LEVITATION AND PROPULSION UNIT - FOUR (LPU-4)

RELATED APPLICATIONS

[0001] This patent application is mainly related to earlier patent granted invention title: Levitation and Propulsion Unit (LPU), filed under PCT application PCT/SG2006/00005, filing dated 14 March 2006, and its related countries applications. And, IPOS patent application: 10202004055T of filing date: 04 May 2020 and PCT patent application: PCT/SG2021/050132, with filing date: 12 March 2021, on title: Rapid Action Enabled and High Driving Force Electromagnet Moving Magnet Linear Actuator.

[0002] The patent granted invention title: Levitation and Propulsion Unit (LPU) is a thrust generating invention as claimed to generate resultant force to create motion from centrifugal force and magnetic flux expansion without mass ejection and/or momentum exchange, unlike current propulsion technologies as in automobile, drone, airplane, helicopter, rocketry, train, boat, bicycle, scooter, wheelchair, or even walking.

[0003] The IPOS and PCT patent application title: Rapid Action Enabled and High Driving Force Electromagnet Moving Magnet Linear Actuator is an electromagnet actuator device as claimed to enable rapid action and high driving force of actuator plunger to mainly meet invention, Levitation and Propulsion Unit (LPU) application requirements and other similar field device application requirements, or in electromagnet actuator application with similar requirements.

FIELD OF THE INVENTION

[0004] This Levitation and Propulsion Unit – Four (LPU-4) is a thrust generating invention in the field of inertia propulsion. Inertia propulsion is propulsion without mass ejection and/or momentum exchange, unlike all current propulsion technologies. This classification of propulsion is generally deemed not workable or not feasible. Thus, less explored, and at its infancy. Inertia propulsion technology does not need traction, aerodynamics or expulsion of mass, to create resultant motion. This LPU propulsion technology generate internal thrust by impulse drive to create resultant motion with no external moving parts or mass ejection. The non-dependent of external environment to create resultant motion makes inertia propulsion technology's operational efficiency very high, and able to offer wider operational capabilities which current propulsion technologies unable.

BACKGROUND OF THE INVENTION

[0005] Past and current attempts in inertia technology uses orbital in an eccentric ellipse approach, or quick shifting of CG, to create external motion in horizontal plane, with only subtle effect. Earlier invention and patent granted, LPU's technology uses totally different and novel approach in inertia propulsion with pronounce effect. The LPU's technology is able to demonstrate resultant force generation in vertical, horizontal planes, and in pendulum set-up – checkout YouTube's search under: samss3, for technology disclosure video clips under Sam Sin.

[0006] Patent granted Levitation and Propulsion Unit's invention basically covers a wheel module comprising main components of: a main wheel, a flywheel, sliding angular couplings, a transfer panel and a strike panel which comprised of one or more electromagnet. The wheel module is capable of creating a resultant thrust as the result of the magnetic pulsating repulsive force and the rotation of the main wheel and the flywheel. However, due to the transfer panel component being incorporated in a floating manner and the electromagnet separated from the transfer panel, these limit the invention function to generate rapid and higher resultant force efficiently.

[0007] This inertia thrust generating invention, Levitation and Propulsion Unit - Four (LPU-4), is an improved design of patent granted invention, Levitation and Propulsion Unit (LPU). This new version, LPU-4, the objective to enable higher and faster efficient inertia thrust generation of patent granted LPU invention.

BRIEF SUMMARY OF THE INVENTION

[0008] Patent granted LPU is an inertia thrust generating invention, it mainly generates internal impact impulse to create an internal resultant force, to create resultant motion, without external interaction, unlike current propulsion technologies whereby it involved mass ejection and/or momentum exchange. This inertia thrust generating technology primarily involves:

1. electromagnetic energy;
2. magnetic repulsive energy;
3. centrifugal force energy; and
4. kinetic energy;

to generate resultant force without external interaction. The LPU's technology leverages on compressed magnetic repulsive flux to convert an induced force from electromagnet and centrifugal force from spinning wheel into conserved energy, and at flux expansion, into driving action force, to mainly accelerate a mass, to generate impact force, to create a resultant force without external interaction. The process of resultant force generation in this Levitation and Propulsion Unit - Four (LPU-4), see fig-1, fig-2, fig-3 & fig-3b, is similar to patent granted Levitation and Propulsion Unit (LPU). In this LPU-4 – fig-1, resultant force generation still include main components but less transfer panel:

- strike panel with electromagnet;
- flywheel;
- sliding angular couplings; and
- main wheel.

The improved features incorporated in this LPU-4 design are:

1) Integrated design of plunger assembly fig-7 with transfer panel 06, wherein it is not connected in patent granted LPU invention. The purpose:
    a) To create a rigid connection to enable stable action and to enable transfer panel magnet 06 closer to stator coil 08 for faster and more effective coil 8 and magnet 06 interaction.

b) The design also enables the plunger assembly to deliver impact at two area to create resultant motion – see fig-1 & fig-7, where is one area in earlier invention
c) The design includes connection shaft 12 with plunger assembly fig-7 to enable installation of sensors, mainly optical and /or hall sensors, to determine precise position of plunger assembly – see fig-1.

2) The design incorporates features to increase the kinetic energy of a mass in motion - plunger assembly fig-7. To enable higher generation of resultant force.
    a) Provision added at mass 18 at the plunger assembly – see fig-7; and
    b) Incorporation of high flux density permanent magnet type in the assembly which is much heavier than normal permanent magnet to further add mass and similarly enable faster plunger response.

3) More efficient design of electromagnet device to increase magnetic flux interaction between each magnet and each stator coil to enable higher driving force and longer plunger assembly fig-7 travel. This, to enable higher compression at compressed magnetic repulsive zone 05 to create higher magnetic repulsive energy -see fig-2, fig-3 & fig-3a.
    a) Magnets 06 and 10 are arranged outside one stator coil 08;
    b) Each magnet of different size and strength – see fig-7;
    c) Each magnet arranged with same pole facing each other in the plunger assembly – see fig-1 & fig-7. This enables very effective use of both attraction and repulsion forces at the same time between one energized stator coil 08 with two magnets. Which enable relatively smaller stator coil size, lesser current input to coil and less heat from coil, hence lesser or any opposing coil field at upward phase of cycle, to enable rapid action;
    d) No ferrous material in stator 09 and plunger assembly fig-7, to remove or reduce hysteresis issue from components to lower hardware latency, to improve electromagnet response time;
    e) Design enables addition of high flux density magnet at magnet 06 and/or magnet 10 at end of plunger shaft 07 by extending bracing rods 15, plunger clamp 11 and clamp lock bolt 21, - see fig-7, to further increase the magnet strength and mass of plunger assembly. This enables plunger assembly fig-7 to make relatively longer travel without increase in current input to stator coil 08. Thus, enable further compression of compressed magnetic flux zone 05 to create higher potential energy to increase thrust at upward phase of a cycle.

4) The material of plunger shaft 07 and stator 09 – fig-1, fig-6 & fig-7, of non-ferrous material like aluminum, titanium, stainless steel, brass, polymer, alloy, composite, plastic, ceramic or likewise materials; to mainly reduce hysteresis

issue to lower system latency. This improves the electromagnet response time to function rapidly.

5) Additional coil 16 over magnet 10, enable energy recovery via induce charge from the moving magnet 10 during thrust generation process – see fig-2 & fig-3.

[0009] This invention preferred embodiment-1 at fig-1 and 10 others embodiments until embodiment -11 mainly relate to variation of components in electromagnet to meet LPU-4 application requirements. The LPU-4 applications mainly in mobility propulsion on Earth and in Space.

BRIEF DESCRIPTION OF THE VIEWS OF THE DRAWING

[0010] The following drawings are for illustration only. Each drawing mainly to show the main components layout to each other to support related description. Constructional details, component size, configuration including magnet polarity and composition can differ in product to meet component constrains, application constrains, and/or further outlines described in various embodiments.

[0011] Fig-1: Sectional view for illustration only of the invention preferred embodiment-1 to include main component of electromagnet linear actuator assembly wherein it comprises mainly of plunger assembly fig-7 arranged in stator coil assembly fig-6, at default status - no current in coil. The view also includes main components of wheel module of earlier invention - Levitation and Propulsion Unit (LPU), mainly the main components: strike panel member 14; transfer panel 06 which is now integrated into plunger assembly fig-7; fly wheel 27 with magnet 24; central shaft/spline 04; compressed magnetic repulsive flux zone 05; sliding angular coupling comprising top and bottom linear slide 49, 49A, slide support 48 and slide connector 50; and main wheel 47 connected to variable speed motor 46. The view also includes optical/hall effect sensors mounting location 13 to sense plunger status and motion via sensing clamp shaft 12 which is connected to plunger assembly fig-7. This view illustrates a typical layout of main components position under preferred embodiment-1 at default position – no action status.

[0012] Fig-2: Sectional view for illustration only of the invention preferred embodiment-1 illustrating the various main components position when the fly wheel 27 is spinning and before the electromagnet is energized. At default position, Fig-1 illustrate fly wheel 27 distance from main wheel 47 is FW-L1. Fig-2 illustrate the fly wheel 27 distance from main wheel 47 is FW-L2. The spinning main wheel 47 generates centrifugal force which act on the connected sliding angular couplings which are also connected to the fly wheel 27 that carries the induced load of compressed magnetic repulsive flux zone 05.

[0013] Fig-3: Sectional view for illustration only of the invention preferred embodiment-1 illustrating the various main components position when the fly wheel 27 is spinning and the electromagnet at end of driving the plunger assembly fig-7 - the end of downward phase or compression phase. At start of downward phase, the energized electromagnet drives the plunger assembly fig-7 out of stator assembly fig-6. The distance between strike panel 14 to plunger shaft

flange is now A2. The electromagnet drives the plunger assembly fig-7 to further compressed the compressed magnetic flux zone 05 and similarly push down fly wheel 27 where the distance between main wheel 47 is FW-L3. This FW-L3 distance can varies and is dependent on electromagnet induced driving force and the spin rate of main wheel 47 which generate centrifugal force.

[0014] Fig-3A: Sectional view for illustration only of the invention preferred embodiment-1 illustrating the various main components position when the fly wheel 27 is spinning and the electromagnet is energized momentarily in reverse polarity at start of upward phase or expansion phase, to attract the plunger assembly fig-7.

[0015] Fig-3B: Sectional view for illustration only of the invention preferred embodiment-1 illustrating the various main components position when the flywheel is spinning and the electromagnet is not energized at start of upward phase or expansion phase. The plunger assembly fig-7 is push upward due to no driving force - low pressure at space A2, and high upward pressure from expanding magnetic repulsive flux at zone 05 and centrifugal force. Once plunger assembly impact the strike panel 14, which create resultant motion, the main components position in the wheel module is same at Fig-2.

[0016] Fig-4: Plan view for illustration only of the invention preferred embodiment-1 illustrating the various radial orientation of sliding angular couplings slide support 48 on the main wheel 47.

[0017] Fig-5: Plan view for illustration only of the invention preferred embodiment-1 illustrating the various components axle to the central axis of the invention assembly at strike panel 14 level.

[0018] Fig-6: Sectional & Plan view for illustration only of a typical cylindrical profile of stator assembly and its plan view illustration. It mainly comprises of stator coil 08, stator 09, stator coil 16, casement members 17 & 14 and bracing rods 15.

[0019] Fig-7: Sectional view for illustration only of a typical cylindrical profile plunger assembly. The plunger assembly mainly comprises of magnet 06 at one end of plunger shaft 07 and magnet 10 at the other end, impact element 22, optional add-mass material 18, clamp shaft 11 & 12, clamp lock bolt 21 and packing element 20.

[0020] Fig-8: Sectional view for illustration only of a typical cylindrical profile of plunger assembly without a magnet 06, as outlined under embodiment-4.

[0021] Fig-8a: Sectional view for illustration only of a typical cylindrical profile of plunger assembly with magnet 23 at end of hollow plunger shaft 07, as outlined under embodiment-4a.

[0022] Fig-8b, Fig-8c & Fig -8d: Sectional view for illustration only of a typical cylindrical profile of plunger assembly with magnet 23 and plunger assembly profile without flange plate, as outlined under embodiment-4b. And fig-8d illustrate the plunger shaft not of hollow profile.

[0023] Fig-9: Sectional view for illustration only of a typical cylindrical profile of plunger assembly including a separate magnet 23 together with magnet 06, as outlined under embodiment-5.

[0024] Fig-9a: Sectional view for illustration only of a typical cylindrical profile of plunger assembly including a separate permanent magnet 23 at hollow plunger shaft 07 together with magnet 06, as outlined under embodiment-5.

DETAILED DESCRIPTION OF THE INVENTION

[0025] LPU-4 is an inertia thrust generating invention which the technology primarily uses electromagnetic energy, permanent magnetic repulsive energy, centrifugal force energy and kinetic energy, to generate internal resultant thrust. The technology leverages on compressed magnetic repulsive flux to convert an electromagnet induced force and centrifugal force from spinning wheel into conserved energy, and back to driving force, to accelerate a mass to generate impact force, to create a resultant force without external interaction. This Levitation and Propulsion Unit -4 (LPU-4), see fig-1, of cylindrical profile configuration is the preferred embodiment-1. The main components layout is similar to patent granted LPU. The difference is at the electromagnet, where the transfer panel 06 component of patent granted invention LPU now integrated into the electromagnet's plunger assembly fig-7. The electromagnet functions are similar to the electromagnet in strike panel described in specification of patent granted invention - Levitation and Propulsion Unit (LPU). At downward phase, the electromagnet energized to repel or move transfer panel 06 to further compress magnetic repulsive flux 05. Which in this LPU-4 design, the plunger assembly fig-7 now includes the functional role of the transfer panel stated in specification of patent granted LPU invention - to transfer the exerted force from electromagnet on to the spinning fly wheel 27 at downward or compression phase, and to deliver the impact on the strike panel 14 at upward or expansion phase. Other main components like magnets, flywheel, sliding angular couplings, main wheel and variable speed motor, basically function as stated in the patent granted LPU's specification in this LPU-4 invention. The major difference is at the improved design of electromagnet and integration of the transfer panel into the plunger assembly enable rapid action of cycle and higher resultant force generation.

[0026] The material of components mainly of non-ferrous material like aluminum, titanium, stainless steel, brass, polymer, alloy, plastic, carbon fiber, ceramic; or ferrous materials, ferromagnetic; or composite of materials or other equivalent materials, to meet each component functional and structural requirement to meet LPU-4's application and device requirements.

[0027] The LPU-4 technology leverages on compression and expansion of compressed repulsive magnetic flux. The compressed magnetic repulsive flux function as the medium in potential energy source and conservation of energy; the energy to accelerate a mass – plunger assembly fig-7 mass, to create impact in generation of resultant force. In this preferred embodiment-1, fig-1, the compressed magnetic repulsive flux zone 05, between magnet 06 and fly wheel 27 function as potential energy sources and conservation of energy. The level of compressed magnetic repulsive flux at zone 05 at default stage or at design stage depend on the amount and frequency of resultant force generation to meet application, in addition to other parameters, like – plunger assembly mass and magnet 06 width, current, coil, magnets, device space, etc.

[0028] LPU-4's basic operation cycle comprises downward or compression phase and upward or expansion phase in a cycle. Fig-1 to fig-3b, which illustrate each main component status at each phase of a cycle. Before the cycle starts the motor 46 starts spinning to spin main wheel 47. The main wheel 47 is connected to a fly wheel by more than one sliding angular couplings via slide supports 48. The slide supports are connected in radial pattern away from the axis of main wheel 47– see fig-4. The number of sliding angular couplings also dependent on the size of fly wheel 27 which depends on application requirement. The spinning main wheel 47 generate centrifugal force. As the spin rate increases, the increase centrifugal force pushes the fly wheel 27 upward to further compress the already compressed magnetic repulsive flux zone 05, which further increases the level of potential energy in zone 05 – see fig-2.

[0029] The cycle starts with downward phase which energizes stator coil 08 to create coil polarities wherein coil 08 "north" is nearest to magnet 06 and coil "south" is nearest to magnet 10, as reflected at fig-2. This coil 08 status creates repulsion force between coil 08 and magnet 06, and attraction force between coil 08 and magnet 10 to pull magnet 10 into stator 09 which together create the driving force to move the plunger assembly fig-7 downward to further compress magnetic repulsive flux zone 05 – see fig-3. At upward phase, the current polarities to coil 08 that induced the driving force is reversed momentarily wherein now coil 08 "north" is nearest to magnet 10 and coil "south" is nearest to magnet 06, see fig-3A. This coil 08 status creates attractive force between coil 08 and transfer 06, and repulsive force between coil 08 and magnet 10 which together momentarily create a pull-up force momentarily on the plunger assembly with magnet 06 upward, to mainly overcome its inertia. And thereafter, current to coil 08 switch off. In condition where there is sufficient strong potential energy at compressed magnetic flux zone 05 at end of downward phase, relative to the thrust and frequency to generate, inertia of plunger assembly with magnet 06 to overcome and other parameters to assess, no momentarily reversal of current needed. Then, current to coil 08 is switch-off once downward phase stop. The highly compressed magnetic flux at zone 05 immediately expand, due to no driving force or low pressure at A2 – see fig-3B. The flux expansion force accelerates the magnet 06 and connected plunger assembly fig-7 upward to impact strike panel14 to create the resultant force. At the same time, at start of upward phase, the motor to generate pulse spin to create a momentarily generation of centrifugal force to push flywheel 27 upward, to push the expanding flux upward - to direct the flux expansion at zone 05 to act more on the plunger assembly. To reduce the expanding flux to act downward on flywheel 27 which can create drag against the intended direction via impact momentum. The expanding flux thus drive the plunger assembly fig-7 to impact the strike panel14 to create resultant force.

[0030] Alternatively, the system can create resultant motion via flux expansion from the expansion of compressed flux at zone 05 if the motor does not generate pulse spin to create a momentarily generation of centrifugal force to push the fly wheel 27. The flux expansion instantly acts on the flywheel 27 once the downward phase stops. The flux expansion instantly pushes the whole device in opposite direction to the direction create by impact force. At the same time the flux expansion also acts on the magnet 06 of plunger assembly fig-7 to push it to impact strike panel 14. The opposite direction motion created by flux expansion stop once plunger assembly impact on the casement member 14. This opposite direction resultant motion is by flux expansion. This opposite resultant motion does not carried momentum unlike the motion by impact force from plunger assembly fig-7 created by momentarily generation of centrifugal force which push flywheel 27 to direct the flux expansion upward. The resultant motion via flux

expansion is mainly in step motion per cycle - step by step, no continuous motion or momentum like via impact force. In zero environment, like in Space, this duo directional resultant capabilities are useful.

[0031] At the electromagnet, the amount of induced driving force on the plunger assembly mainly depends on the magnetic flux density and flux spread of magnet 10 and magnet 06 in relation to coil 08 layout, its energized electromagnetic flux density and spread. At device design stage, amongst other parameters, need to determine the maximum amount able to drive plunger assembly fig-7 to further compress the already compressed magnetic flux zones 05, to optimally conserve the energy in the form of compressed magnetic flux at zone 05. And, at upward phase, able to create the needed energy at flux expansion to accelerate plunger assembly fig-7 to generate the resultant impact force.

[0032] At downward phase or compression phase, as the energized coil 08 induced a driving force to move the plunger assembly downward, there is an equal opposite force acting on the coil 08 to move upward or opposite direction - Newton 3rd law: action = reaction. The coil 08 is connected to the strike panel 14 and application, therefore, the reacting force move the whole device and its application upward or opposite direction to the plunger assembly fig-7 motion. In gravity environment, if the induced force is sufficient, the reacting force creates a momentarily lift or motion, and it stop once the induced force stop, and gravity pull it back down at nominal rate 9.84m/sec square. In gravity environment, the amount of lift or opposite motion to plunger assembly fig-7 motion depends on the mass of the device and its application. Against gravity, if the reacting force is not sufficient to create motion, the reacting force which also acts along the force path and area around coil 08 connection, can flex or deform the material - dependent on elasticity of the material and/or structure. Therefore, the device structural adequacy and suitable electromagnet are needed to meet functional requirement to meet application requirement. In zero gravity environment, the reacting force can move the device and application in opposite direction to the plunger assembly fig-7 motion, and the motion stop once the plunger assembly fig-7 motion stop.

[0033] To create continuous motion, it is similar to multi-stage rocket - previous impact momentum supports the next stage generation of impact momentum. In gravity environment, if the frequency of an impact resultant force is faster the gravitation acceleration, the lift or motion created by reacting force at downward phase of a cycle can continue with the impact momentum at upward phase of the cycle. Therefore, in gravity environment, to create airborne propulsion and levitation functions, cycle frequency higher than gravitation acceleration and sufficient resultant force generation in a cycle to meet application requirement are essential. In zero gravity environment, cycle frequency and resultant force sufficiency may not be essential to create motion, continuous motion and etc.

[0034] This Levitation and Propulsion Unit -4 (LPU-4), resultant force generation is mainly through regulation and systematic control of current to coil of electromagnet to move plunger assembly fig-7 and control of motor spin, to create the desire resultant motion and motion direction.

[0035] This Levitation and Propulsion Unit -4 (LPU-4) applications mainly in mobility propulsion on Earth and in Space. It can complement or supplant current propulsion technologies. The layout of main components is scalable to meet application requirement. And, the design of this LPU-4 is scalable and/or apply in combination of more than one unit to meet

application requirement. Further, there can be more than one electromagnet to induce force on one flywheel to meet application requirement.

[0036] As described at para [0027] to [0029], the LPU technology basically leverages on compression and expansion of compressed magnetic repulsive flux to accelerate a mass to create impact to generate a resultant force motion. Alternatively, as described at para [0030], the technology can also create resultant motion in opposite direction to impact resultant motion direction by leverage the expansion of compressed magnetic flux only without motor pulse acceleration to generate momentarily centrifugal force to push the flywheel 27 at end of downward phase of a cycle. Therefore, the control of compressed magnetic repulsive flux expansion determines the direction of resultant force motion. There are also various devices to create the exertive force to further compress the compressed magnetic repulsive flux to create the potential energy for flux expansion. The suitability of such devices depends the function and its response time to meet application requirements - to defy gravity, response time need to be faster than gravitation acceleration.

[0037] Other embodiments of this Levitation and Propulsion Unit -4 (LPU-4) invention design are:

Embodiment-2: include preferred embodiment-1, embodiment-6, embodiment-7, embodiment-8, embodiment-9 and/or embodiment-10, wherein it comprises of additional magnet/s at position 18 in or along plunger shaft length to enable further increase plunger thrust force to further compress magnetic flux zone 05 to create higher potential energy at downward phase of a cycle. And, at upward phase of a cycle, enable higher energy release from expansion of compressed magnetic flux zone 05 to further accelerate the plunger assembly fig-7 to create higher impact on the strike panel, to generate higher thrust force to create higher resultant motion of application.

Embodiment-2a: include preferred embodiment-2, wherein magnet 10 include or replace with other material to add mass to plunger assembly to increase driving mass to increase impact force.

Embodiment-2b: include preferred embodiment-2 wherein there is no magnet 10.

Embodiment-3: include preferred embodiment-1, embodiment-2, embodiment-2a and/or embodiment-2b, wherein it comprises more than one individual control coil on stator to enable control and/or tracking of plunger travel via systematic energizing and sensing of each coil or coils.

Embodiment-4: include preferred embodiment-1, embodiment-2, embodiment-2a, embodiment-2b and/or embodiment-3, wherein the plunger assembly exclude the transfer panel magnet 06 of the earlier invention. This plunger configuration facilitates attachment of similar or other transfer panel profile, magnet/s and/or materials to meet application; or composition described in earlier invention specification to meet application; or to meet other similar field device requirement; or other electromagnet actuator of similar requirements.

Embodiment-4a: include either preferred embodiment-1, embodiment-2, embodiment-2a, embodiment-2b or embodiment-3, wherein the plunger assembly includes magnet 23, exclude the transfer panel magnet 06 of the earlier invention, see fig-8, fig-8a, fig-8b & fig-8c. This plunger configuration facilitates attachment of other transfer panel profile to meet application

stated in earlier invention specification or to meet other similar field device requirement, or other electromagnet actuator of similar requirements.

Embodiment-4b: include embodiment-4a wherein the plunger assembly includes magnet 23, exclude the flange at plunger shaft. This plunger configuration facilitates attachment of other transfer panel profile to meet application stated in earlier invention specification or to meet other similar field device requirement, or other electromagnet actuator of similar requirements.

Embodiment-5: include Embodiment-4 wherein the plunger assembly include a separate permanent magnet 23 on top of magnet 06 or the transfer panel magnet 06 of the earlier invention, see fig-9 and fig-9a. This facilitates transfer panel of other configuration and material where the transfer panel comprises of ring magnet, other profile permanent magnet or composite of magnets and materials, to meet application; as described in earlier invention specification or to meet other similar field device requirement, or other electromagnet actuator of similar requirements.

Embodiment-6: include Embodiment-1 wherein the profile of magnet with or without central hole or well, stator assembly and/or plunger assembly, not of cylindrical/round profile. The profile to meet best performance of components, constraint of application requirement and/or to meet other similar field device requirement, or other electromagnet actuator of similar requirements.

Embodiment-7: include Embodiment-1 wherein plunger shaft 07 is of round/hex/triangular/rectangular/likewise rod profile with or without magnet detachable clamp shaft 11 & 12, central spline/shaft and with spline/shaft well of threaded or non-threaded, lock bolt 21, optical and/or hall effect sensor. To meet best performance of components, constraint of application requirement and/or to meet other similar field application requirement, or other electromagnet actuator of similar requirements.

Embodiment-8: include Embodiment-1, Embodiment -7 and/or Embodiment-6 wherein the magnet/s on plunger shaft and/or transfer panel 06, the magnet of high flux density permanent magnet, each of different flux density, ring magnet, composite magnets and/or electromagnet, or not of high flux density magnet. To meet best performance of components, constraint of application requirement and/or to meet other similar field application requirement, or other electromagnet actuator of similar requirements.

Embodiment-9: include Embodiment -8 wherein the magnet on plunger shaft and/or plunger material of ferromagnetic material and/or the components used of ferrous material, to meet best performance of components, constraint of application requirement and/or to meet other similar field device requirement, or other electromagnet actuator of similar requirements.

Embodiment-10: include Embodiment-9 or Embodiment - 8, wherein the stator assembly fig-6 exclude strike panel member 01 & 02, spacer member 16, casement members 17 & 14 and/or bracing rods 15. To meet best performance of components, constraint of application requirement and/or to meet other similar field application requirement, or other electromagnet actuator of similar requirements.

Embodiment-11: include Embodiment-1, Embodiment-10 and/or any preceding Embodiments, wherein there is more than one electromagnet to induce force on one flywheel to meet application requirement.

CLIAMS

1. An inertia thrust generating wheel module comprising:
   a main wheel;
   a sliding coupling disposed between the main wheel and fly wheel;
   a fly wheel with magnet facing in the direction of strike panel;
   a strike panel;
   wherein the strike panel comprises an electromagnet comprising:
   a stator;
   a hollow profile plunger shaft;
   two magnets, each of different size;
   where one magnet is disposed at each end of a plunger shaft and outside a stator coil;
   a stator coil;
   wherein the stator coil is arranged for exerting a magnetic field on the magnets disposed on the plunger shaft;
   whereby one magnet and plunger shaft travels in the stator;
   whereby the plunger shaft exerts a magnetic repulsive force on the fly wheel;
   whereby the sliding angular coupling is arranged for transferring the magnetic repulsive force to the main wheel and for transforming centrifugal force of the main wheel and fly wheel into an upward force on the fly wheel toward the strike panel;
   wherein the inertia thrust generating wheel module is capable of creating a resultant force as the result of the expansion of magnetic repulsive force and the rotation of the main wheel and the fly wheel.

2. The apparatus as claimed in claim-1, wherein the magnetic repulsive force is generated through a compression and expansion of the magnetic repulsive forces.

3. The apparatus as claimed in claim-1 and claim-2, wherein the strike panel comprises more than one electromagnet.

4. The apparatus as claimed in claim-3, wherein the electromagnet the two magnets on plunger shaft of similar size.

5. The apparatus as claimed in claim-1 to claim-3, wherein the electromagnet the plunger shaft is arranged to secure more than two magnets.

6. The apparatus as claimed in claim-1 to claim-3, wherein the electromagnet the plunger shaft is arranged to secure one magnet.

7. The apparatus as claimed in claim-4 and claim-5, wherein the electromagnet the magnet of different magnetic flux density.

8. The apparatus as claimed in claim-1 to claim-7, wherein the electromagnet the material of stator and plunger shaft not of ferrous material.

9. The apparatus as claimed in claim-1 to claim-8, wherein the electromagnet the plunger shaft is arranged with a flange.

10. The apparatus as claimed in claim-1 to claim-9, wherein the electromagnet the stator is arranged to hold one or more stator coil.

11. The apparatus as claimed in claim-1 to claim-10, wherein the electromagnet the stator is arranged to hold one or more magnet.

12. The apparatus as claimed in claim-1 to claim-11, wherein the electromagnet includes a stator and a stator coil arranged to recover induce charge from moving magnet.

13. The apparatus as claimed in claim-1 to claim-12, wherein the sliding coupling is angled at 45 degrees on a top side of the main wheel in a direction away from the axis of rotation.

14. The apparatus as claimed in claim-1 to claim-13, wherein the electromagnet includes a shaft connected to plunger shaft for position sensor like optical and/or hall effect sensor to determine precise plunger shaft position and motion.

15. The apparatus as claimed in claim-14, wherein the fly wheel comprises of one or more magnet of high flux density permanent magnet, non-high flux density permanent magnet, ring magnet, composite magnets and/or electromagnet for repelling the repulsive force from plunger shaft magnet.

16. The apparatus as claimed in any one of the preceding claims, wherein the electromagnet the plunger shaft is arranged detachable from stator.

17. The apparatus as claimed in any one of the preceding claims, wherein the electromagnet the plunger shaft of rod profile.

18. The apparatus as claimed in any one of the preceding claims, wherein the electromagnet the plunger shaft not of hollow profile.

19. The apparatus as claimed in any one of the preceding claims, wherein the electromagnet the plunger shaft, stator and/or magnet not of cylindrical profile.

20. The apparatus as claimed in any one of the preceding claims, wherein the electromagnet the plunger shaft and/or stator arranged with one or more magnet of high flux density

permanent magnet, non-high flux density permanent magnet, ring magnet, composite magnets and/or electromagnet.

21. The apparatus as claimed in any one of the preceding claims, further comprising a central shaft or spline for aligning the main wheel, fly wheel and strike panel.

22. The apparatus as claimed in any one of the preceding claims, further comprising a torque generating means coupled to main wheel for rotating the main wheel.

23. The apparatus as claimed in any one of the preceding claims, wherein the fly wheel and main wheel material not of ferrous metal.

24. The apparatus as claimed in any one of the preceding claims, wherein the inertia thrust generating wheel module not of cylindrical profile.

25. An inertia thrust generating apparatus as claimed in any one of the preceding claims, comprising more than one inertia thrust generating wheel module.