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(54) **Titre : SYSTEME DE GESTION D'ENERGIE POUR VEHICULE A BATTERIE ET SON PROCEDE DE FONCTIONNEMENT**
(54) **Title: A POWER MANAGEMENT SYSTEM FOR A BATTERY-OPERATED VEHICLE AND A METHOD OF OPERATING THE SAME**

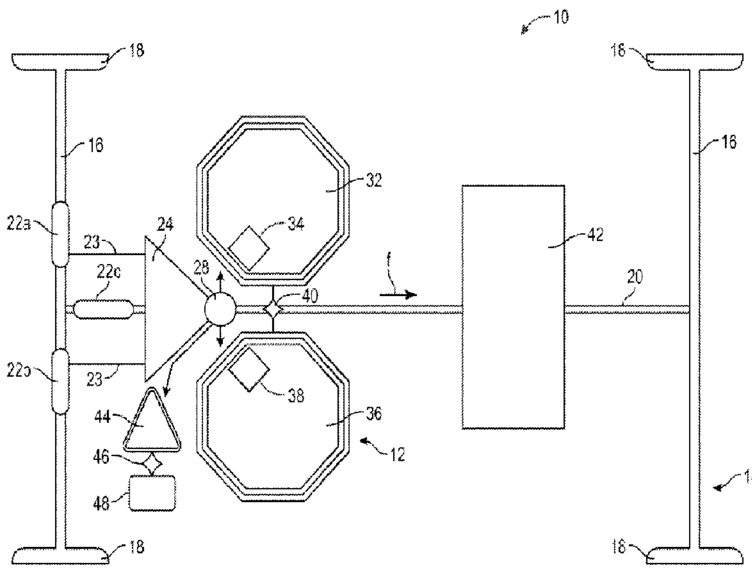

FIG. 1

(57) **Abrégé/Abstract:**
Power management system for battery-operated vehicle including electric motor, and kinetic energy devices for capturing kinetic friction energy produced by moving parts in the vehicle. Central direct current (DC) supercharge component (CDCSC) converts kinetic friction energy into an electric current. The CDCSC connects to a current toggle that directs electric current to battery packs i.e., a first battery pack and second battery pack for powering the electric motor. The current toggle directs electric current to battery packs to recharge/ store power. The power management system governs power output from the battery packs, manages depletion/efficiency of the battery packs, and includes a parallel port that directs outgoing power feeds from the battery packs to the electric motor. The electric motor connects to a drive shaft of the vehicle. The power management system includes an additional battery pack that stores excess kinetic friction energy captured for external transfer.

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A POWER MANAGEMENT SYSTEM FOR A BATTERY-OPERATED VEHICLE AND A METHOD OF OPERATING THE SAME

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims benefit to the following provisional and non-provisional application, which is here expressly incorporated herein by reference:

[0002] U.S. Provisional Patent Application Ser. No. 63/196,740, filed June 04, 2021, with Attorney Docket no. MMIL001USP, and titled **"POWER MANAGEMENT SYSTEM FOR A BATTERY-OPERATED VEHICLE AND A METHOD OF OPERATING THE SAME."**

FIELD OF INVENTION

[0003] The present subject matter generally relates to a power management system for a battery-operated vehicle. More specifically, the present subject matter relates to a power generation, recharge and management system that provides an uninterrupted power supply loop for operating a battery-operated vehicle for a longer time and distance without the need for external plug-in recharging needs.

BACKGROUND OF INVENTION

[0004] It is known that an electric vehicle (or EV vehicle), also referred as a battery-operated vehicle, uses one or more electric motors for propulsion of the vehicle. The electric motors are generally powered by rechargeable batteries on-board the vehicle. Typically, a driver of the electric vehicle recharges the batteries of the vehicle by connecting the vehicle to a charging station that transfers electric energy to the vehicle. The distance the electric vehicle can be driven on a single charge depends on type of batteries used, the weight of the vehicle, among other things.

[0005] Some electric vehicles have a limited range and only be driven a limited distance (e.g., between 100 to 250 miles) due to the low amount of energy that can be stored in the rechargeable batteries. Once the batteries are discharged, they must be recharged before the electric vehicle can be used again. Typically, it takes considerable time e.g., up to 3 to 6 hours to charge the battery, which depends on the type of batteries.

[0006] Several techniques have been disclosed in the past to charge the batteries of an electric vehicle. One such example is disclosed in a United States granted patent No. 7602140, entitled,

CA 03220704 2023-11-28

"**Apparatus for supplying power for a vehicle**" ("the '140 Patent"). The '140 Patent discloses an apparatus for supplying power for a vehicle includes a first battery, a second battery, a switching device, a monitoring device and a control device. The first battery is electrically connected to load devices which are mounted on the vehicle. The second battery serves as a backup power source. The switching device switches the first and second batteries. The monitoring device monitors remaining capacity for each of the first and second batteries. When the control device determines that the remaining capacity of the second battery is less than the remaining capacity of the first battery based on information monitored by the monitoring device, the control device controls the switching device so as to conduct switching of the first and second batteries.

[0007] Another example is disclosed in a United States granted patent No. 8639406, entitled **"Switch controlled battery charging and powering system for electric vehicles"** ("the '406 Patent"). The '406 Patent provides methods and apparatuses for operating an electric vehicle using switch controlled battery charging and powering systems. The apparatuses and methods disclosed herein include a first and second battery pack that are alternatively recharged multiple times and alternatively power the electric motor using a first and second switch. In some implementations, the battery packs are charged using a generator operatively connected to a wheel axle or the shaft of the vehicle's motor.

[0008] Another example is disclosed in a PCT Publication No. 2016081988, entitled **"Power management for an electric vehicle"** ("the '988 Publication"). The '988 Publication discloses a power system for an electric vehicle. An electric motor is arranged to provide driving mechanical output for moving the vehicle. An electric generator is arranged to convert mechanical energy, due to movement of the vehicle, into electrical energy. The system includes a first and a second rechargeable electrical power storage device, which are electrically isolated from one another. A controller is arranged to selectively connect one of the first and second rechargeable electrical power storage device with the electric motor in order to power the motor, and selectively connect the other of the first and second electrical power storage device with the generator to receive charging.

[0009] Another example is disclosed in a United States granted patent No. 9610848, entitled **"On-board charging system and control method thereof"** ("the '848 Patent"). The '848 Patent discloses an on-board charging system in which a main battery is charged with generated power by a solar cell after the generated power is stepped up in a voltage by a step-up converter includes a step-up ratio calculating portion configured to calculate a step-up ratio when stepping up the voltage with the step-up converter. The auxiliary battery is set as a charging target battery if it is determined that the calculated step-up ratio is equal to or greater than the determination threshold value, and the main battery is set as the charging target battery if it is not determined that the calculated step-up ratio is equal to or greater than the determination threshold value.

[0010] Another example is disclosed in a United States granted patent No. 7486034, entitled **"Power supply device for vehicle and method of controlling the same"** ("the '034 Patent"). The '034 Patent discloses a power supply device for a vehicle includes a battery serving as a first electric storage device, a battery serving as a second electric storage device, a motor generator driving a wheel, a selection switch selecting one of the first and second electric storage devices and connecting the selected electric storage device to the motor generator, and a control device controlling switching of the selection switch in accordance with a state of charge of each of the first and second electric storage devices. In the case where the selection switch selects the first electric storage device, when charging is performed and the state of charge of the first electric storage device becomes higher than a first prescribed level, the control device instructs the selection switch to select the second electric storage device.

[0011] Although the above-discussed disclosures provides power supply systems for operating the electric vehicle, they have several problems. For example, the electric vehicles have the problem of range uncertainty or range limitation. As such, in particular given real ranges below 250 miles, meaningful long-distance operation is not possible as they still require repeated recharging.

[0012] Therefore, there is a need for a power management system that provides an uninterrupted power supply loop for operating a battery-operated vehicle or an electric vehicle for a longer time and distance without the need for external plug-in recharging needs.

SUMMARY

[0013] It is an object of the present subject matter to provide a power management system that provides an uninterrupted power supply loop for operating a battery-operated vehicle or an

CA 03220704 2023-11-28

electric vehicle for a longer time and distance without the need for external plug-in recharging needs and that avoids the drawback of known techniques.

[0014] It is another object of the present subject matter to provide a power management system for electric vehicles (EVs), capable of delivering a constant, renewable, uninterrupted power supply, and an increase by an order of magnitude (10x plus) in both operational range and operational time to EVs and similar mechanically powered machinery and industrial systems, without the need for external plug-in recharging needs.

[0015] It is another object of the present subject matter to provide a power management system that operates as a power generation and management system and provides an uninterrupted power supply loop to operate a battery-operated vehicle for longer duration of time and/or distance.

[0016] It is another object of the present subject matter to provide a power management system that uses less energy, and delivers more efficient operational function.

[0017] In order to achieve one or more objects, the present subject matter provides a power management system for a battery-operated vehicle (or simply vehicle). The power management system includes an electric motor. The electric motor connects to a drive shaft of the vehicle. The vehicle moves resulting in movement of moving parts in the vehicle. The moving parts include, but not limited to, an axle, a drive shaft, wheels, braking, sensors, axle friction recharge, wheel rotation friction recharge, brake pad friction, exterior vehicle/mechanism friction capture, wind/water (hull friction, wake, etc.), and solar surface on vehicle, etc. The power management system includes kinetic energy devices that connect on, near, and/or around the moving parts of the vehicle. The kinetic energy devices capture kinetic friction energy produced by the moving parts. A central direct current (DC) supercharge component (CDCSC) converts the kinetic friction energy into an electric current (DC electric current). The CDCSC connects to a current toggle that directs the electric current to two distinct and identical battery packs i.e., a first battery pack and a second battery pack that power the electric motor. Here, whichever battery that actively powers the electric motor at any given point of time in operation is referred as a primary battery power source (or primary battery source) and the other battery is referred as a secondary battery power source (which then becomes the primary battery source when the charge in other battery pack depletes). The current toggle engages the battery packs i.e., the primary battery source providing power to the electric motor, and the secondary battery source which is recharged constantly by the return flow of kinetic energy created by the primary battery operation. The primary battery powers the electric motor, which in turn creates distinct kinetic friction energy through the movement of moving parts. These moving parts are encased or in contact with the kinetic capture devices.

[0018] When the primary battery source reaches a predefined depletion point (predefined threshold level) and requires recharging, the current toggle switches/swaps functions of the distinct battery packs, routing the electric flow to recharge the primary battery source, and enables the second battery pack to become the primary battery source to the electric motor. Each of the first battery pack and the second battery packs includes a distinct power output flow governor and flow routing hardware and software, maximizing the operational efficiency of the charge, recharge and store mechanism. This constant power, constant kinetic capture, constant DC supercharge and recharge loop enables to conserve energy.

[0019] As an added power efficiency value, if the secondary battery source (in charging position) attains full charge from the kinetic charge devices feed while the primary battery source is still operational and not depleted, then the residual electric charge generated from the kinetic charge devices (charge that is not immediately needed for recharge of the secondary battery source, referred to as the "overflow charge" or "rollover charge"), is directed to a third distinct module, i.e., a third battery pack. The third battery pack is a distinct power collection hardware source or battery pack that accepts and stores the overflow charge, allowing transfer of stored electric charge to the third battery pack when the vehicle or power management system is not in use.

[0020] In one advantageous feature of the present subject matter, the power management system governs power output from batteries, manages battery/source depletion and efficiency. The power management system presents a parallel port that connects to the battery packs. The parallel port directs primary of multiple outgoing power feeds from battery packs to the electric motor.

[0021] In one advantageous feature of the present subject matter, the power management system eliminates the need for multiple generators, multiple transformers, and multiple motors. Further, the power management system stores excess kinetic energy captured in a distinct battery source (third battery pack) for external transfer/use. In addition, the power management system allows for multiple additional sensor capture components to deliver charge to the battery packs.

[0022] In addition, under normal operating conditions, the presently disclosed power management system allows the battery-powered electric vehicle to have nearly unlimited range of travel (distance) - without interruption, or need for time consuming stops for "plugging in" for recharging.

[0023] Features and advantages of the subject matter hereof will become more apparent in light of the following detailed description of selected embodiments, as illustrated in the accompanying **FIGUREs**. As will be realised, the subject matter disclosed is capable of modifications in various respects, all without departing from the scope of the subject matter. Accordingly, the drawings and the description are to be regarded as illustrative in nature.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Further features and advantages of the present subject matter will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

[0025] **FIGURE 1** illustrates an environment in which a power management system implements in a vehicle, in accordance with one embodiment of the present subject matter;

[0026] **FIGUREs 2** to **4** show one or more kinetic capture devices connecting over the length of axle and/or drive shaft, in accordance with exemplary embodiments of the present subject matter;

[0027] **FIGURE 5** illustrates a block diagram of power management system;

[0028] **FIGUREs 6A** and **6B** illustrate a perspective view and a top view of a battery, respectively in accordance with one embodiment of the subject matter;

[0029] **FIGURE** 7 illustrates a top view of battery **110,** in accordance with another embodiment of the subject matter; and

[0030] **FIGURE 8** illustrates the operation of the power management system, in accordance with one embodiment of the subject matter.

[0031] It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0032] Before the present features and working principle of a power management system for a battery-operated vehicle is described, it is to be understood that this subject matter is not limited to the particular system as described, since it may vary within the specification indicated. Various features of a power management system for a battery-operated vehicle might be provided by introducing variations within the components/subcomponents disclosed herein. It is also to be understood that the terminology used in the description is for the purpose of describing the particular versions or embodiments only, and is not intended to limit the scope of the present subject matter, which will be limited only by the appended claims. The words "comprising," "having," "containing," and "including," and other forms thereof, are intended to be equivalent in meaning and be open-ended in that an item or items following any one of these words is not meant to be an exhaustive listing of such item or items, or meant to be limited to only the listed item or items.

[0033] It should be understood that the present subject matter describes a power management system for battery-operated vehicle. The power management system includes an electric motor. The electric motor connects to a drive shaft of the vehicle. The vehicle moves resulting in movement of moving parts in the vehicle. The power management system includes kinetic energy devices for capturing kinetic friction energy produced by the moving parts. A central direct current (DC) supercharge component (CDCSC) converts the kinetic friction energy into an electric current. The CDCSC connects to a current toggle that directs the electric current to battery packs i.e., a first battery pack and a second battery pack for powering the electric motor. The current toggle directs the electric current to the battery packs to recharge or store power. The power management system governs power output from the battery packs, manages depletion and efficiency of the battery packs. The power management system includes a parallel port that directs outgoing power feeds from the battery packs to the electric motor. The electric motor connects to a drive shaft of the vehicle. The power management system includes an additional battery pack that stores excess kinetic friction energy captured for external transfer.

[0034] Various features and embodiments of the power management system for a battery-operated vehicle are explained in conjunction with the description of **FIGUREs 1-8**.

[0035] The present subject matter discloses a power management system for a battery-operated vehicle. **FIGURE 1** shows environment **10** in which power management system **12** implements in vehicle **14,** in accordance with one embodiment of the present subject matter. The term “vehicle” as used herein refers to either an all-electric vehicle, also referred to as an EV, or a battery-operated vehicle, plug-in hybrid vehicles, also referred to as a PHEV, or a hybrid vehicle

(HEV), a hybrid vehicle utilizing multiple propulsion sources one of which is an electric drive system. Here, vehicle **14** includes a motor cycle, car, truck, boat, train or any other vehicle that operates on energy stored in a battery.

[0036] The present description is explained considering that vehicle **14** is a car. However, a person skilled in the art understands other vehicles **12** as presented above may also implement the presently disclosed power management system **12** for operating vehicle **14.** Vehicle **14** encompasses axle **16** connecting wheels **18,** say at the front and rear of vehicle **14.** Axle **16** connects to drive shaft or power train **20** that controls movement of vehicle **14.** In accordance with one embodiment of the present subject matter, power management system **12** includes one or more kinetic capture devices such as first kinetic capture device **22a,** second kinetic capture device **22b** and third kinetic capture device **22c,** collectively referred as kinetic capture devices **22. FIGURE 1** shows first kinetic capture device **22a** and second kinetic capture device **22b** connecting to axle **16,** and third kinetic capture device **22c** to drive shaft **20.** However, a person skilled in the art understands kinetic capture devices **22** connect in any number depending on the moving parts present in vehicle **14.** A person skilled in the art understands **FIGURE 2** illustrates axle **16** containing multiple smaller kinetic capture devices **22** of smaller configuration. Further, **FIGUREs 3** and **4** illustrate a single elongated kinetic capture device **22** that extends substantial or entire length of axle **16. FIGUREs 2, 3** and **4** show one or more kinetic capture devices **22** connect over the length of axle **16.** A person skilled in the art understands that one or more kinetic capture devices **22** connect over the length of drive shaft **20** without departing from the scope of the present subject matter.

[0037] Now referring to **FIGUREs 1** and **5**, working of power management system **12** in vehicle **14** is explained. As specified above, **FIGURE 1** shows environment **10** in which power management system **12** implements in vehicle **14. FIGURE 5** shows a block diagram of power management system **12,** in accordance with one embodiment of the present subject matter. As specified above, power management system **12** includes kinetic capture devices **22.** Kinetic capture devices **22** connect to axle **16** and/or drive shaft **20.** Kinetic capture devices **22** connect on, near, and/or around axle **16** and/or drive shaft **20** in a variety of patterns. Each of kinetic capture devices **22** captures kinetic friction energy from movement of moving parts in vehicle 14. In one example, kinetic capture devices **22** captures kinetic friction energy from axle **16,** drive shaft **20,** braking, sensors, axle friction recharge, wheel rotation friction recharge, brake pad friction, exterior vehicle/mechanism friction capture, wind/water (hull friction, wake, etc.), solar surface on vehicle **14,** etc. Each of kinetic capture devices **22** captures the kinetic friction energy produced by movement of moving parts in vehicle **14**, and transfers the kinetic friction energy via flow transfer cable(s) **23** to central direct current (DC) supercharge component **24,** hereinafter referred as CDCSC **24.** In one implementation, one or more kinetic capture devices **22** attach to axle **16** and/or drive shaft **20,** each kinetic capture device **22** delivering a single or multiple distinct electric charge(s) to CDCSC **24** via flow transfer cable **23,** as shown in **FIGURE 2**, for example. **FIGURE 2** shows an exemplary embodiment in which axle **16** including seven kinetic capture devices **22** i.e., first kinetic capture device **22a,** second kinetic capture device **22b,** third kinetic capture device **22c,** fourth kinetic capture device **22d,** fifth kinetic capture device **22e,** sixth kinetic capture device **22f** and seventh kinetic capture device **22g.** A person skilled in the art understands that the number of flow transfer cables **23** used for transferring the kinetic friction energy produced by kinetic capture devices **22** to CDCSC **24** changes depending on the need and/or pattern of kinetic capture devices **22** placed over axle **16** and/or drive shaft **20**.

[0038] In another implementation, axle **16** and/or drive shaft **20** surrounds or contains entirely or substantially by a single kinetic capture device **22a. FIGURE 3** shows an exemplary embodiment in which a single kinetic capture device **22** connecting along the substantial length of axle **16.** Additionally, kinetic capture device **22** connect along the substantial length of drive shaft **20.** Here, kinetic capture device **22a** engages axle **16** and/or drive shaft **20** directly or fully. Kinetic capture device **22a** employs a single or multiple distinct reporting and delivering electric charge(s) to CDCSC **24** via flow transfer cable **23,** as shown in **FIGURE 3**, for example.

[0039] In another implementation, axle **16** and/or drive shaft **20** come precast (manufactured together with or fully integrated) with kinetic capture device **22a. FIGURE 4** shows an exemplary embodiment in which a single kinetic capture devices **22** extends over the entire length of axle **16.** Optionally, kinetic capture device **22** extend over the entire length of drive shaft **20.** Here, kinetic capture device **22a** engages axle **16** and/or drive shaft **20** directly and/or fully. Kinetic capture device **22a** employs a single or multiple distinct reporting and delivering electric charge(s) to CDCSC **24** via flow transfer cable **23,** as shown in **FIGURE 4**, for example.

[0040] Upon receiving the kinetic friction energy captured by kinetic capture devices **22,** CDCSC **24** converts the kinetic friction energy captured to a DC electric current. Subsequently, CDCSC **24** directs the DC electric current to battery packs i.e., first battery pack **32** and second battery pack **36** via current toggle **28.** The DC electric current is used for charging or recharging first battery pack **32** and second battery pack **36.** Current toggle **28** directs the DC electric current to traffick and provide constant recharging one of first battery pack **32** and second battery pack **36.** In one example, current toggle **28** includes controller **30.** Controller **30** simultaneously switches the flow of incoming DC current to one of first battery pack **32** and second battery pack **36**, as it immediately begins recharging for later toggle back. Controller **30** includes a software/hardware module that stores charge levels of first battery pack **32** and second battery pack **36.** Further, controller **30** maintains and records the depletion point or predefined threshold levels of charge to switch charging of first battery pack **32** and second battery pack **36** by current toggle **28.** In addition, current toggle **28** directs the incoming DC electric charge to third battery back **44** when first battery pack **32** and second battery pack **36** are fully charged or when a rollover option is engaged. The rollover charge indicates a charge that is not immediately needed for recharge of the secondary battery source. In other words, when the secondary battery source (in charging position) attains full charge from the kinetic charge devices feed while the primary battery source is still operational and not depleted, then the residual electric charge generated from the kinetic charge devices is referred as overflow charge" or "rollover charge". In one implementation, current toggle **28** monitors charge, output levels, switchover needs of first battery pack **32** and second battery pack **36** and functional reports of axle **16** and drive shaft **20.**

[0041] In one implementation, CDCSC **24** connects to Thermophotovoltaics (TPV) heat sensors **26**. TPV heat sensors **26** includes one or more heat management and transference sensors that surround battery packs i.e., first battery pack **32** and second battery pack **36.** TPV heat sensors **26** act as heat contact sensors. TPV heat sensors **26** capture the heat produced from first battery pack **32** and second battery pack **36** and create a distinct DC electric current (current charge). The distinct DC electric current is then directed to and fed into CDCSC **24 (FIGURE 5).** In accordance with one embodiment of the present subject matter, TPV heat sensors **26** provide additional sourcing of electric current generated (in addition to kinetic friction energy created by kinetic capture devices **22**) in power management system **12.** As such, TPV heat sensors **26** serve as an additional recharge power and heat management system for battery packs i.e., first battery pack **32** and second battery pack **36**.

[0042] In another implementation, CDCSC **24** connects to additional sensors. Additional sensors, include, but not limited to, including solar, wind flow drag over vehicle surfaces, water flow (hydro drag) over hull, compression, additional friction, etc.

[0043] As can be seen from **FIGUREs 1** and **5**, current toggle **28** connects to battery packs i.e., first battery pack **32** and second battery pack **36** to direct and control the flow of DC electric current for charging them. First battery pack **32** and second battery pack **36** are identical but distinct battery packs. The term “battery pack” as used herein refers to multiple individual batteries contained within a single piece or multi-piece housing, the individual batteries electrically interconnected to achieve the desired voltage and capacity for a particular application. The terms, “battery”, “cell”, and “battery cell” may be used interchangeably and may refer to any of a variety of different cell types, chemistries and configurations including, but not limited to, lithium ion (e.g., lithium iron phosphate, lithium cobalt oxide, other lithium metal oxides, etc.), lithium ion polymer, nickel metal hydride, nickel cadmium, nickel hydrogen, lithium-nickel-cobalt-aluminium, lithium-nickel-manganese-cobalt, nickel zinc, silver zinc, or other battery type/configuration.

[0044] Here, each of first battery pack **32** and second battery pack **36** includes a non-metal-air battery pack or metal-air battery pack, depending on the need. Given the high energy density and the large capacity-to-weight ratio offered by metal-air cells, they are well suited for use in vehicle **14**. Due to their limited power density, however, their use is most appropriate when combined with a more conventional power source, such as a lithium ion battery pack. As used herein, metal-air batteries refer to any cell that utilizes oxygen as one of the electrodes and metal (e.g., zinc, aluminium, magnesium, iron, lithium, vanadium, etc.) in the construction of the other electrode. Battery pack that utilizes non-metal-air cells provide high power density, thus providing a combined power source that achieves an optimal combination of energy and power. Exemplary batteries that use non-metal-air cells include, but are not limited to, lithium ion (e.g., lithium iron phosphate, lithium cobalt oxide, other lithium metal oxides, etc.), lithium ion polymer, nickel metal hydride, nickel cadmium, nickel hydrogen, nickel zinc, silver zinc, etc.

[0045] First battery pack **32** includes first power output flow governor **34.** First power output flow governor **34** indicates a software and/or hardware module that installs on the output flow of first battery pack **32** and communicatively connects to current toggle **28.** First power output flow governor **34** maintains a power output ceiling for first power output flow governor **34** when one of first battery pack **32** and second battery pack **36** acts as a primary battery source for providing operating power to electric motor **42.** First power output flow governor **34** manages battery power to effectively reach maximum, nearly unlimited EV range and uninterrupted operational time which is critical to maximizing operational performance of power management system **12** and/or vehicle **14.** First power output flow governor **34** ensures the battery power usage is sufficient to deliver the maximum power to electric motor **42** for the longest timeframe, thus enabling charging of second battery pack **36** to gain full recharge time. First power output flow governor **34** operates to ensure vehicle **14** still maintains plenty of acceleration capacity and torque to achieve normal speed and operational needs for the user of vehicle **14.** In addition, first power output flow governor **34** maintains efficient power flow so as not to drain the battery power supply.

[0046] Similarly, second battery pack **36** includes second power output flow governor **38.** Second power output flow governor **38** indicates a software and/or hardware module that installs on the output flow of second battery pack **36** and communicatively connects to current toggle **28.** Second power output flow governor **38** maintains a power output ceiling for second power output flow governor **38** when one of first battery pack **32** and second battery pack **36** acts as a primary battery source for providing operating power to electric motor **42.** Second power output flow governor **38** manages battery power to effectively reach maximum, nearly unlimited EV range and uninterrupted operational time which is critical to maximizing operational performance of power management system **12** and/or vehicle **14.** Second power output flow governor **38** ensures the battery power usage is sufficient to deliver the maximum power to electric motor **42** for the longest timeframe, thus enabling charging of first battery pack **32** to gain full recharge time. Second power output flow governor **38** operates to ensure vehicle **14** still maintains plenty of acceleration capacity and torque to achieve normal speed and operational needs for the user of vehicle **14.** In addition, second power output flow governor **38** maintains efficient power flow so as not to drain the battery power supply.

[0047] Each of first battery pack **32** and second battery pack **36** connects to parallel port **40** that directs/delivers the power output from one of first battery pack **32** and second battery pack **36** to electric motor **42.** In accordance with the present subject matter, parallel port **40** acts as an adapter, which controls and defines current flow to electric motor **42** from one of first battery pack **32** and second battery pack **36** to power electric motor **42**. In other words, parallel port **40**

connects to both first battery pack **32** and second battery pack **36,** and receives and directs power output from whichever battery pack is acting as a primary battery source to operate electric motor **42.** Power output from one of first battery pack **32** and second battery pack **36** delivers to parallel port **40**, which in turn toggles drive shaft **20**, directing flow **f (FIGURE 1)** from appropriate battery to electric motor **42.**

[0048] In accordance with one embodiment of the present subject matter, the battery pack powering electric motor **42** is referred as a primary battery source and the battery that is getting recharged while the other battery pack is powering electric motor **42** is referred as a secondary battery source. In other words, current toggle **28** engages two distinct but identical battery packs first battery pack **32** and second battery pack **36.** The battery pack i.e., the primary battery source (say first battery pack **32)** provides power to electric motor **42**, and the secondary battery source (say second battery pack **36)** gets recharged constantly by the return flow of kinetic energy created by the operation (output power) of the primary battery source. The primary battery source powers electric motor **42**, which in turn creates distinct kinetic friction energy through the movement of mechanical/moving parts that gets captured by kinetic capture devices **22** thereby creating a loop for operating one of the battery packs for powering electric motor **42**. A person skilled in the art understands that the presently disclosed power management system utilizes the kinetic energy, which otherwise gets lost from the movement of the moving parts in vehicle **14,** and converts the kinetic energy to electric current for recharging the battery packs that power electric motor **42** whenever vehicle **14** is in motion.

[0049] Assuming that first battery pack **32** is fully charged and powering electric motor **42** from the charge stored therein, then first battery pack **32** becomes the primary battery source and second battery pack **36** becomes the secondary battery source as it gets charged until power in first battery pack **32** depletes to a pre-defined threshold level. Considering the above scenario, current toggle **28** directs the DC electric current to second battery pack **36** to recharge second battery pack **36** until the charge reaches 100% in second battery pack **36** or power in first battery pack **32** reaches near or below the pre-defined threshold level. If charge in second battery pack **36** reaches 100% while first battery pack **32** (acting as primary battery source) powers electric motor **42,** then second power output flow governor **38** communicates to current toggle **28** such that current toggle **28** directs the DC electric current to third battery pack **44.** Further, if charge in first battery pack **32** reaches near or below the pre-defined threshold level, then second power output flow governor **38** communicates to current toggle **28** such that current toggle **28** notifies parallel port **40** to change the battery output flow from first battery pack **32** to second battery pack **36,** thus making second battery pack **36** the primary battery source and allowing first battery pack **32** to get charged and act as the secondary battery source.

[0050] After notifying, parallel port **40** allows and directs power output from second battery pack **36** to electric motor **42** to operate drive shaft **20** and thereby vehicle **14.** Concurrently, current toggle **28** switches (as a return flow system) the flow of the DC electric current to charge first battery pack **32.** The above process repeats when first battery pack **32** charges 100% or power in second battery pack **36** reaches near or below the pre-defined threshold level. Here, the power output flow governor in respective battery pack when acting as the primary battery source maintains a power output ceiling when the battery pack is powering electric motor **42**. Critical to maximizing operational performance, respective power output flow governor manages battery power to effectively reach maximum, nearly unlimited drive range for vehicle **14** and uninterrupted operational time. Assuming a driver drives vehicle **14** maximum "flat out" at top power for long period of time, current toggle **28** and power output flow governors ensure maximum efficient power outflow is appropriate, so as not to cause early depletion of the primary battery source (before secondary battery source is fully recharged). The power output flow governor of the primary battery source ensures the battery power usage is sufficient to deliver the maximum power to electric motor **42** for the longest timeframe, thus enabling charging of the secondary battery source to gain full recharge time (and net extra DC electric current sent to third battery pack **44**). The power output flow governor in respective battery pack operating as the primary battery source ensures vehicle **14** maintains plenty of acceleration capacity and torque to achieve normal speed and operational needs for the user, while recharging the battery packs in loop.

[0051] In the event of the primary battery source powering electric motor **42**, and the secondary battery source has been fully recharged, the rollover option or rollover charge is engaged at current toggle **28**. As a full efficiency operational capture and collection of the DC electrical current, current toggle **28** directs the incoming DC electrical current to third battery back **44**.

[0052] Electric motor **42** operates from the power output of one of first battery pack **32** and second battery pack **36** and drives drive shaft **20.** Drive shaft **20** operates and causes movement of the moving parts in vehicle **14** such as axle **16,** drive shaft **20**, braking, sensors (not shown), axle friction recharge, wheel rotation friction recharge, brake pad friction, exterior vehicle/mechanism friction capture, wind/water (hull friction, wake, etc.), solar surface on vehicle **14**, etc. Movement of the moving parts causes kinetic energy release, re-capture, reprocess, redirection. As explained above, kinetic capture devices **22** are configured to capture the kinetic friction energy from axle **16,** drive shaft **20**, braking, sensors (not shown), axle friction recharge, wheel rotation friction recharge, brake pad friction, exterior vehicle/mechanism friction capture, wind/water (hull friction, wake, etc.), solar surface on vehicle **14,** etc. Kinetic capture devices **22** capture the kinetic friction energy produced by movement of moving parts in vehicle **14**, and transfer the kinetic friction energy via flow transfer cable(s) **23** to CDCSC **24.** This constant power, constant kinetic friction energy capture, constant DC supercharge and recharge loop ensures the energy is conserved.

[0053] Power management system **12** includes third battery pack **44,** as shown in **FIGUREs 1** and **5.** Similar to first battery pack **32** and second battery pack **36,** third battery pack **44** refers to multiple individual batteries contained within a single piece or multi-piece housing, the individual batteries electrically interconnected to achieve the desired voltage and capacity for a particular application. Third battery pack **44** acts as a distinct power collection hardware source or battery pack that accepts and stores the rollover charge or overflow charge, allowing transfer of stored electric charge to third battery pack **44** when vehicle **14** or power management system **12** is not in use. When first battery pack **32** powers electric motor **42** and second battery pack **36** has been fully charged and during all excess time beyond that moment (of no recharge need for second battery pack **36**), and up to the defined depletion point (predefined threshold level) of first battery pack **32**; then current toggle **28** rollovers the DC electric current (converted from the kinetic friction energy captured by kinetic capture devices **22**) to third battery pack **44.** Similarly, when second battery pack **36** powers electric motor **42** and first battery pack **32** has been fully charged and during all excess time beyond that moment (of no recharge need for first battery pack **32**), and up to the defined depletion point of second battery pack **36**; current toggle **28** rollovers the DC electric current (converted from the kinetic friction energy captured by kinetic capture devices **22**) to third battery pack **44.** Current toggle **28** directs the incoming DC electric current to third battery pack **44** to efficiently utilize the kinetic friction energy captured by kinetic capture devices **22.**

[0054] In the present subject matter, third battery pack **44** collects and stores excess and unassigned DC electric current. In other words, third battery pack **44** fills to partial or full capacity (depending on operation time). Subsequently, third battery pack **44** transfers stored power to external battery pack **48** via transfer port **46.** In one example, external battery pack **48** indicates a stand-alone home/industrial/grid battery power system that the user uses to power home appliances and other power equipment from the battery power stored therein. Transfer port **46** includes a universal connection adaptability that allows a "bidirectional" charging platform. Operationally, transfer port **46** receives excess charge or outputs charge and manages outbound transfer to external battery pack **48**. In the event of both first battery pack **32** and second battery pack **36** deplete (due to possible system change or failure), third battery pack **44** can be used to power electric motor **42.** Here, the battery charge from third battery pack **44** is directed to flow (via current toggle **28** and attending sensors) to parallel port **40** and thus directed to power electric motor **42** (from its internal stored electrical charge, if any).

[0055] FIGUREs 6A and **6B** show a perspective view and a top view of graphene sphere battery (GSB) or simply battery **100,** respectively, in accordance with one embodiment of present subject matter. Each of first battery pack **32,** second battery pack **36** and third battery pack **44** incorporates the design of battery **100.** In one implementation, battery **100** has a unique concentric layered design e.g., sphere-shaped standalone structure. Battery **100** includes a spherical battery shell with concentric circles of ultrathin graphene sheet material attached to internal anchoring posts which hold the graphene material in place. As can be seen from **FIGURE 6B**, battery **100** has thermophotovoltaic (TPV) sensor casing **102** that surrounds battery casing **104.** Battery casing **104** includes multiple graphene sheets **106.** Graphene sheets **106** are attached with the help of attachment posts **108** to retain them in shape. At the outer side, TPV sensor casing **102** includes battery ports **110** that supplies power to electric motor **42.** Here, water or other superconducting fluid flows around and in between all independent or conjoined graphene sheets **106**.

[0056] Battery **100** operates on a principle that the more conductive and reactive surface area that interacts with the reacting and catalyst fluid, the more maximized the resulting charge. When compared to existing lithium ion battery packs having a large pile of batteries taped or combined in a casing shell together, the presently disclosed battery **100** provides much more efficiency in increased charge and output potential, and significantly reduced gross weight and size of the on-board battery packages. As shown in **FIGUREs 6A** and **6B**, internal structure layout of graphene sheets **106** include alternately or independently concentric circles or spheres of independent graphene sheets **106** small to large in scope from the center at the battery anchor post to the outer battery casing **104.** Alternatively, graphene sheets **106** include one extended, unbroken, expanding and encircling itself in a pinwheel formation from the center at the battery anchor post to the outer battery casing anchors, filling the battery casing as shown in **FIGURE** 7 (another embodiment). The battery ports **110** maintain the integrity structure of spherical battery casing **104** and provide anchoring for graphene sheets **106**. Battery port **110** includes a parallel port or separate ports (one for inflow, and another for outflow). Battery **100** optimizes inflow of recharge to the "secondary battery" position (second battery pack **36**), and outflow of power capability for the "primary battery" (first battery pack **32)**. The super conducting capabilities of graphene sheets **106** and reactive fluid is superior to existing lithium ion battery packs.

[0057] FIGURE 7 shows a top view of battery **150**, in accordance with another embodiment of present subject matter. In the current embodiment, battery **150** includes a continuous or expanding "pinwheel structure". Similar to battery **100,** battery **150** has thermophotovoltaic (TPV) sensor casing **152** that surrounds battery casing **154.** Battery casing **154** includes multiple graphene sheets **156.** Graphene sheets **156** are attached with the help of attachment posts **158** to retain them in shape. At the outer side, TPV sensor casing **152** includes battery ports **110** that supplies power to electric motor **42.** Here, water or other superconducting fluid flows around and in between all independent or conjoined graphene sheets **156**.

[0058] FIGURE 8 illustrates method **200** of operating a power management system for a battery-operated vehicle, in accordance with one exemplary embodiment of the present subject matter. The order in which method **200** is described should not be construed as a limitation, and any number of the described method blocks can be combined in any order to implement method **200** or alternate methods. Additionally, individual blocks may be deleted from method **200** without departing from the spirit and scope of the subject matter described herein. Furthermore, method **200** can be implemented in any suitable hardware, software, firmware, or combination thereof. However, for ease of explanation, in the embodiments described below, method **200** may be implemented using the above-described power management system **12**.

[0059] As specified above, power management system **12** connects to vehicle **14** at axle and/or drive shaft **20.** Power management system **12** operates when vehicle **14** is motion, as shown at

CA 03220704 2023-11-28

step **202**. Movement of vehicle **14** causes moving parts to produce kinetic friction energy. Kinetic capture devices **22** capture the kinetic friction energy produced by the moving parts, as shown at step **204.** At step **206,** kinetic capture devices **22** transfer the kinetic friction energy captured to central direct current (DC) supercharge component **24 (**CDCSC) **24.** At step **208,** CDCSC **24** converts the kinetic friction energy to a DC electric current. CDCSC **24** connects to current toggle **28,** whereby current toggle **28** directs the DC electric current to one of first battery pack **32,** second battery pack **36,** and third battery pack **44** (step **210).**

[0060] At step **212,** current toggle **28** checks whether first battery pack **32** and second battery pack **36** are fully charged. Considering that second battery pack **36** is fully charged (or has sufficient charge to power electric motor **42)** and first battery pack **32** is depleted (below the predefined threshold level) or requires charging, then current toggle **28** directs the DC electric current to charge first battery pack **32** and uses second battery pack **36** as a primary battery source for operating electric motor **42** (step **214).** At step **216,** current toggle **28** checks with second power output flow governor **38** if second battery pack **36** is at or below a predefined threshold level charge. If second battery pack **36** has sufficient charge, then current toggle **28** in conjunction with second power output flow governor **38** instructs parallel port **40** to direct power flow **f** from second battery pack **36** to operate electric motor **42,** as shown at step **218.** If charge in second battery pack **36** is at or below a predefined threshold level charge (at step **216**), then method **200** moves to step **120**. At step **120,** current toggle **28** directs the DC electric current to charge second battery pack **36** and uses first battery pack **36** as a primary battery source for operating electric motor **42.** At step **222,** current toggle **28** checks with first power output flow governor **34** if first battery pack **32** is at or below a predefined threshold level charge. If first battery pack **32** has sufficient charge, then current toggle **28** in conjunction with first power output flow governor **32** instructs parallel port **40** to direct power flow **f** from first battery pack **32** to operate electric motor **42,** as shown at step **224.** If charge in first battery pack **32** is at or below a predefined threshold level charge (at step **222**), then method **200** moves back to step **214**.

[0061] Upon powering electric motor **42** at steps **218** and **224,** electric motor **42** drives drive shaft **20** which in turn operates moving parts in vehicle **12** to produce kinetic friction energy which gets captured by kinetic capture devices **22** at step **204.** This creates a constant power supply loop for operating electric motor **42** from the power out of one of first battery pack **32** and second battery pack **36.**

[0062] At the time of charging first battery pack **32** at step **214**, current toggle **28** determines whether first battery pack **32** has fully charged while second battery pack **36** has sufficient charge to power electric motor **42** (step **226**). If first battery pack **32** has fully charged while second battery pack **36** has sufficient charge to power electric motor **42,** then current toggle **28** directs the DC electric current to charge third battery pack **44** (step **230**). If not (step **226**), then method **200** moves to step **216.**

[0063] Similarly, at the time of charging second battery pack **36** at step **220**, current toggle **28** determines whether second battery pack **36** has fully charged while first battery pack **32** has sufficient charge to power electric motor **42** (step **228**). If second battery pack **36** has fully charged while first battery pack **32** has sufficient charge to power electric motor **42,** then current toggle **28** directs the DC electric current to charge third battery pack **44** (step **230**). If not (step **228**), then method **200** moves to step **222.** After charging third battery pack **44** at step **130,** the battery power gets transferred to external battery pack **48,** as shown at step **232.**

[0064] Based on the above, a person skilled in the art understands that the presently disclosed power management system uses less energy as it requires no recharging from external sources, and delivers more efficient and constant operational function. This allows the vehicle to have constant, renewable, and uninterrupted power supply in both operational range and operational time to EVs and similar mechanically powered machinery and industrial systems, without the need for external plug-in recharging needs. The presently disclosed power management system allows for use the entire life span of battery packs and/or electric motor.

[0065] Further, under normal operating conditions, the presently disclosed power management system allows the battery-powered electric vehicles to have nearly unlimited range of travel (distance) - without interruption, or need for time consuming stops for "plugging in" for recharging. The presently disclosed power management system comes in-built in new battery-operated vehicles or retro-fits into current electric motor powered vehicles operating with conventional lithium or other market standard battery sources, removing need for downtime/offline recharging, and extending operational range and life exponentially.

[0066] Further, the presently disclosed power management system is adaptable and effective in multiple operational instances, including most vehicle types (land-, water-, and air-based), as well as military transport and deployment, industrial mechanical operations including resource extraction wellhead drilling, many industrial plant and refinery operations, water well management, municipal infrastructure and transportation, construction and demolition vehicles, extreme condition power generation, and exo-atmospheric scenarios.

[0067] As the presently disclosed power management system powers the vehicle upon movement of the moving parts, the power management system operates independently of all reasonable weather conditions, lack of sunlight, water, wind and with proper insulation, even in the vacuum of space.

[0068] The presently disclosed power management system provides a long sought need of energy efficiency, power management platform expansion, and control for most concepts. The presently disclosed power management system provides a power management and on-board recharge flow platform and energy efficiency needs.

[0069] The kinetic capture devices provides a unique kinetic energy capture/collection hardware design and makes kinetic energy capture/collection process efficiency and adaptability. With the proposed kinetic capture devices efficiency of energy transfer and transform functions increases considering the vehicular systems related to overall weight and structural dynamics. In addition, the kinetic capture devices provide an ability to integrate/utilize multiple sensor capture components (solar, TPV, wind, compression).

[0070] The presently disclosed power management system provides less hardware, less gross weight, and therefore less vehicular drag and less wasted system redundancies.

[0071] The present subject matter has been described in particular detail with respect to various possible embodiments, and those of skill in the art will appreciate that the subject matter may be practiced in other embodiments. First, the particular naming of the components, capitalization of terms, the attributes, data structures, or any other programming or structural aspect is not mandatory or significant, and the mechanisms that implement the subject matter or its features may have different names, formats, or protocols. Further, the system may be implemented via a combination of hardware and software, as described, or entirely in hardware elements. Also, the particular division of functionality between the various system components described herein is merely exemplary, and not mandatory; functions performed by a single system component may instead be performed by multiple components, and functions performed by multiple components may instead be performed by a single component.

[0072] Some portions of the above description present the features of the present subject matter in terms of algorithms and symbolic representations of operations on information. These algorithmic descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. These operations, while described functionally or logically, should be understood as being implemented by computer programs.

[0073] Further, certain aspects of the present subject matter include process steps and instructions described herein in the form of an algorithm. It should be noted that the process steps and instructions of the present subject matter could be embodied in software, firmware, or hardware, and when embodied in software, could be downloaded to reside on and be operated from different platforms used by real-time network operating systems.

[0074] The algorithms and operations presented herein are not inherently related to any particular computer or other apparatus. Various general-purpose systems may also be used with programs in accordance with the teachings herein, or it may prove convenient to construct more specialized apparatus to perform the required method steps. The required structure for a variety of these systems will be apparent to those of skill in the, along with equivalent variations. Also, the present subject matter is not described with reference to any particular programming language. It is appreciated that a variety of programming languages may be used to implement the teachings of the present subject matter as described herein, and any references to specific languages are provided for disclosure of enablement and best mode of the present subject matter.

[0075] It should be understood that components shown in **FIGUREs** are provided for illustrative purposes only and should not be construed in a limited sense. A person skilled in the art will appreciate alternate components that may be used to implement the embodiments of the present subject matter and such implementations will be within the scope of the present subject matter.

[0076] While preferred embodiments have been described above and illustrated in the accompanying drawings, it will be evident to those skilled in the art that modifications may be made without departing from this subject matter. Such modifications are considered as possible variants included in the scope of the subject matter.

WHAT IS CLAIMED IS:

1. A power management system for a battery-operated vehicle, said power management system comprising:

a plurality of kinetic capture devices, wherein said plurality of kinetic capture devices capture kinetic friction energy from movement of moving parts in said battery-operated vehicle;

a central direct current (DC) supercharge component (CDCSC) connecting said plurality of kinetic capture devices, wherein said CDCSC converts the kinetic friction energy to a DC electric current;

a first battery pack and a second battery pack, wherein said first battery pack is distinct from said second battery pack;

a control toggle configured to direct the DC electric current from said CDCSC to said first battery pack and said second battery pack;

a parallel port connecting said first battery pack and said second battery pack, wherein said parallel port draws power from said first battery pack and said second battery pack and delivers to an electric motor for powering said battery-operated vehicle; and

a third battery pack distinct from said first battery pack and said second battery pack,

wherein when said first battery pack is fully recharged, said first battery pack powers said electric motor via said parallel port and said control toggle directs the DC electric current from said CDCSC to said second battery pack for recharging said second battery pack,

wherein when said first battery pack reaches a pre-defined depletion threshold level, said control toggle switches the DC electric current from said CDCSC to said first battery pack for recharging said first battery pack, wherein said second battery pack powers the electric motor via said parallel port, and

wherein said current toggle directs the DC electric charge to said third battery back:

when said first battery pack and said second battery pack are fully recharged, or

when a residual electric charge generated from said kinetic charge devices is not needed to recharge said first battery pack when second battery pack is powering said electric motor, or

when a residual electric charge generated from said kinetic charge devices is not needed to recharge said second battery pack when first battery pack is powering said electric motor.

2. The power management system of Claim **1**, wherein said plurality of kinetic capture devices capture the kinetic friction energy from one of an axle**, a** drive shaft, braking, sensors, axle friction recharge, wheel rotation friction recharge, brake pad friction, exterior vehicle/mechanism friction capture, wind/water, and solar surface on said battery-operated vehicle.

3. The power management system of Claim **1**, wherein said plurality of kinetic capture devices deliver a single or multiple distinct electric charges to said CDCSC via a flow transfer cable.

4. The power management system of Claim **1**, wherein said third battery pack powers said electric motor when said first battery pack and said second battery pack are at or below said pre-defined depletion threshold level.

5. The power management system of Claim **1**, wherein said third battery pack stores and transfers energy to an external battery pack via a transfer port.

6. The power management system of Claim **1**, further comprises Thermophotovoltaics (TPV) heat sensors, wherein said TPV heat sensors surround said first battery pack and said second battery pack, wherein said TPV heat sensors capture the heat produced from said first battery pack and said second battery pack and create a distinct DC electric current, and wherein

TPV heat sensors feed the DC electric current said CDCSC and act as an additional sourcing of electric current generated in said power management system.

7. The power management system of Claim **1**, wherein said control toggle maintains and records the depletion point or predefined threshold levels of charge to switch recharging of said first battery pack and said second battery pack.

8. The power management system of Claim **1**, wherein said first battery pack comprises a first power output flow governor, wherein said first power output flow governor maintains a power output ceiling of said first battery pack for providing operating power to said electric motor, and wherein said first power output flow governor communicates with said current toggle for switching recharging of said first battery pack and said second battery pack.

9. The power management system of Claim **1**, wherein said second battery pack comprises a second power output flow governor, wherein said second power output flow governor maintains a power output ceiling of said second battery pack for providing operating power to said electric motor, and wherein said second power output flow governor communicates with said current toggle for switching recharging of said first battery pack and said second battery pack.

10. The power management system of Claim **1**, wherein said electric motor operates causing distinct kinetic friction energy through the movement of moving parts in said battery-operated vehicle, wherein said plurality of kinetic capture devices capture the kinetic friction energy and create creating a loop for recharging one of said first battery pack and said second battery pack for powering said electric motor.

11. The power management system of Claim **1**, wherein each of said first battery pack, said second battery pack and said third battery pack comprises a graphene sphere battery (GSB) having a spherical battery shell with concentric circles of thin graphene sheet material attached to internal anchoring posts holding the graphene material in place.

12. The power management system of Claim **11**, wherein said graphene sphere battery comprises a thermophotovoltaic (TPV) sensor casing surrounding a battery casing, wherein said battery casing comprises graphene sheets attached using attachment posts to retain them in shape, and wherein said TPV sensor casing comprises battery ports for supplying power to said electric motor.

13. A method of operating a power management system for powering a battery-operated vehicle, the method comprising steps of:

capturing kinetic friction energy from movement of moving parts in said battery-operated vehicle;

converting the kinetic friction energy captured to a DC electric current;

directing the DC electric current for recharging a first battery pack and a second battery pack;

drawing power from said first battery pack and said second battery pack for powering an electric motor of said battery-operated vehicle;

switching the DC electric current for recharging said first battery pack and said second battery pack, said switching comprising:

directing the DC electric current to said second battery pack for recharging said second battery pack when said first battery pack is fully recharged and utilizing said first battery pack for powering said electric motor; and

directing the DC electric current to said first battery pack for recharging said first battery pack when said first battery pack reaches a pre-defined depletion threshold level and utilizing said second battery pack for powering said electric motor; and

providing a third battery pack distinct from said first battery pack and said second battery pack, said method further comprising:

switching the DC electric current for recharging said third battery back:

when said first battery pack and said second battery pack are fully recharged, or

when a residual electric charge generated from said kinetic charge devices is not needed to recharge said first battery pack when second battery pack is powering said electric motor, or when a residual electric charge generated from said kinetic charge devices is not needed to recharge said second battery pack when first battery pack is powering said electric motor.

14. The method of Claim **13**, further comprising:

causing distinct kinetic friction energy through the movement of moving parts in said battery-operated vehicle with the operation of said electric motor;

capturing the distinct kinetic friction energy for creating a loop for recharging one of said first battery pack and said second battery pack for powering said electric motor.

15. The method of Claim **13**, further comprising storing and transferring energy stored in said third battery pack to an external battery pack.

16. The method of Claim **13**, further comprising powering said electric motor using said third battery pack when said first battery pack and said second battery pack are at or below said pre-defined depletion threshold level.

17. The method of Claim **13**, further comprising:

providing Thermophotovoltaics (TPV) heat sensors surrounding said first battery pack and said second battery pack;

capturing the heat produced from said first battery pack and said second battery pack for creating a distinct DC electric current; and

feeding the DC electric current as an additional sourcing of electric current generated in said power management system for recharging said first battery pack and said second battery pack.

18. The method of Claim **13**, wherein the step of switching the direction the DC electric current, comprises:

maintaining the pre-defined depletion threshold level of charge for switching recharging of said first battery pack and said second battery pack.

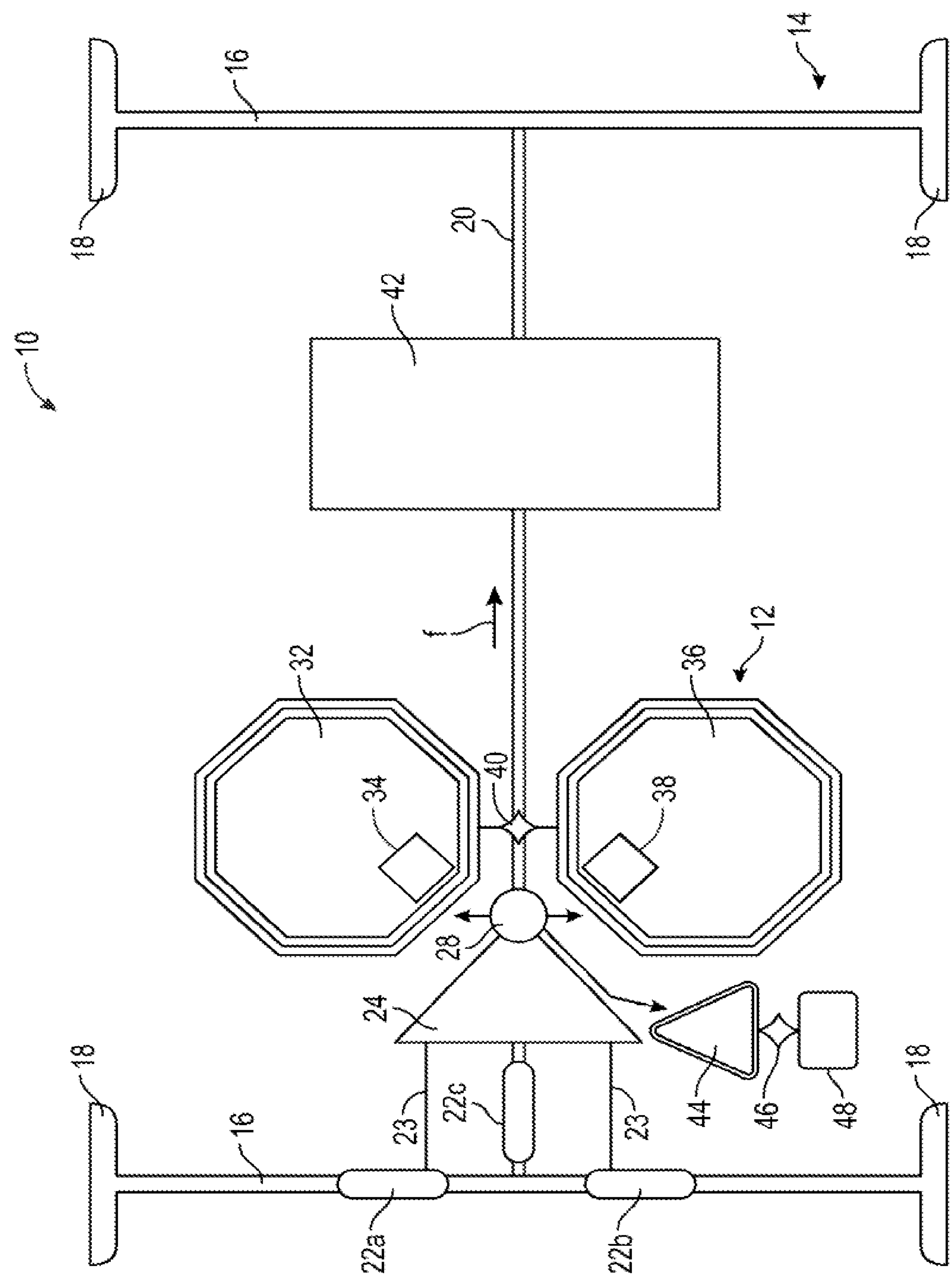
19. The method of Claim **13**, further comprising:

providing a first power output flow governor for governing power output, managing depletion and efficiency of said first battery pack; and

providing a second power output flow governor for governing power output, managing depletion and efficiency of said second battery pack.

20. The method of Claim **13**, further comprising providing a spherical battery shell having an extended graphene sheet encircling itself in a pinwheel pattern from internal anchoring posts holding the graphene material in place for each of said first battery pack, said second battery pack and said third battery pack.

CA 03220704 2023-11-28


10
14
16
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f
32
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22c
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18
22a
22b

FIG. 1

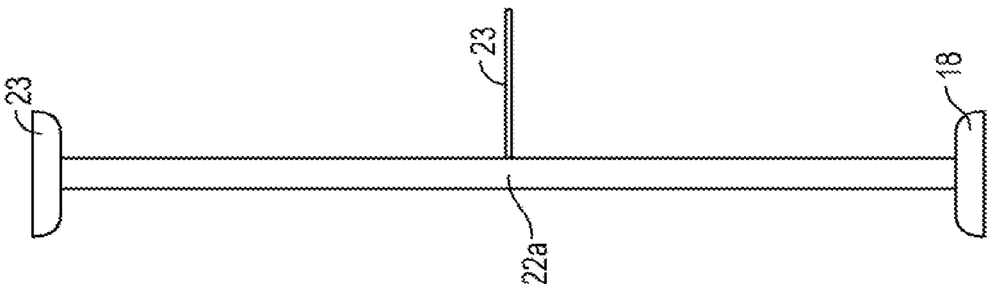


FIG. 4

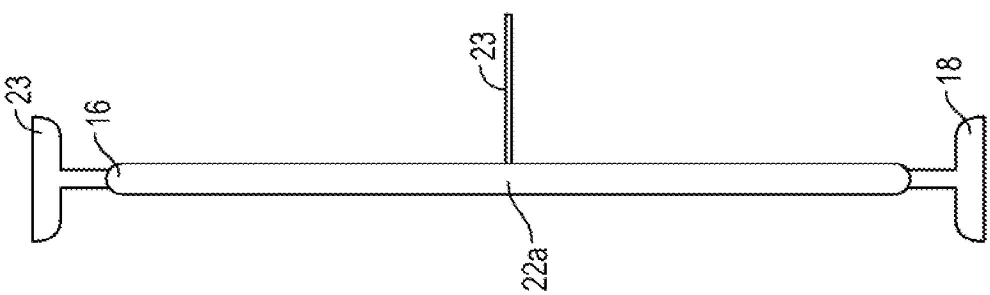


FIG. 3

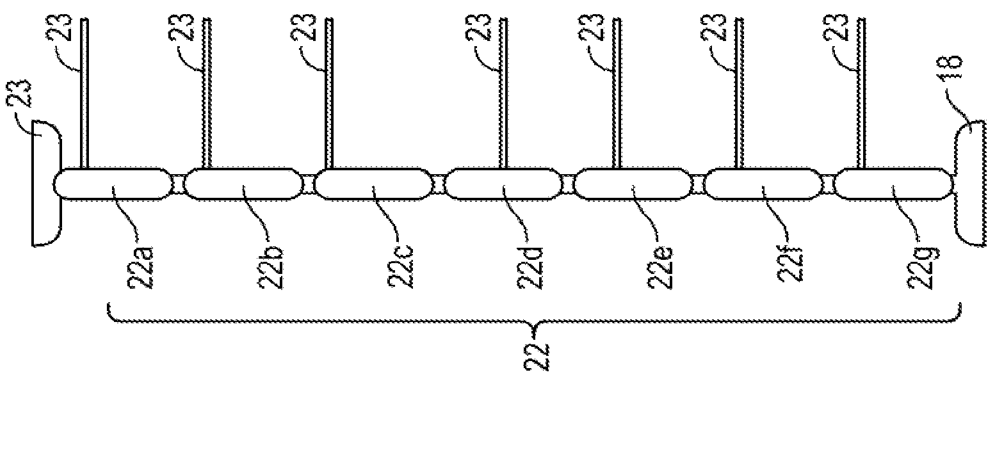


FIG. 2

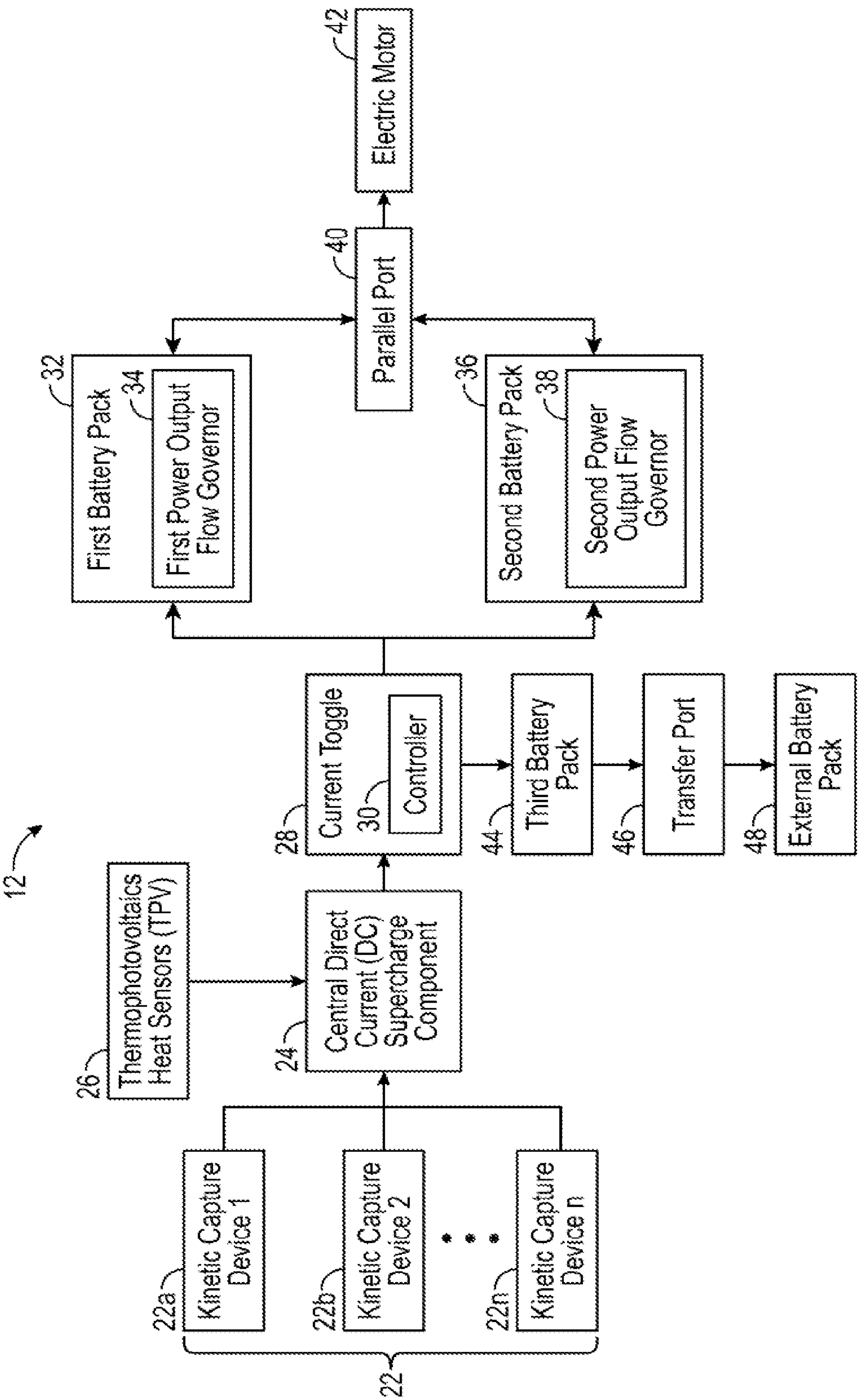

12
Kinetic Capture Device 1
Kinetic Capture Device 2
Kinetic Capture Device n
22a
22b
22n
22
Thermophotovoltaics Heat Sensors (TPV)
26
Central Direct Current (DC) Supercharge Component
24
Current Toggle
28
Controller
30
First Battery Pack
32
First Power Output Flow Governor
34
Second Battery Pack
36
Second Power Output Flow Governor
38
Parallel Port
40
Electric Motor
42
Third Battery Pack
44
Transfer Port
46
External Battery Pack
48

FIG. 5

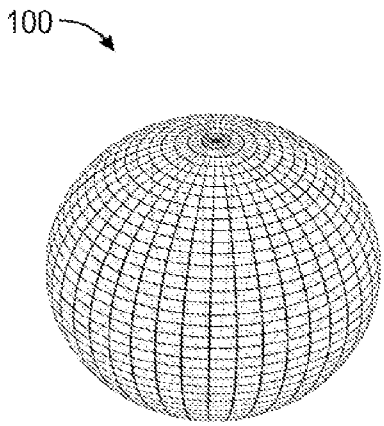


FIG. 6A

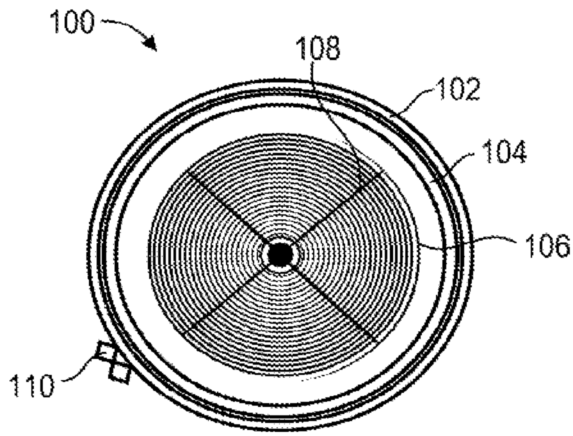


FIG. 6B

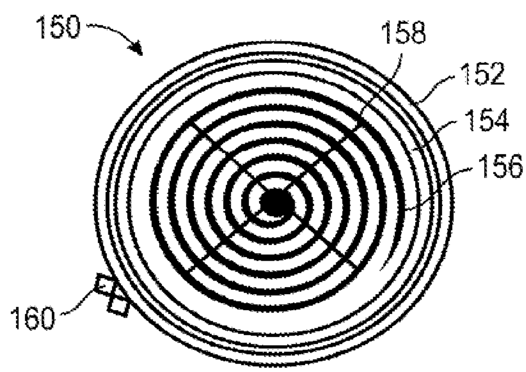


FIG. 7

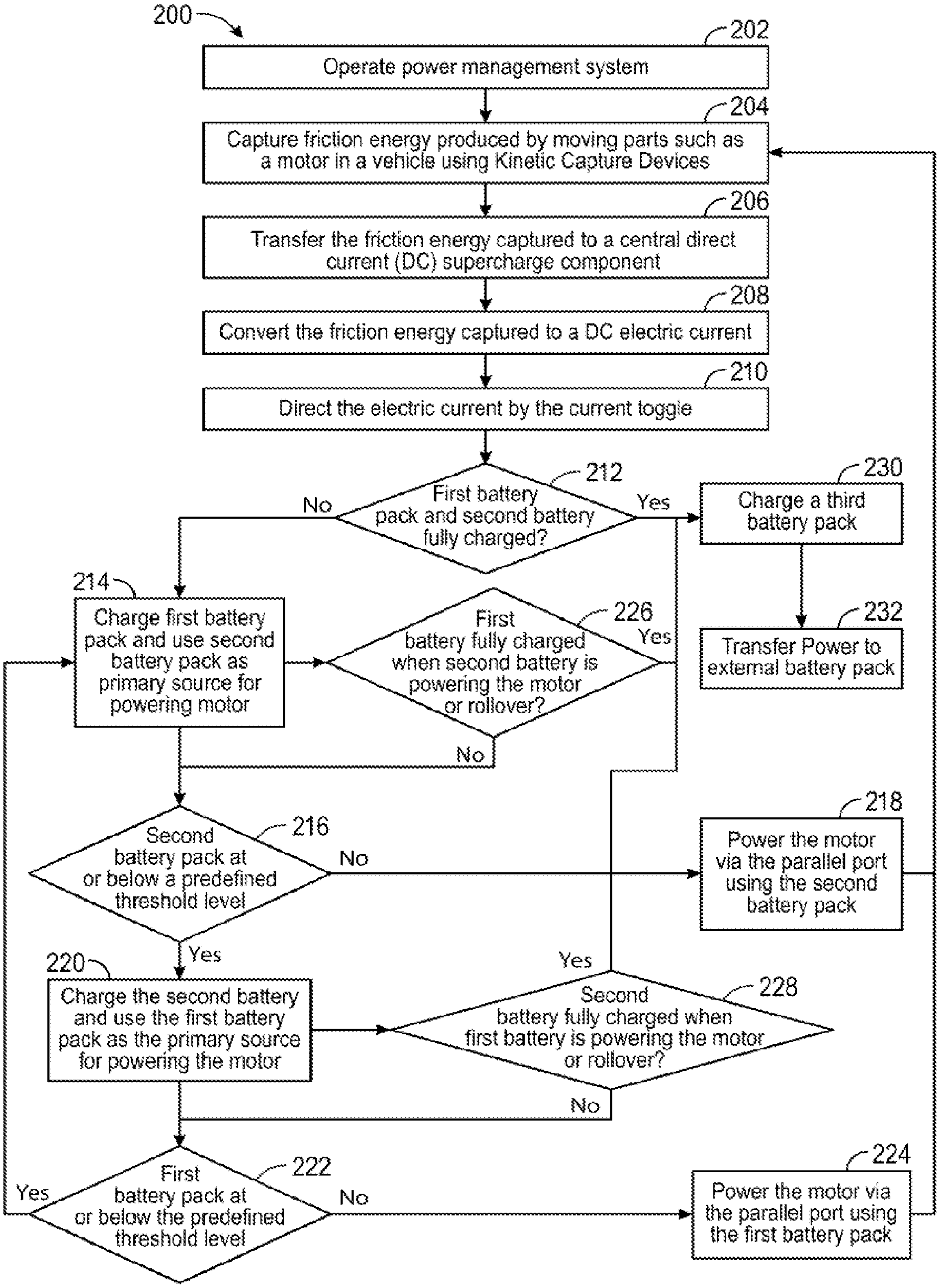
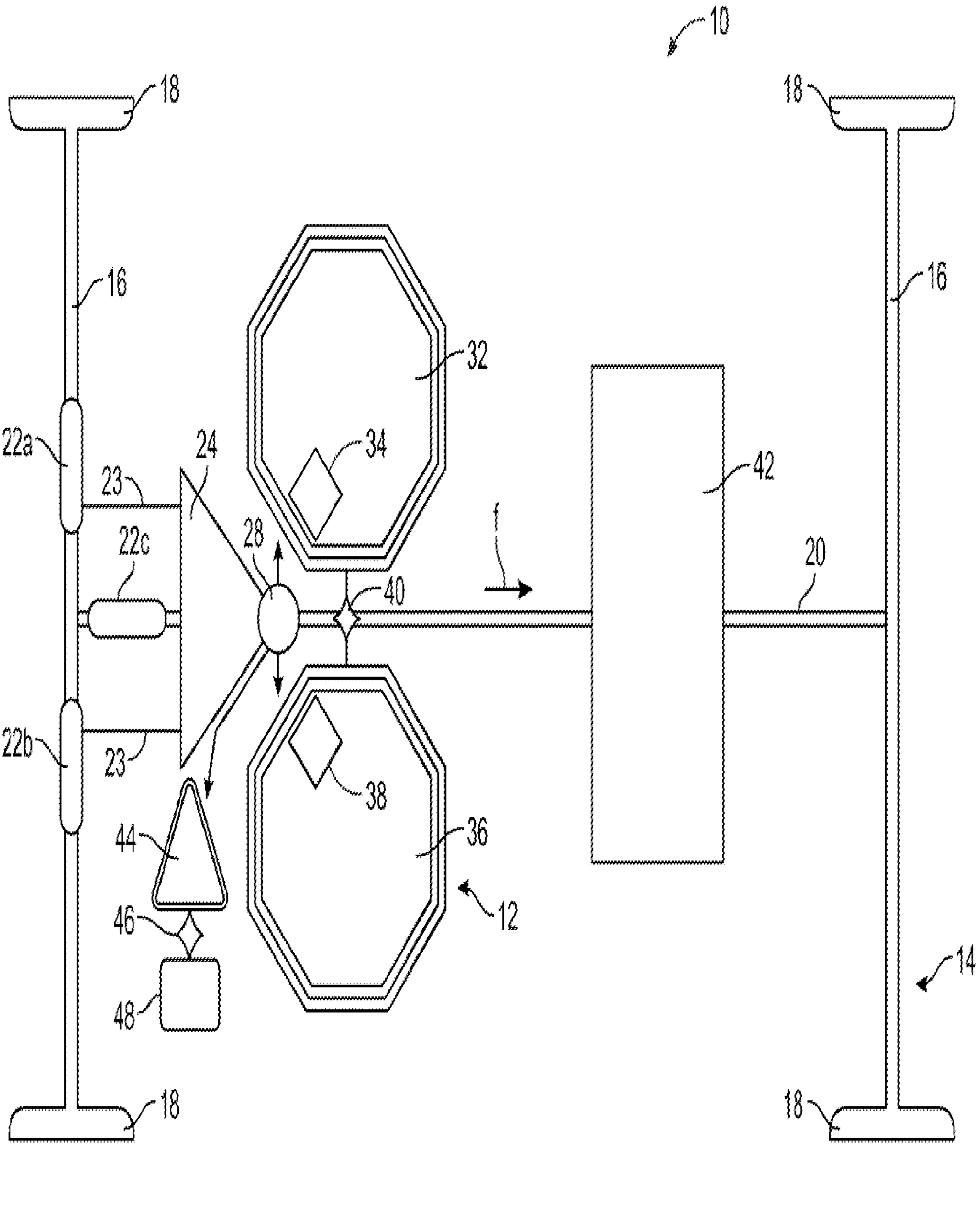

200
202
Operate power management system
204
Capture friction energy produced by moving parts such as a motor in a vehicle using Kinetic Capture Devices
206
Transfer the friction energy captured to a central direct current (DC) supercharge component
208
Convert the friction energy captured to a DC electric current
210
Direct the electric current by the current toggle
212
First battery pack and second battery fully charged?
No
Yes
230
Charge a third battery pack
232
Transfer Power to external battery pack
214
Charge first battery pack and use second battery pack as primary source for powering motor
226
First battery fully charged when second battery is powering the motor or rollover?
Yes
No
216
Second battery pack at or below a predefined threshold level
No
Yes
218
Power the motor via the parallel port using the second battery pack
220
Charge the second battery and use the first battery pack as the primary source for powering the motor
228
Second battery fully charged when first battery is powering the motor or rollover?
Yes
No
222
First battery pack at or below the predefined threshold level
Yes
No
224
Power the motor via the parallel port using the first battery pack

FIG. 8


10
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18
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16
32
34
42
22a
24
23
22c
28
f
40
20
22b
23
38
44
36
12
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14
48
18
18

FIG. 1