent plates (26) at a rapidly changing rate to provide thrust resulting from non-linear electric field paths created through the device (10) as a result of the cell (22) and surrounding material (42, 28) configuration.



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PROPULSION DEVICE AND METHOD EMPLOYING ELECTRIC FIELDS FOR PRODUCING THRUST

Cross Reference To Related Application

This application incorporates by reference and claims priority to Provisional Application Serial No. 60/123,086 for "FIELD PROPULSION APPARATUS AND METHOD" having a filing date of March 5, 1999, and commonly owned with the instant invention.

Field of the Invention

The present invention relates to conversion of energy, and in particular to the use of electrical potentials for producing forces to cause motion of a structure by direct operation of electric fields, thus providing a thrust sufficient for propelling a vehicle.

Background

Field propulsion is an electrical phenomenon, which employs an electric field and electric field effects for generating propulsion forces. As disclosed in U.S. Patent Nos. 2,949,550 and 3,187,206 to T. T. Brown, through an electrokinetic phenomenon, electrical energy can be converted to mechanical energy which is then used to provide a force for providing movement to a structure. However, except for insignificantly small forces of electrostatic attraction and repulsion, electrical energy has not been used for the direct production of force and motion. As of this writing, decades later, a practical use of available electrokinetic effects has not been provided.

As is well known in the art, and as emphasized by Brown, the elimination of machinery for intermediate conversion of energy provides a great cost savings, and greatly reduced weight and space. Such is desirable in self-propelled vehicles including aircraft and especially space craft. Since any conversion of energy from one form to another is accompanied by losses due to friction, radiation or conduction of heat, hysteresis, and the like, as well as serious reductions in availability of the energy by increases in entropy of the system, it is apparent that great increases in efficiency may be achieved through the use of the direct production of forces to produce motion from electrical energy, the subject of the present invention.

By way of further example regarding use of field in moving bodies, U.S. Patent No. 3,662,554 to DeBroqueville discloses an electromagnetic propulsion device including annular electrodes disposed on an outside dielectric surface of a body for providing a propulsion electromagnetic force field around the body to decrease overpressure in front of the moving body within a surrounding fluid for reducing a shock wave resulting from the overpressure. U.S. Patent No. 5,207,760 to Dailey et al. discloses an electric engine useful in sustaining space travel. The electric engine includes a pulses inductive magnetic thruster powered by a nuclear reactor. A gas is discharged against an inductor comprising a series of parallel coils arranged in a spiral fashion with capacitors connected thereto for charging and discharging simultaneously by a trigger generator immediately after a puff of propellant gas reaches the inductor. Current and magnetic field in the ionized gas drives the gas away from the coils creating a thrust which drives the spaceship.

As further disclosed in U.S. patent No. 4,891,600 to Cox, by way of example, when a spacecraft is in space or in an orbit, it is desirable to have a ratio of thrust produces to a rate of consumption of fuel to be as high as possible, thus producing a high specific impulse. One such propulsion system is an electrostatic propulsion system, wherein the thrust is created by electrostatic acceleration of ions created by an electron source in an electric field. However, where a large amount of thrust is needed, the weight of such an electrostatic system is excessively high. A dipolar force field propulsion system is disclosed by Cox which includes electric and magnetic field formed to create a spacial force field into which a particle is transported causing the dipole of the particle to be driven into a cyclic motion at a frequency which accelerates the particle. The acceleration of the particle in a space craft having the induced dipole electromagnetic propulsion system is accelerated by a reactive thrust. However, in spite of such developments since the disclosures of Brown, there still remains a need for providing a propulsive force within a relatively simple and inexpensive engine capable of being driven by well accepted power sources, while maintaining a high specific impulse that results from a generally light weight structure.

Summary of Invention

In view of the foregoing background, it is therefor an object of the present invention to provide a device for a practical conversion of energy of an electrical potential to a mechanical force suitable for propelling a transport vehicle.

This and other objects, features, and advantages of the invention are provided by a device for producing thrust through a preselected shaping of an electric field. The device comprises a housing and a core carried by the housing, wherein the core and the housing are formed from a material having a high dielectric constant. A cell having a high dielectric is sandwiched between an electrode and a lower dielectric, with a plurality of cells carried by the housing and formed around the core. A channel is formed between each cell for spacing thereof, wherein the channel is filled with a material having a dielectric property of the lower dielectric. Electrical connection means is provided for connection between an electrical power source and each electrode of each cell for providing power thereto.

In one preferred embodiment, the core comprises a cylindrical shape having a longitudinal axis extending along a direction of thrust. The core can be extended beyond a top surface and a bottom surface of a cell assembly for providing a structural attachment to a vehicle with which the device is operable. One set of cells extends radially from a longitudinal axis of the core to form a circular plate with each cell within the plate uniformly positioned therein. The electrical connection means comprise a wire carried through the high dielectric for connection with the electrode at a generally central location thereof. A plurality of wires extends radially from one cell to an adjacent cell within the plate for the connection to the electrical power source. A bridge conduit extends between adjacent cells within one plate having the adjacent cells therein. The bridge conduit provides a wire path for connection of the electrodes carried within the one plate, the bridge conduit further formed from a dielectric material having the dielectric properties of the high dielectric for the cell. An electric power supply provides voltage and current to the electrodes, with positive and negative signal connections to adjacent plates.

In a method aspect of the invention, the electrodes are provided with a rapidly changing charging voltage and/or changing current for enhancing the thrust provided from the self-contained device.

An electric field can either be of and alternating current (AC) or direct current (DC) type. As will herein be described, one preferred embodiment of the present invention includes the use of AC fields. A field propulsion device can operate using either an AC or DC electric field to cause a non-linear field geometry to form between at least two electrode plates. This non-linearity is accomplished even in a fully geometrically symmetrical capacitor through a polarity difference between plates. The polarity difference between positive and negative potentials has a flux density that is higher at the positive pole then at the negative pole thus creating a relative non-linearity for even the geometrically symmetrical capacitor. All capacitors share this phenomenon as described, by way of example, in U.S. Patent Nos. 3,187,206; 3,018,394; 3,518,462; 3,022,430; 2,949,550; and 1,974,483 to Brown. However, none have been optimized to take advantage of this effect, as herein described for the present invention. This non-linearity will cause a thrust effect to be generated in the direction of largest flux density, in other words, in the direction of largest field curvature, no mater the charge polarity of capacitor plates relative to each other.

Brief Description of Drawings

A preferred embodiment of the invention, as well as alternate embodiments are described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a schematic diagram illustrating a capacitive circuit;

FIG. 2 and 3 are plots of voltage versus time illustrating charging and discharging time, respectively, for a capacitor in a DC circuit of FIG. 1;

FIG. 4 and 5 are plots illustrating relationships of reactance X_C caused by capacitance and frequency in an AC powered capacitor, respectively;

FIG. 6 is a plot illustrating a relationship between power, voltage and current within an AC circuit;

FIG. 7 is a partial cross-section view of a vehicle illustrating one embodiment of a device of the present invention;

FIG. 8 is a partial perspective and cross-section view of one field propulsion device of the present invention;

FIG. 9 is a partial top plan view of one embodiment of the present invention illustrating one preselected arrangement of cells;

FIG. 10 is a side elevation view of cells forming a plate of FIG. 9;

FIG. 11 is a partial perspective and cross-section view illustrating an embodiment of the present invention;

FIG. 12 is a partial top plan view of the embodiment of FIG. 9 illustrating an alternate arrangement of electrical wire routing to cells;

FIG. 13 is a side elevation view of the cells forming the plate of FIG. 12; and

FIG. 14 is a partial perspective cut-away view of one embodiment illustrating a staggered adjacent plate orientation.

Detailed Description of Preferred Embodiments

The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

By way of further background, and with reference initially to FIG. 1, in a capacitive circuit, the amount of power absorbed by a field developed within a dielectric is equal to the amount of the power returned to the circuit when the field collapses. Further, a capacitor will absorb power for one half of an applied AC cycle and return the power to the circuit during the next half of the cycle. By way of example, a DC charged capacitor is limited, because even by placing components in a fashion that orientates an electric field for generating thrust in one direction, no mater the relative polarity, a DC charged capacitive device can not operate as well as an AC powered capacitor because it can not make use of charging rates of change in voltage as easily as can an AC powered device.

However, a pulsing DC is for all intents and purposes a regular direct current that will charge the capacitor and unless the capacitor dissipates that energy before the next pulse occurs, the capacitor will still have a residual charge that will remain until the next pulse. It has been discovered that a preferred effect occurs when the capacitor is initially charging, not when it is constantly charged as in a typical DC system. The charging time is associated with a drift velocity of charges. The DC device of the present invention operates with a constant charge rate that will, as the capacitor is increased in power, reach a saturation level of the capacitor and begin to create a leakage current. The leakage current will continue to build up until the device suffers a dielectric breakdown where arcing occurs, thus limiting the maximum energy that can be induced unto a DC device, significantly more than in a typical AC powered device.

While an AC powered device can experience similar effects as does a DC powered device, its reversal of polarity and rate of cycles can take advantage of the superior thrust generated at the first few micro seconds of the charging time. This has the effect of generating more thrust with the same amount of energy input. As a result, higher power input levels can be reached without exceeding the rated power of the capacitor. The cycles reverse themselves before the maximum power rating is reached and a relative reversed polarity state compared to the previous cycle is induced. Since an AC cycle first charges the capacitor and then discharges it, followed by a relative polarity reversal, the capacitor can take full advantage of the best charging cycle frequency to power ratio and can thus generate a superior thrust effect. Charging and discharging time in a DC circuit is illustrated, by way of example, with reference to FIGS. 2 and 3. As illustrated, the charging of the capacitor is rapid at first, but slows down considerably as it reaches a full charge. The same holds true for the discharge rate. Reactance causes the slowing down in both cases, with the charges repelling each other during the charging and discharging process. Reactance is the resistance that charged particles experience as the capacitor charges. Figs. 4 and 5 illustrate relationships of reactance X_C caused by capacitance and frequency in an AC powered capacitor, respectively. As frequency increases capacitance decreases. As frequency decreases, reactance increases without changing the structure of the capacitor. If we were to increase capacitance by changing the structure of the capacitor, and if we increase capacitance, the reactance decreases. If we decrease capacitance, reactance increases.

As a result of the arrangement of capacitor plates, a polarity reversal has the same effect on both the positive and negative cycle and thus generates thrust at both sides of the cycle. With reference to FIG. 6, power being absorbed and returned to the circuit is illustrated within shaded areas under a positive and negative voltage cycle. The shaded areas above and below the baseline represent power that is absorbed by the capacitor. The solid curve line represents a current level rising and dropping as the AC cycles reach their peak to peak values. The dashed curve line represents voltage. Values for both the current and the voltage curve lines are dependent on a structure of the capacitor and a form of the power input. The amount of current that goes through a capacitor depends on the potential difference and the properties of that capacitor. However, in a capacitor, at any preselected AC potential difference, the current is greater at higher frequencies.

As a result, an AC system, especially a capacitive as will herein be described in further detail, can use the charging time to its advantage as well as the polarity reversal cycle. Be reminded that the reversal of polarity in a cycle is always a positive energy input. Thus, positive and negative polarity will have the same effect, and can both take advantage of the above charging time effect.

Also in a DC capacitor, the use of materials having a relatively low dielectric constant, the degree to which a material can resist flow of an electric charge, is effective in creating thrust because it is such a material through which currents will flow. In a DC system, this has the effect of charging the capacitor, while on the other hand, an AC current can travel through a material that normally DC could not, given the same amount of capacitance to hold the voltage, because of the charging time frequency advantage. Further, while a DC powered capacitor must use low rated dielectrics which limit the total capacitance, the AC powered devices can use high rated dielectrics and thus allow for extremely high rated capacitors to be made that can thus have even higher power ratings. This added to the charging time advantages results in a higher thrust without a significant increase in size of such capacitors, and thus devices. Since the AC device uses the energy more efficiently by generating thrust in the first moments of the charging cycle, then the same power (e.g. watts) yields more force.

As illustrated with reference to FIG. 7, a device **10** of the present invention provides an engine **12**, by way of example, for a vehicle **14** when employing the above described techniques, with such an engine being self-contained and carrying its own environment. Thus, the engine **14** can operate within the vehicle **14** without the need for direct exposure to the surrounding environment **16** through which the vehicle is moving. As a result, since the device **10** employing field propulsion can propel itself without exhausting any matter in the opposite direction of vehicle motion, it can propel itself without being exposed to the environment **16** through which it is moving.

Such self-containment serves multiple purposes. First it makes the device **10** of the present invention safer by allowing the device to have a casing or housing **18** for operation of the device with minimum danger to users. Second the housing **18** is useful because it can be made into an RF or electromagnetic shield. Third, since the device **10** is electrical in nature, the housing **18** provides protection for the device against foreign objects or grounding contacts that could cause short circuits. The housing **18** also provides a convenient means from which to transfer propulsive forces created by the device **10** to the vehicle **14** such as a spacecraft, as herein described by way of example, automotive vehicles, marine vehicles, and aircraft.

With reference to FIG. 8, one embodiment of the device **10** includes a plurality of engine cells **22** arranged about an axis **24** of the device. In the embodiment herein described, by way of example, the plurality of cells **22** are juxtaposed radially outward from the axis **24** and longitudinally along the axis. As illustrated with reference to FIGS. 9, a preselected number of cells **22** will be arranged to meet the need for providing desired forces to be delivered, the more cells, the more power, the more thrust. As illustrated with reference to FIG. 10, the radial arrangement of cells **22** form a plate **26**. Thus, with the formation of the plate **26**, as desired, stacking of the plates will provide the desired size. Further, and as illustrated with reference to FIG. 11, neighboring plates will be supplied with opposing positive and negative charge, with the thrust directed toward the positive charge.

As further illustrated with reference to FIG. 11, and again to FIGS. 8 and 9, the cells **22** are assembled circumferentially around and longitudinally along a core **28**, which core extend to and, if desirable, beyond top and bottom surfaces **30**, **32** of a cell assembly **34** formed therefrom. With the core **28**, formed from a high dielectric material, a connection to a structure of the vehicle **14** can be made. The core material should preferably be made from a relatively strong material with a high dielectric constant, for facilitating construction of the device **10** and transferring of forces generated by the engine cells **22**.

As an alternative, and as earlier described with reference to FIG. 7, the device **10** is attached via the housing **18**. Each cell **22**, in a preferred embodiment herein described by way of example, includes a high dielectric **36** sandwiched between a conductive material forming an electrode **38** and a lower dielectric **40**. Generally, the electrodes **38** will be formed from a copper sheet material, aluminum sheet material, and the like. The high dielectric **36** is preferably has similar dielectric properties as the core **28**, for generally preventing current flow therethrough. While the lower dielectric **40** includes dielectric properties that permit current flow, and thus a field path therethrough. Preferably, the cell **22** is positioned with the electrode **38** placed to form a top of each cell, with the high dielectric **36** having a larger thickness than the lower dielectric **40**, to further discourage an electric field path through the high dielectric, as herein illustrated.

With reference again to FIGS. 9 and 11, each neighboring cell **22** is separated by a lower dielectric forming a channel **42**. The channel **42** fills a gap between the cells **22** and functions as a circumferential spacer therebetween. Preferably, the material forming the channel **42** has similar dielectric properties and the lower dielectric **40** forming a part of the cell **22**. In this way, the channel **42** and the lower dielectric **40** provide an electric field path shaping that is further formed around the high dielectric material **36**, thus providing the desirable non-linear path for producing thrust. It is also preferred that the material used to form the housing **18** has similar dielectric properties as does the high dielectric **36**. A bridge power conduit **44** is further provided at a plurality of locations within the channel **42** for carrying electrically conductive wire **46** from cell to cell, as illustrated with reference again to FIGS. 9 and 10. Material filling the conduit preferably includes similar dielectric properties as the high dielectric **36**. The electrical wire **46** is connected to the electrodes **38** of cells **22** within one plate **26**, as illustrated with reference again to FIG. 9, and alternatively by way of example, with reference to FIGS. 12 and 13. Preferably, the connection of the wire **46** is made at a generally central location of the electrode **38**, with such connection of the wire **46** to each cell **22** within a plate **26** distributing energy evenly between all the electrodes in that plate. The electrical wire **46** is carried through a power input conduit **48** within each cell **22**.

In an alternate embodiment, and as illustrated with reference to FIG. 14, a staggered arrangement of plates **26** is provided, which arrangement serves to further increase non-linearity of the electric field, and therefore thrust.

As a result, the device **10** of the present invention, generates a useful motive force using non-linear AC or DC electric fields applied between at least two electrodes divided by a dielectric. As earlier described, it is intended that the device **10** be preferably used with AC generated electric fields to take advantage of the charging time phenomenon to extract the maximum amount of force from the input energy field. Further, the materials that make up elements of the device **10** also serve the purpose of transferring a mechanical force of the device to a support **20** or directly to the vehicle **14**, as illustrated again with reference to FIG. 7.

With the formation of non-linear fields created by the above described structure for the device **10**, the device can be used on the outside of a vehicle to create a propulsive force on the entire mass of the vehicle. The combined use of the internal engines **12** in combination with outer propulsion effect will produce a more efficient control of the vehicle **14**. Further, the use of a vehicle skin **50** or outer hull for carrying the electrodes on a dielectric allows the entire vehicle to be used to create thrust. As herein described, by way of example, the use of the internal engine **14** allows the device **10** to induce lines of force to collapse towards an area where the engine is positioned, thus increasing the non-linearity of the field.

By way of further detail regarding the preferred embodiment herein described by way of example, and with reference again to FIG. 11, the channels **42** and the lower dielectric **40** of the cell **22**, as well as the high dielectric **36** improve performance of a set of neighboring plates **26** by increasing the amount of energy being used in a device and allowing that energy to generate a respective thrust without any increase in size. The channels **42** also increase the field effect by allowing the lines of force to be in a generally parallel arrangement, which, as is appreciated by one of skill in the art, increases the Lorentz force effect and therefore the field propulsion effect. The Lorentz force has been observed through experimentation as an important factor in the thrust-generating phenomenon. The more parallel the lines of force are relative to each other, the larger the force effect for a given energy input. The Lorentz force is a recognized phenomenon that works partially by the forces generated between drift velocities of charges.

The geometrical shape of the cell assembly **34**, by way of example, cylindrical, circular, square, and the like, is not as important as what is done with the shape to optimize the drift velocity of the charges or energy input. The segmentation of the cells **22** for the device **10** as herein described, allows for control of the field by the variation of the potential of the cells and plates themselves and its intensity between the cells and plates, which is accomplished by an electronic control.

Further, the routing of the wire **46** providing power lines to the respective plate **26** through the high dielectric material **36** serves the useful purpose of keeping arcing events to a minimum by distributing the energy over the plates and not at any one single wire point location. This prevents arcing at the leads and so maintains the needed power balance. Furthermore, the multi-port input to a plate **26**, as described earlier with reference to FIG. 12, and shared connection of input, as illustrated with reference again to FIGS. 9 and 12, by way of example, are used to more equally distribute the energy.

As earlier described with reference to FIG. 11, the dielectric material in the channel **42** is preferably of a relatively lower dielectric constant than the dielectric **36** on which the electrode **38** is placed to allow for a non-linear relationship to form between plates **26** and their respective electrodes. Further, there is a layer of dielectric material between the cells **22** created by the lower dielectric **40** of lower dielectric strength as for material in the channels **42**. This allows the desirable formation of the non-linearity in the field. The plates **26** can be arranged so that the channels **42** are aligned with the next set of plates as earlier described with reference to FIG. 11, or staggered to cause a larger non-linearity effect, as earlier described with reference to FIG. 14.

By the use of an electrical power source **52**, constant DC and preferably pulsing DC, will provide a useful force generated by the field propulsion device **10** of the present invention, herein described. Further, as earlier described with reference to FIG. 6, taking advantage of the initial power increase within an AC supply of power provides yet further thrust from the device **10**.

With reference again to FIG. 7, for an alternate embodiment of the device **10**, as herein described, it is expected that the teachings of the present invention will encourage use of a nose section **54** of the vehicle **14** to be segmented into sections as herein described for the device **10**. An vehicle inner wall **56** will be made into a RF or electromagnetic shield without disturbing the thrust generating effect. The overall structure of the vehicle **14**, like the cell **22**, is made of a dielectric material on which electrode are positioned and through which the power is routed. The vehicle **14** will contain a main machinery bay **58** for housing key components. The outside walls of the bay are made from a dielectric material. The bottom wall **60** of the vehicle will be formed as yet another electrode, with the result that vehicle structure includes electrodes and dielectrics to generate thrust by the use of the field propulsion phenomenon, herein described for the present invention. Such a vehicle can then operate in any dielectric environment such as air or the vacuum of space. The internal engine **12** earlier described can then be used in conjunction with or as separate propulsion systems.

The internal engine **14**, unlike the engine formed form the structure of the vehicle can generate thrust in any environment because it is shielded from the environment through which the vehicle **12** is traveling. As illustrated with reference again to FIG. 7, an hydraulic system **62** is one example of a means of vectoring the engine **12** side to side to maneuver the vehicle **12**. For the device **10** herein described with reference to FIG. 11, by way of example, generated a thrust in a direction as indicated by arrow **64**. In contrast, the vehicle skin propulsion can provide a thrust vector by charging a section of its skin at higher potential relative to the other sections and thus generate more thrust from that section than from others.

It is to be understood that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

That Which Is Claimed Is:

1. A device (10) for producing thrust by a preselected shaping of an electric field, the device (10) comprising:

a housing (18);

a core (28) carried by the housing (18), the core (28) and the housing (18) formed from a material having a high dielectric constant;

a cell (22) having a high dielectric (36) sandwiched between an electrode (38) and a lower dielectric (40), wherein a plurality of cells (22) are carried by the housing (18) and formed around the core (28);

a channel (42) formed between each cell (22), wherein the channel (42) is filled with a material having a dielectric property of the lower dielectric (40); and

electrical connection means (46) for connection between an electrical power source (52) and each electrode (38) of each cell (22) for providing power thereto.

2. The device (10) according to Claim 1, wherein the core (28) comprises a cylindrical shape having a longitudinal axis (24) extending along a direction (64) of thrust.

3. The device (10) according to Claim 2, wherein core (28) extends beyond a top surface (30) and a bottom surface (32) of a cell assembly (34) for providing a structural attachment to a vehicle (14) with which the device (10) is operable.

4. The device (10) according to Claim 1, wherein a first set of cells (22) extends radially from a longitudinal axis (24) to form a circular plate (26) with each cell (22) within the plate (26) uniformly positioned therein.

5. The device (10) according to Claim 1, wherein the electrical connection means comprise a wire (46) carried through the high dielectric (36) for connection with the electrode (38) at a generally central location thereof.

6. The device (10) according to Claim 5, wherein a plurality of wires (46) extends radially from cell (22) to adjoining cell (22) within the plate (26) for the connection to the electrical power source (52).

7. The device (10) according to Claim 1, further comprising a bridge conduit (44) extending between adjacent cells (22) within one plate (26) having the adjacent cells (22) therein, the bridge conduit (44) providing a wire path for connection of the electrodes (38) carried within the one plate (26), the bridge conduit (44) further formed from a dielectric material having the dielectric properties of the high dielectric (36) for the cell (22).

8. The device (10) according to Claim 1, further comprising an electrical power source (52) for providing a rapidly changing voltage and/or current to each of the electrodes (38) within each cell (22).

9. The device (10) according to Claim 8, wherein the electrical power source (52) is operably connected for providing opposing positive and negative voltage and/or current signals to adjacent plates (26).

10. A method for providing thrust to a vehicle (14) from the shaping of an electric field between electrodes (38) arranged within a cell assembly (34) including at least one cell (22) having positively charged and opposing negatively charged electrodes (38) with dielectric material (36, 40) carried therebetween, the method comprising the steps of:

forming a cell (22) from a high dielectric (36) sandwiched between an electrode (38) and a lower dielectric (40);

positioning a plurality of cells (22) around a core (28) to form a plate (26) extending radially outward therefrom, wherein the core (28) is formed from a material having a similar dielectric property as the high dielectric (40);

forming a channel (42) between each cell (22), wherein the channel (42) is filled with a material having a dielectric property of the lower dielectric (40);

positioning a plurality of plates (26) for providing a cell assembly (34) having a plurality of electrodes (38);

making an electrical connection (46) between an electrical power source (52) and each electrode (38) of each cell (22) for providing power thereto; and

providing power to each cell (22) with opposing charging of adjacent electrodes (38) for providing a preselected field path through the channel (42) and lower dielectric (40), and thus thrust to the vehicle (14) to which the cell assembly (34) is connected.

11. The method according to Claim 10, wherein the cell (22) forming step comprises the step of providing the high dielectric (36) with a larger thickness dimension than the lower dielectric (40) to further reduce chances of an electric field path therethrough.

12. The method according to Claim 10, further comprising the steps of:

providing a housing (18) formed from a material having a similar dielectric property as the core (28); and

carrying the cell assembly (34) and core (28) within the housing (18) for providing a self-contained device (10) used to provide thrust to the vehicle (14).

13. The method according to Claim 10, wherein the plate (26) stacking step comprises the steps of longitudinally stacking a plurality of plates (26) along an axis (24) of the core (28), which axis (24) is a longitudinal axis of a cylindrical shaped core (28).

14. The method according to Claim 13, wherein the core (28) extends beyond a top surface (30) and a bottom surface (32) of the cell assembly (34) for providing a structural attachment to the vehicle (14).

15. The method according to Claim 10, wherein a first set of cells (22) extends radially from a longitudinal axis (24) to form a circular plate (26) with each cell (22) within the plate (26) uniformly positioned therein.

16. The method according to Claim 10, wherein the power providing step comprises the step of extending a wire (46) through the high dielectric (36) for connection with the electrode (38) at a generally central location thereof.

17. The method according to Claim 16, wherein a plurality of wires (46) extends radially from the cell (22) to the adjoining cell (22) within the plate (26) for the connection to the electrical power source (52).

18. The method according to Claim 17, further comprising the steps of:

providing a bridge conduit (44) extending between neighboring cells (22) within one plate (26) having the neighboring cells (22) therein; and

extending the wire (46) through the bridge conduit (44) for providing a wire path for connection of the electrodes (38) carried within the one plate (26), wherein the bridge conduit (44) is formed from a dielectric material having the dielectric properties of the high dielectric (36) for the cell (22).

19. The method according to Claim 10, wherein the power providing step includes the step of providing a rapid power change to the electrodes (38) for enhancing the thrust.

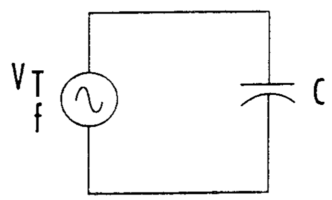

FIG. 1.

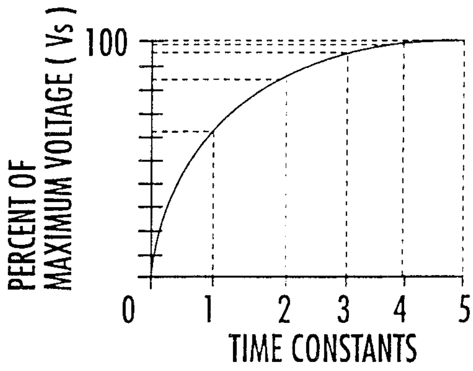

FIG. 2.

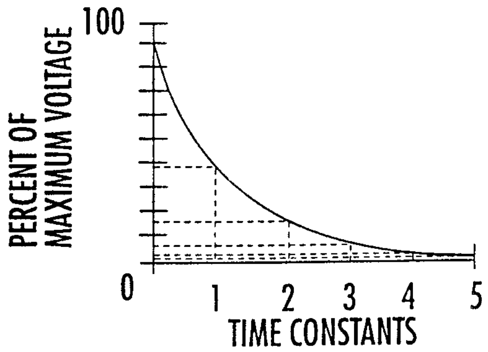

FIG. 3.

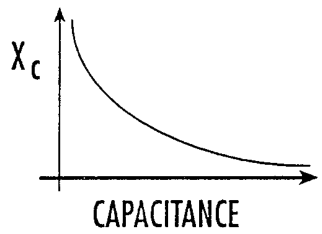

FIG. 4.

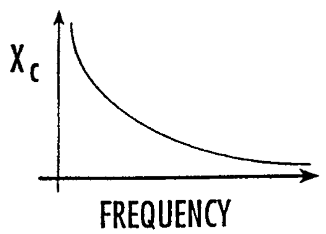

FIG. 5.

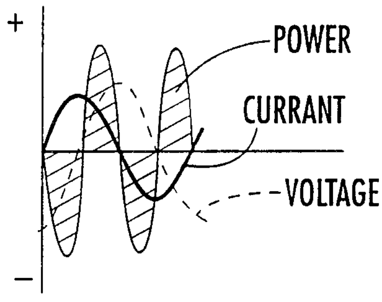

FIG. 6.

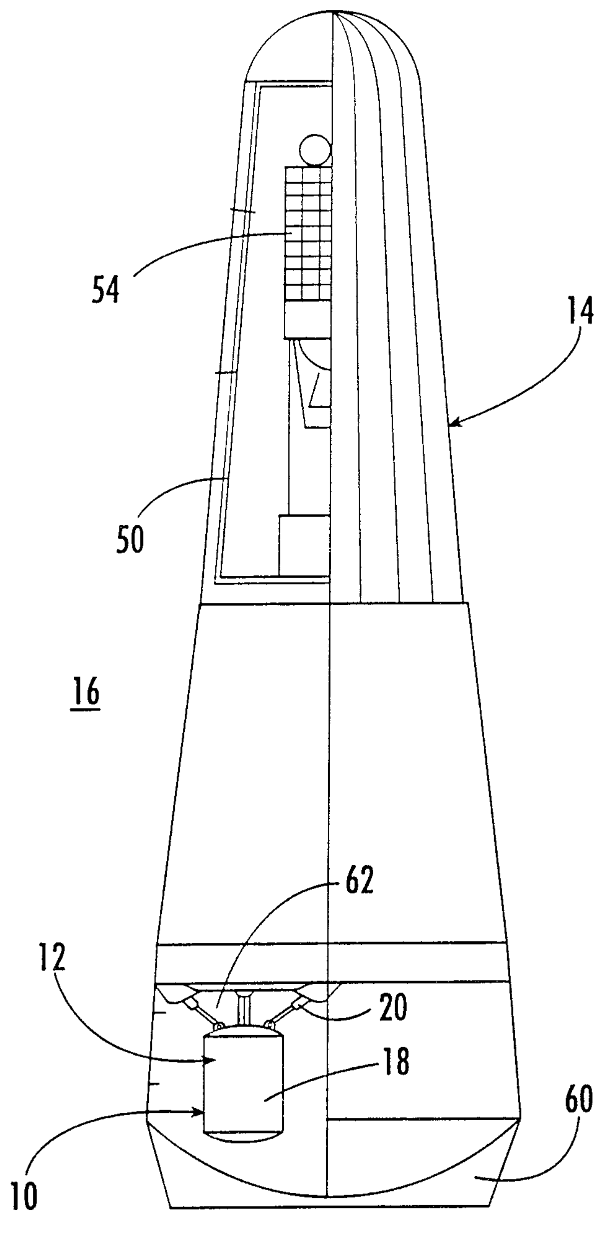

FIG. 7.

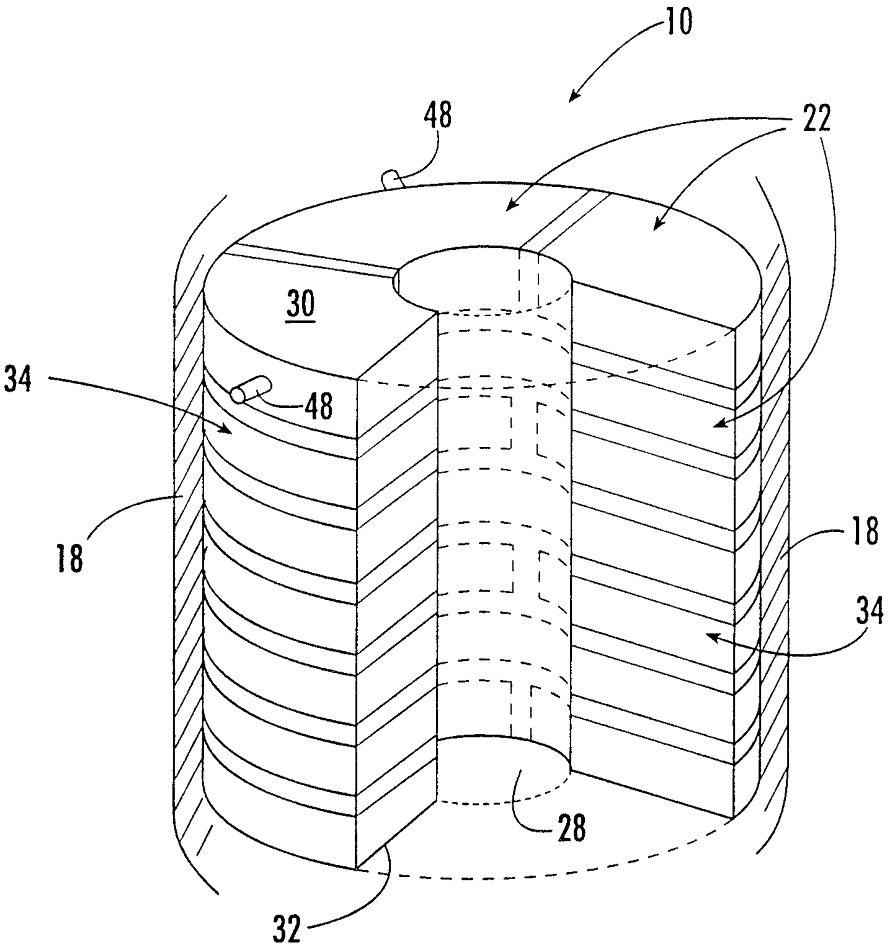

FIG. 8.

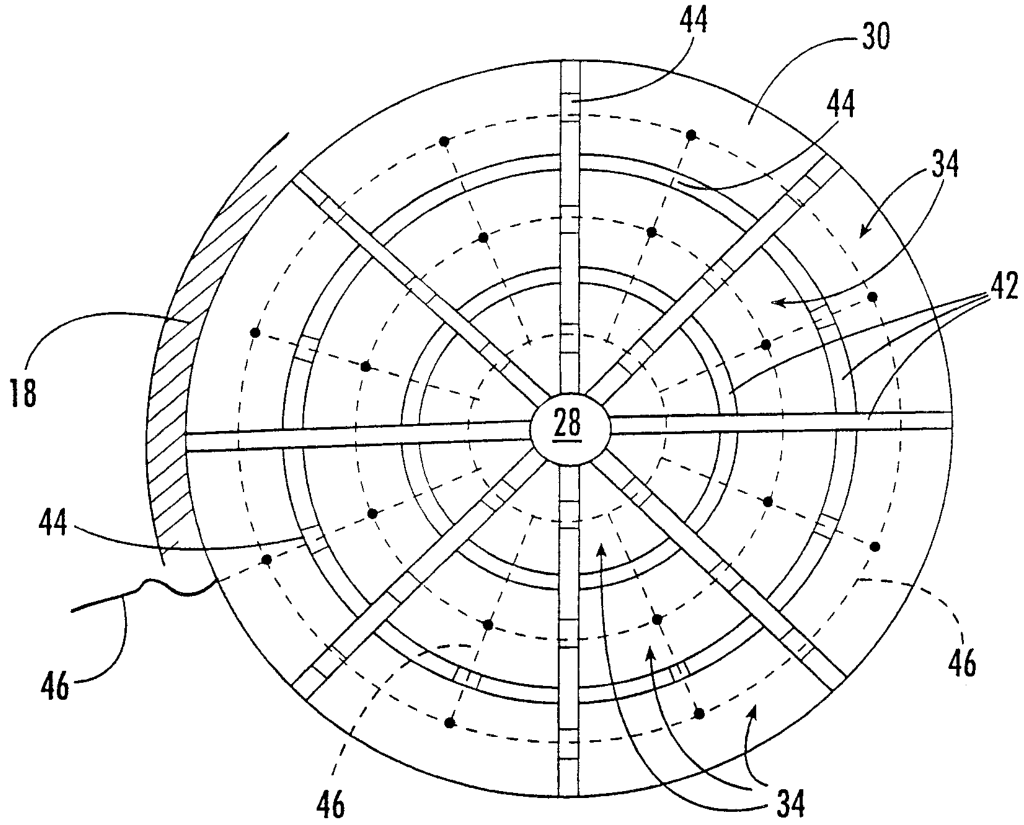

FIG. 9.

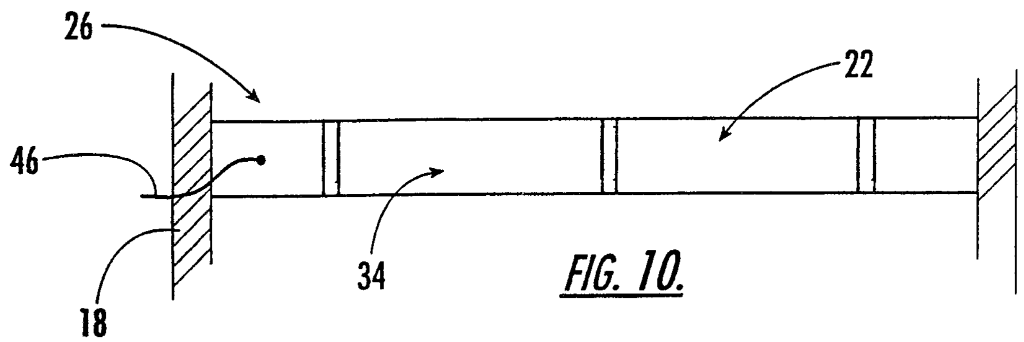

FIG. 10.

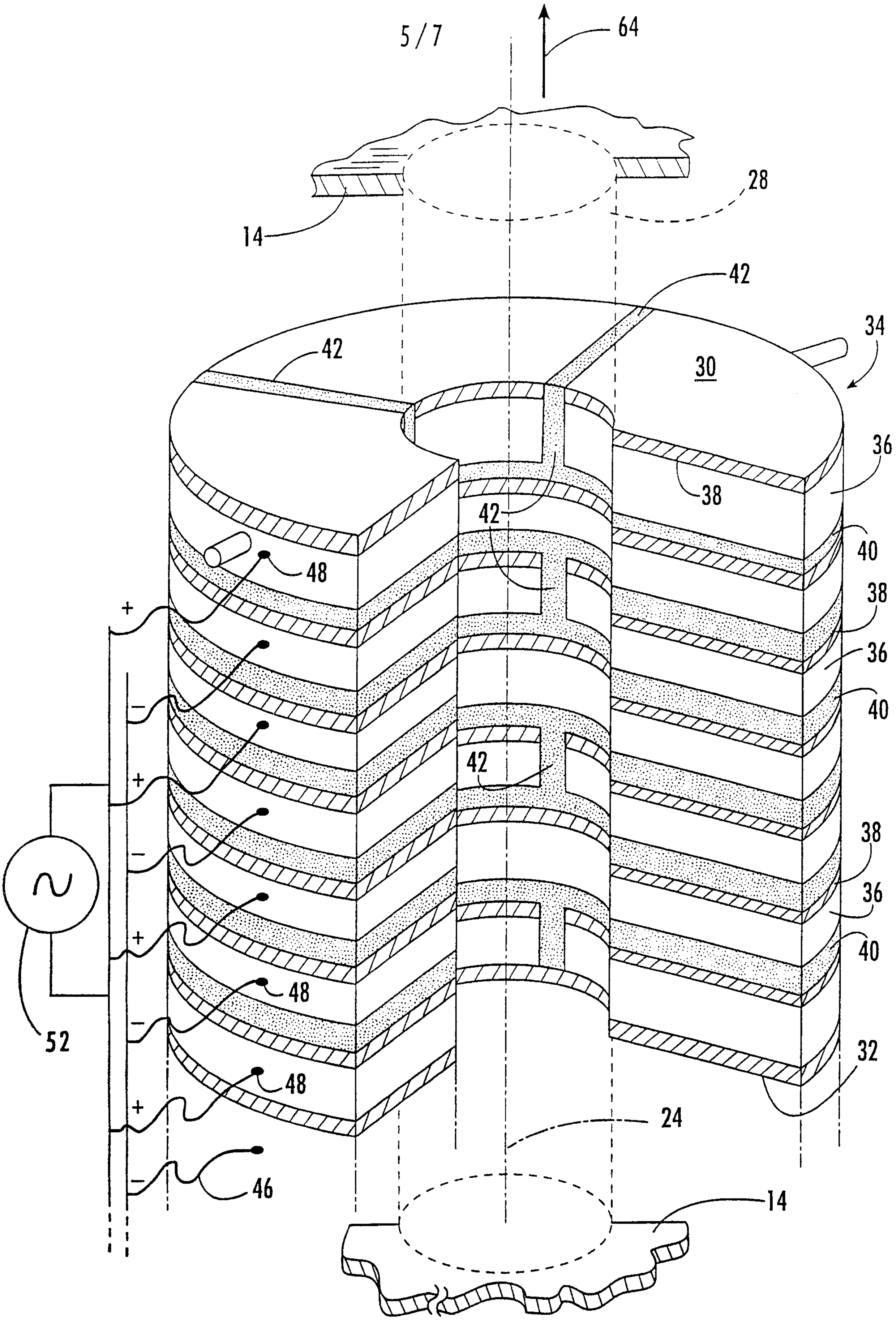
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FIG. 11.

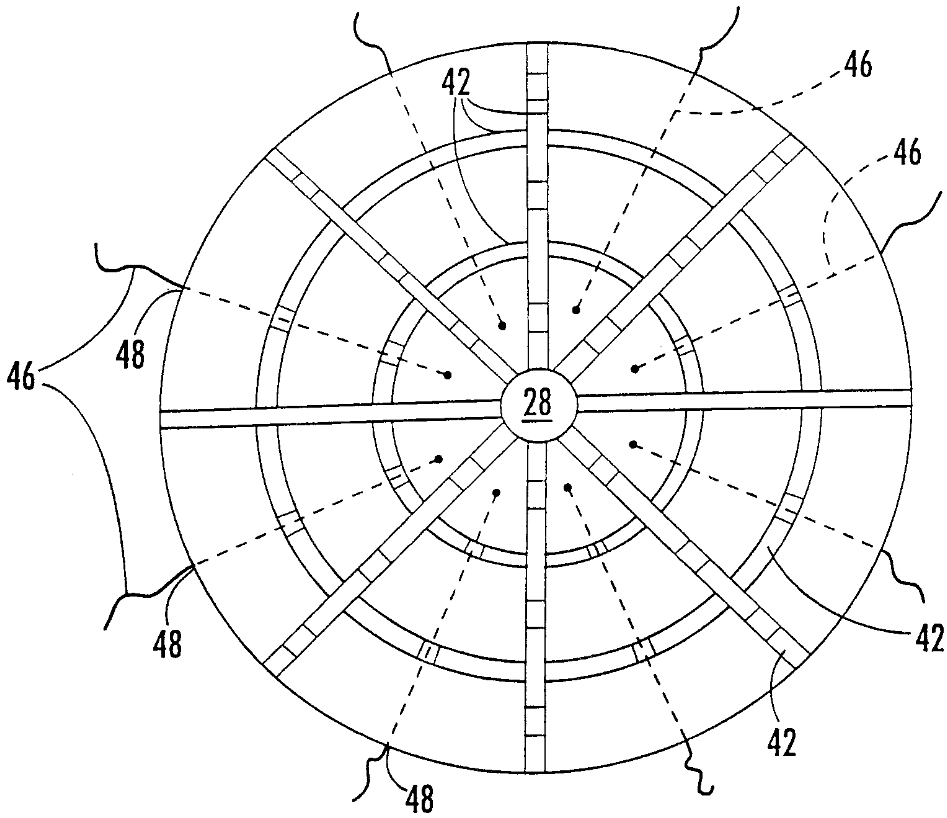

FIG. 12.

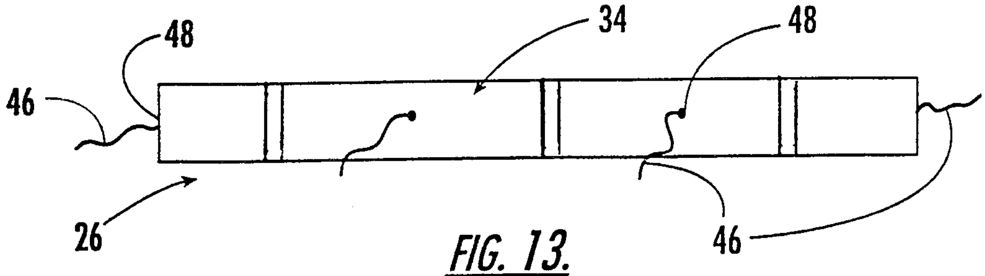

FIG. 13.

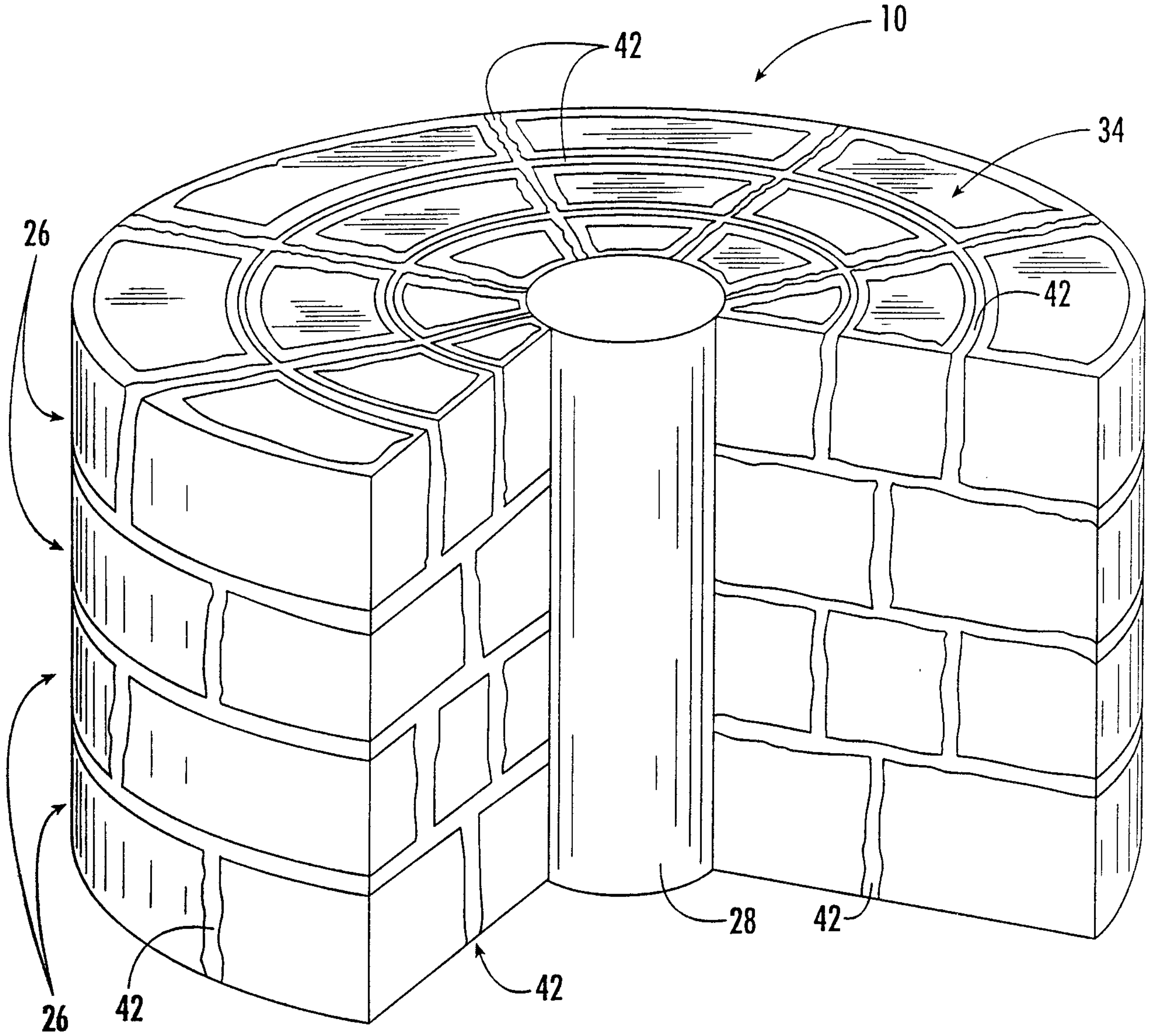

FIG. 14.