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A stand alone flywheel engine

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Abstract

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A Stand Alone Flywheel Engine as illustrated in Fig's 1 and 2 in the drawings, wherein shaft torque is provided by stimulated oscillation and a sympathetic resonance of one or more 'vector forces' established or instituted in the flywheel means of the invention and configured laterally to the flywheel's axial shaft; wherein said vector forces engage a number of 'cam followers' which are pivotal about their opposite end on a number of fixed position points equally spaced around and outside the flywheel's perimeter and incorporated in the flywheel engine's housing; and wherein said vector forces are maintained between an axial 'hub and cam' profile and an equal number of concatenate 'epicyclic arcs', each of which is incorporated in the inner face of a number of 'fly arms' pivotal about their centre part and supported upon the outer region of the flywheel means face; and whereby, an 'expansion device' or 'spring means' is positioned on the flywheel means to provide a radial force and outward bias to the tail end part of each fly arm: this outward bias in the tail end part of the fly arms is counter-balanced by an opposite and equal force presented in the forward part of each fly arm and maintained by a 'connecting rod' directing said force from the forward part of a fly arm to the hub and cam means and through its axis, whereby the transitional force instituted in the cam, interfaces with a cam follower's inner face and consequently the cam follower's outer interface with the forward epicyclic arc sector; wherein the sum of the counter-balance force is directed to the common axis, and whereby, the counter-balance configuration presents as a lateral vector force which engages a cam follower presenting between the forward epicyclic sector and cam profile: this engagement stimulates the drive or positive phase of a cam follower's oscillation cycle whereby the return or negative phase is provisioned by the tail end epicyclic arc part, and thus an oscillation continuum is presented which causes a sympathetic resonance to occur between the flywheel means and the cam follower's fixed position pivot points supported around and outside the flywheel's perimeter; said sympathetic resonance reciprocates the positive sine of the epicyclic arcs and cam followers oscillation cycle as an inverse pulse which augments rotation to the flywheel means and is in accordance with the 'equation of kinematic equations', wherein the fixed position pivot points of the cam followers and common axis represent zero, and the capacity for work within the configuration and dynamics of the flywheel(s), and as a result of its motion, provides a kinetic energy which augments rotation or spin to the flywheel means, and provides torque to the shaft of the flywheel engine of the invention.

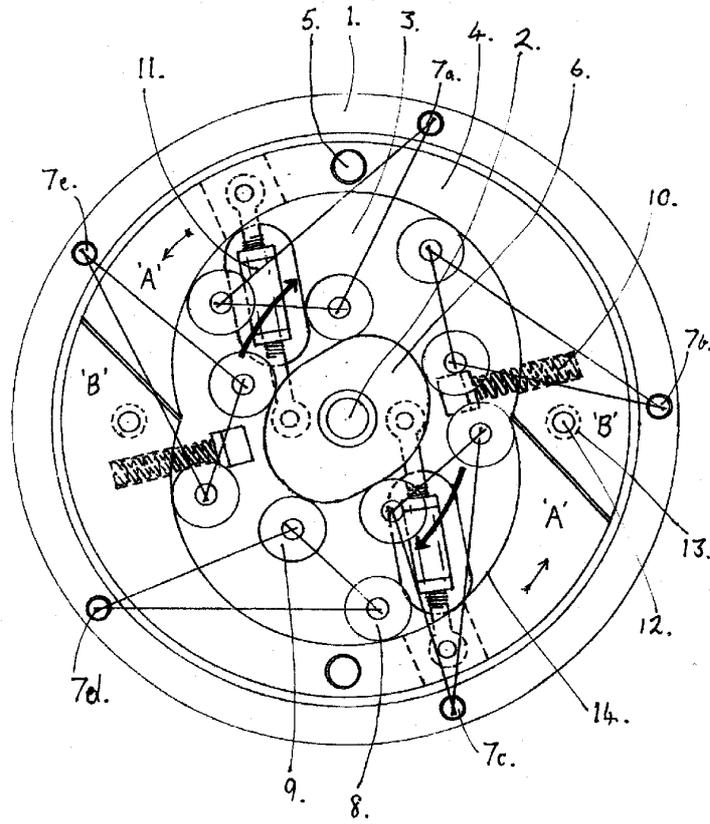
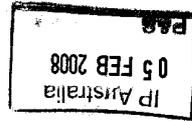


FIG. 1.

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**COMPLETE SPECIFICATION
STANDARD PATENT**

A STAND ALONE FLYWHEEL ENGINE

The following 10 pages provide a full description and statement of the above invention, including the best form of the invention known to me:

A STAND ALONE FLYWHEEL ENGINE

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Power or energy supply presently relied upon to accommodate most of our everyday needs is costly and creates enormous pollution problems; wherein, the present invention is inexpensive, effective, easy to manufacture and produces no pollution; and wherein, the present invention provides an equal or improved power output to similar forms of energy supply, e.g. from torch batteries, hydro-carbon engines to base load applications.

This is achieved by applying a variation of the differential equation that supports the containment and existence of an elementary particle or singularity - to the dynamics embodied in the Stand Alone Flywheel Engine of the present invention; wherein the potential difference accorded by the differential equation is reciprocated in spin to the elementary particle or singularity – it is likewise accorded to the shaft of the flywheel engine of the present invention which is described as follows:

The present invention consists of one or more flywheel means each being secured upon an axis shaft supported at each end in a housing of either an open, or closed configuration; and wherein shaft torque and spin is provided by stimulated oscillation and a sympathetic resonance generated by one or more 'vector forces' established or instituted on one, or both faces of each flywheel, and which are configured laterally to the flywheel(s) plane; said vector forces each engage in a precessional manner with a number of 'cam followers', each of which is pivotal at its opposite end part on an equal number of fixed position points equally spaced around, and outside the flywheel's perimeter and incorporated in the inventions housing; said vector forces are maintained between a freely rotatable 'hub and cam' profile, and an equal number of concatenate 'epicyclic arcs', each of which is configured in the inner face of an equal number of 'fly arms' that are pivotal about their centre part and supported at the outer part of a flywheel's face; and wherein, a number of 'expansion and/or contraction devices' configured radially to a flywheel's axis shaft provide both an outward or inward potential force or bias to the tail end part of each fly arm and inversely, to the forepart of said fly arms; the expansion and/or contraction devices are operated remotely by a prior art means (i.e. hydraulic, electro-magnetic, or mechanical) and routed through the flywheel's axial shaft to a journal and regulation

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means: alternatively, a spring means may be configured in situ to provide the outward bias to the fly arms tail end part; wherein, in both configurations, maximum rotation speed is regulated by a centrifugal governing device designed to engage with the fly arms and negate the bias or potential force acting outwardly on said fly arms and which transitionally presents as a lateral vector force by which the drive phase of a cam follower's oscillation cycle is inaugurated: wherein, by negating the potential difference established or instituted between the flywheel means and fixed position pivot points of the cam followers, the driving force that inaugurates and augments rotation to the flywheel is put out of action.

The expansion and /or contraction device(s) or spring means may be configured on one, or both faces, or in a flywheel, according to different design parameters, and in each case, provides an outward bias to the tail end part of the fly arms; this outward bias is counter-balanced by an opposite and equal force provided between the forepart of said fly arms and the hub and cam means which is freely supported on the flywheel's common axis; and whereby, said counter-balance is effected by means of a fixed or adjustable 'connecting rod' joining the fore part of each fly arm to the hub and cam means and through the flywheel's axis to provide an equal and opposite force at a cam's interface with the inner face of a cam follower, and consequently, to the cam follower's outer interface with the forward epicyclic arc sector: this counter-balance configuration enables a lateral vector angle to be established between the cam's profile and forward epicyclic arcs and provides the vector force which engages the opposed faces of each cam follower as they present in this sector; this engagement stimulates and inaugurates an oscillation cycle to the cam followers which presents as a wave form through the concatenate epicyclic arcs, and as a consequence, provides a sympathetic resonance to occur between the flywheel means and fixed position pivot points of the cam followers as the flywheel(s) rotates; whereby, the vector forces established or instituted in the flywheel means are echoed by the fixed position points of the cam followers to provide an active lateral positive pulse, or inverse vector force, to the flywheel means: this oscillation and sympathetic resonance of the vector forces establishes and augments spin or rotation to the flywheel and provides torque to the shaft of the invention – the above configuration is in accordance with the 'equation of kinematic equations', wherein the fixed position pivot points of the cam followers and flywheel's axis represent zero; and, the capacity for work provided by

the configuration and dynamics of the flywheel means, and as a result of its motion, provides a kinetic momentum to the flywheel of the invention which augments rotation speed and provides torque to the shaft of the present invention.

5 To maintain the fixed divergent nature required of the vector angles and to effect a continuum, the cam followers are configured or triangulated in a manner that determines: 'that the distance from said cam follower's pivot point to its interface with a cam face, is less than the distance from said pivot point to its interface with the epicyclic arcs configured in the inner face of each fly arm'; and wherein, this
10 configuration insures that - as the flywheel(s) rotate, the divergent vector angles established are reciprocated by the change in angular moment defined by the triangulation and configuration of the cam followers as they pass through the vector angled sector; thus said cam followers are interdependent in maintaining the fixed position nature required of the fly arms and cams: this fixed position nature is further
15 maintained by ensuring that at least one cam follower is presented in the drive phase of its oscillation cycle at all times as the flywheel(s) rotates; and whereby, to minimise slip friction at the cam follower's interfaces with the cams and epicyclic arcs, the cam follower's each incorporate a pair of off-set rotary or epicycloid interface means.

20
Once a cam follower has completed the outward drive phase or positive sine of its oscillation cycle through the vector angle, the tail end sector of the epicyclic arc provides the return phase or negative sine of said cam follower's oscillation cycle; whereby, the outward force presented by direction change to the cam followers during
25 this phase of its oscillation cycle, increases the bias or potential force engaging as a vector force upon a cam follower presenting in the forward epicyclic arc sector, and therefore negates any loss of power realised through the cam follower's return phase of its oscillation cycle: this allows for greater design parameters to said cam followers regarding weight and robustness.

30
In configuring the flywheel means, transition of the radially established or instituted drive forces which provide the outward bias to the fly arms, and which subsequently provides the lateral vector forces which engage the cam followers to augment rotation, also present radially at the axis shaft and fly arms central pivot posts during

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this transition prior to establishing said vector forces, thus preventing any unwanted lateral forces.

5 To minimise knock-on characteristics and noise which may occur at the end of a cam
6 follower's oscillation cycle as it leaves the tail end of an epicyclic arc, the cam's
7 profile is intimately profiled to accept a cam follower at a tangent to the flywheel's
8 axis, whereby the kinetic momentum gained by the cam follower is discreetly
9 absorbed in the direction of the shaft's axis, after which, the cam follower is allowed
10 to settle in the vector angled sector as another cam follower is released from its
11 respective drive phase by the cam means; whereby the fore mentioned cam follower
12 engages smoothly with the vector angles potential force to inaugurate its drive phase..

15 A braking means, either directly to the flywheel means, or to the shaft of the invention
16 is incorporated in the design and considered by a prior art means; wherein the braking
17 means established, provides a safe braking method to stop the flywheels rotation; said
18 braking means may be integrated with the expansion and/or contraction means
19 incorporated in the invention, and may be applied to either a manually operated form
20 of the invention, or an automated system.

20 Fine-tuning of the flywheel engine of the invention is carried out by a length
21 adjustment to the connecting rods by which correction and alignment of the
22 concatenate epicyclic arcs is provided to maintain the fixed position nature required of
23 the cam's profile and fly arms and relative interdependence of the cam follower's
24 configuration and triangulation parameters.

25 In one form of the invention; by positively weighting the tail end part of the fly arms,
26 and during rotation of the flywheel means, the centrifugal force induced in them
27 augments rotation to said flywheel means by transitionally increasing the potential
28 energy already established or instituted in the vector forces by the expansion and/or
29 contraction means or spring means, and thus the centrifugal force increases shaft
30 torque and speed to the flywheel engine of the present invention respectively.

To better understand the invention, reference will now be made to the following drawings, which graphically illustrate and represent the elements defining the basic form of the invention:

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- 5 **In the Drawings:**
1. Housing
 2. Common axis shaft
 3. Flywheel
 4. Fly Arm
 - 10 5. Fly Arm pivot post
 6. Hub and Cam means
 7. Cam Followers and pivot points a,b,c,d,e.
 8. Cam Follower's outer rotary or epicycloid face
 9. Cam Follower's inner rotary or epicycloid face
 - 15 10. Drive Spring or alternatively, an expansion and/or contraction driving device
 11. Adjustable Connecting Rod
 12. Governor pin
 13. Governor pin clearance hole in the Flywheel
 14. Epicyclic Arc embodied in the Fly Arm's inner face
 - 20 15. Centrifugal Governor Arm
 16. Governor Arm Stop Pin
 17. Governor Arm Set Spring means
 18. Governor Arm pivot point
 - 'A'. Forepart of Fly Arm
 - 25 'B'. Tail end part of Fly Arm

Figure 1 graphically illustrates the basic elements comprising the Stand Alone Flywheel Engine of the present invention and does not represent a detailed engineering drawing - the intention of this reference is to simplify understanding of the invention only; wherein, only the 'spring means' 10 is included in the drawings to provide the principle driving force by which rotation is inaugurated and augmented in the flywheel means 3: the spring means 10 is shown orientated radially to the axis shaft 2 (in order to negate unwanted lateral forces being applied to the flywheel means); and whereby the spring means provided, produces an outward bias or force to

the tail end part 'B' of each 'fly arm' 4, which are counter-balanced through the centrally positioned 'pivot posts' 5 of the fly arms by an equal and opposite force provided between said fly arm's fore part 'A' and common axis shaft 2; wherein, by directing the counter-balance force by way of the connecting rods 11, through the hub and cam means 6 and back to the fly arms 4 by way of the off-set cam follower's 'rotary or epicycloid faces' 8 and 9 respectively, a vector angle is able to be established between the forward epicyclic arc 14 and the 'hub and cam' means 6, whereby said vector angles provide the lateral vector forces (indicated by the dark arrows) which engage the 'rotary or epicycloid' faces 8 and 9 respectively of a cam follower presenting in that sector, and wherein, the triangulation and configuration of the cam followers is shown reciprocated by the fixed nature of the divergent vector angles as the flywheel means rotates, and is illustrated in Fig 1 by the five positional aspects of the cam followers 7 a,b,c,d,e, and their respective rotary interfaces 8 and 9.

- 15 On engagement of the cam followers by the vector forces, the positive phase of their oscillation cycle is stimulated and inaugurated and shown at 7c, after which, the return or negative phase of the cam followers oscillation cycle is provided by the tail end sector of the epicyclic arcs, and shown at 7e and 7b; whereby continuation of this oscillation cycle presents as a sympathetic resonance between the cam follower's fixed position pivot points 7 a,b,c,d,e, and the flywheel means as it rotates, and whereby the reciprocal pulse generated, inaugurates and augments rotation to the flywheel of the invention.

- 25 The epicyclic arcs 14 configured in the inner face of each fly arm 4, the cam followers 7 a,b,c,d,e, and respective rotary or epicycloid interface parts 8 and 9, and the hub and cam means 6, are interdependent, and their alignment is integral in maintaining the fixed position relationship of the cams and fly arms necessary to sustain an oscillation continuum, and wherein the cam face(s) are profiled to allow a cam follower, shown at 7c, to settle in the vector angled sector freely before the vector force engages upon it: this is enabled by suitably profiling a cam's face to release a cam follower presently in the drive phase of its oscillation cycle, and is shown at 7a and respective rotary interface 9 with the cam 6; it is also integral that the approach angle to the cam face at the end of a cam follower's return phase is profiled to initially align at a tangent to the common axis to absorb the kinetic momentum

gained by the cam followers during their respective return phase, and is shown at 5 degrees after top dead centre by the cam follower 7c which is positioned to commence its drive phase.

- 5 Fine-tuning the flywheel engine of the invention is undertaken by adjustment to the connecting rods length 11, which allows alignment to the concatenate epicyclic arcs configured in each fly arm's inner face; and wherein the engagement and release positions of the cam followers established by the cam's profile are a principle consideration in configuring the alignment parameters so as to utilize the favourable drive sector of the forward epicyclic arc sectors.
- 10

The five cam followers shown in Fig 1 provide that at least one cam follower is presented in the drive cycle at all times.

- 15 To control the maximum rotation speed of the flywheel means, and illustrated in Fig 2 - is one configuration of a centrifugal governor means; wherein, as the flywheel gains momentum, the increase in centrifugal force presenting in the governor arm 15, which is held in place by the governor arm stop pin 16 and governor arm set spring means 17, provides leverage through the pivot point 18 to the governor pin 12 passing through the clearance hole 13 in the flywheel 3, and embodied in the fly arms 4, the action of which negates any outward bias presented in the tail end part 'B' of the fly arms at the set position for maximum rotation speed: said governor device may be controlled remotely in some forms of the invention by routing a control means through the flywheel's axial shaft to a journal and operating station.
- 20

- 25 The above reference to Figures 1 and 2 is provided to enable a better understanding of the workings of the invention and the illustrations are not to be interpreted or regarded as detailed engineering drawings.

- 30 The Stand Alone Flywheel Engine as described may be built or fabricated to any practical size according to application requirements; and whereby present and future manufacturing methods, materials and design may be used to construct or build the invention according to the parameters disclosed in the description and the claims supporting the present invention.

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The Claims defining the Invention are as follows:

Claim1. A Stand Alone Flywheel Engine wherein shaft torque is provided by
5 stimulated oscillation and sympathetic resonance of one or more 'vector forces'
established or instituted in the flywheel means of the invention and configured laterally
to the flywheel's plane; wherein said vector forces engage a number of 'cam followers'
which are pivotal about their opposite end on a number of fixed position points equally
spaced around and outside the flywheel's perimeter and configured in the inventions
10 housing; and wherein said vector forces are maintained between an axial and freely
rotatable 'hub and cam means' profile and an equal number of concatenate 'epicyclic
arcs', each of which is configured in the inner face of an equal number of 'fly arms'
which are pivotal about their centre part and supported upon the outer region of the
flywheel means face; and whereby, an 'expansion and/or contraction device' or 'spring
15 means' is positioned on the flywheel means to provides a radial force and outward bias
to the tail end part of each fly arm: this outward bias to the tail end part of the fly arms
is counter-balanced by an opposite and equal force acting outwardly upon the forward
part of each fly arm and which is maintained by a 'connecting rod' directing said
counter-balance force from the forward part of a fly arm to the hub and cam means and
20 through its axis, whereby interfacing with a cam follower's inner face, and
consequently, said cam follower's outer interface with the forward epicyclic arc sector;
and wherein the sum of the counter-balance force is directed to the common axis: the
above configuration provides a lateral vector force which engages a cam follower
presenting between the forward epicyclic arc sector and the cam's profile, and whereby
25 this engagement stimulates the drive or positive phase of a cam follower's oscillation
cycle followed by the return or negative phase which is provided by the tail end
epicyclic arc part; the action of which, inaugurates an oscillation continuum to the cam
followers and further provides a sympathetic resonance to occur between the flywheel
means and the cam follower's fixed position pivot points supported around and outside
30 the flywheel's perimeter; said sympathetic resonance reciprocates the positive sine
induced by the forward epicyclic arc sectors as an inverse vector force pulse and which
augments rotation to the flywheel means: to maintain the fixed divergent nature
required of the vector angles to effect an oscillation continuum, the cam followers are
triangulated and configured so that 'the distance from the cam follower's pivot point to

its interface with the cam's profile, is less than the distance from its pivot point to its interface with the epicyclic arcs'; this configuration insures that the divergent vector angle is reciprocated in the change in angular moment defined by the cam followers as the flywheel(s) rotates: to further maintain the fixed divergent nature required of the vector angles, at least one cam follower must present in the drive phase of its oscillation cycle at all times through a flywheel's rotation: the above configuration is in accordance with the 'equation of kinematic equations', wherein the fixed position pivot points of the cam followers and common axis represent zero, and the capacity for work established in the configuration and dynamics of the flywheel(s), and as a result of its motion, provides a kinetic momentum which augments rotation or spin to the flywheel means and torque to the shaft of the flywheel engine of the invention.

Claim 2. A Stand Alone Flywheel Engine of Claim 1; wherein the expansion and/or contraction devices are operated remotely by means of a hydraulic, electromagnetic or mechanical means routed by way of the common axis shaft to a journal and control station.

Claim 3. A Stand Alone Flywheel Engine of Claim 1; wherein a cam follower's interface with the cam's profile and epicyclic arcs respectively, is provided by an offset configuration of a pair of rotary or epicycloid means to reduce slip friction.

Claim 4. A Stand Alone Flywheel Engine of Claim 1; wherein a cam follower's return phase - or the negative sine of its oscillation cycle through the tail end sector of the epicyclic arcs - increases the outward bias presenting in said tail end part of the fly arms - which further increases the vector force engaging a cam follower in its respective drive cycle - and therefore counters the direction change losses that would be incurred during said cam follower's return phase - which allows for greater design parameters regarding weight and robustness to the cam followers.

Claim 5. A Stand Alone Flywheel Engine of Claim 1; wherein the fly arms may be positively weighted at their respective tail end parts relative the fore part; wherein, on rotation of the flywheel means, provides a centrifugal force which increases the outward bias presented in the fly arms by the expansion device or spring means, and

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therefore transitionally increases the shaft torque developed by the flywheel engine of the invention.

5 **Claim 6.** A Stand Alone Flywheel Engine of Claims 1 and 5; wherein, to limit augmentation to the flywheel's rotation speed, a centrifugal governing device is incorporated in the invention and configured according to design requirements; whereby, said centrifugal governing device engages the fly arms in a manner to negate the outward bias established or instituted in the tail end part of each fly arm, and wherein, said centrifugal governing device would be pre-set to determine maximum rotation speed; or alternatively, remotely operated.

10 **Claim 7.** A Stand Alone Flywheel Engine of Claim 1; wherein the invention would incorporate a braking means of a prior art means, either directly to the flywheel(s) of the invention, or to the common axial shaft; and wherein, in either configuration, 15 would provide a safe braking means to the invention.

Claim 8. A Stand Alone Flywheel Engine of Claim 1; wherein the connecting rods joining the fly arms to the hub and cam means incorporate a length adjustment means by which alignment of the concatenate epicyclic arcs embodied in the inner face of 20 each fly arm is enabled, and which, provides a fine-tuning mechanism to the flywheel engine of the invention.

Claim 9. A Stand Alone Flywheel Engine of Claim 1; wherein the hub and cam means interface with the cam followers is profiled to facilitate and initiate said cam follower's 25 drive phase of its oscillation cycle by providing an intimate approach angle to the cam's face at the end of the cam follower's return phase, whereby the kinetic momentum gained in the return phase is directed toward the axis of the hub and cam means as the cam follower reaches its apex, after which the cam follower is allowed to present in the vector angle by the intimate profiling of the cam's face as another cam 30 follower is released from the drive phase of its oscillation cycle, whereby the vector force engages the fore mentioned cam follower to promote its respective drive phase; this configuration of the cam faces profile allows for a smooth cam follower oscillation transition and limits knock-on and noise.

Claim 10. A Stand Alone Flywheel Engine of Claims 2, 6 and 7; wherein the governing device, braking means and expansion and/or contraction devices are integrated to provide an improved operation and control to the invention, either manually or in an automated system.

Claim 11. A Stand Alone Flywheel Engine of Claims 1 to 10; wherein any practical size, application, manufacturing method and material, may be used to construct or build the invention according to the Claims supporting the Stand Alone Flywheel Engine as described in the present invention.

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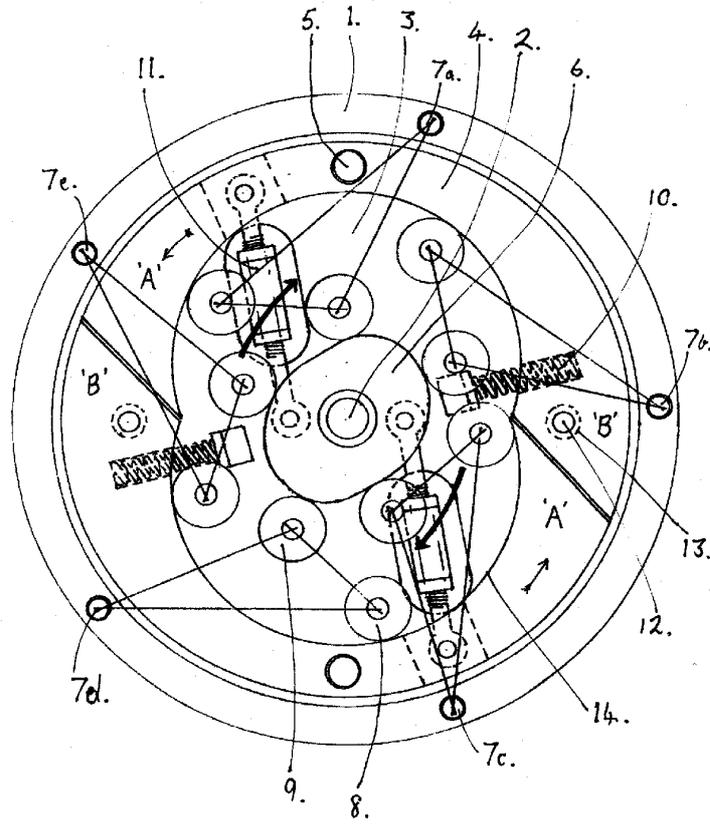


FIG. 1.

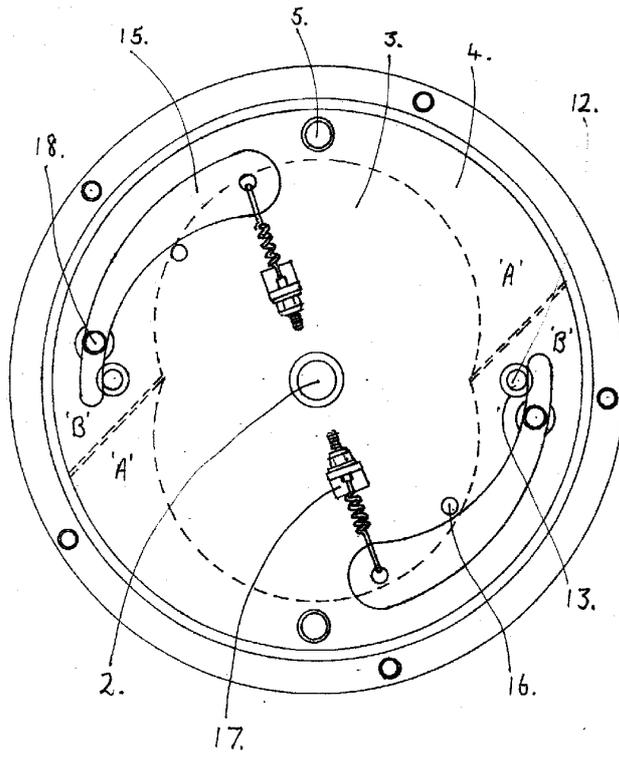


FIG.2.