Abstract Title: Oscillating pendulum prime mover

A prime mover comprises an oscillating pendulum 1 carrying a mass 7 and magnets 25, the magnets interacting with switched electromagnets 28 to maintain the oscillation. The pendulum couples via a length compensator 12 with a crank mechanism 15 which may drive a generator, a hydraulic pump 35 or a pneumatic pump. Alternatively the pendulum rotates the pinion of rack and pinion arrangement to provide an oscillating linear output which may drive a pair of pumps (fig 6) A wind turbine 33 or solar power 34 supplies power to the battery energizing the electromagnets via timing circuit 31. A double pendulum system swinging in opposition is disclosed driving a shaft through freewheel sprockets (figs 8-10). The construction of the compensator is shown (fig 2). Basic hydraulic circuits are disclosed.
GRAVITY ASSISTED PRIME MOVER

FIELD OF THE INVENTION

This invention relates to a method and apparatus for generating usable power.

BACKGROUND OF THE INVENTION

It is known that usable energy such as electrical power can be, and is currently, generated in many ways using a wide and varied selection of methods and apparatus.

Some such apparatus involves using chemical reactions such as those that occur in batteries and fuel cells, the use of rotating devices such as alternators and direct current generators driven by various prime movers such as steam turbines, diesel, gasoline and gas fueled internal combustion engines, piezoelectric devices and solar devices that convert the energy in solar radiation to electrical energy, normally referred to as photocells. Also electrical power can be generated using wind and water powered devices.

Such known methods of generating usable energy are fundamentally based upon the precept that the energy required, in whatever form it may be, to produce the usable energy is overall less than the level of energy being produced by the method in question thereby leaving a positive balance of power that is usable.

It is well known that the generation of usable energy such as electrical power is a fundamental need of society in today’s world where industry and commerce are almost totally dependent upon continuous supplies of electrical power in order to operate the many processes that control the lives of people world wide.
As the demand for electrical power continually increases from which it follows that as the demand for electrical power in all countries throughout the world continues to grow, even greater demand is put on the dwindling reserves of fossil fuels such as coal, oil and gas, which are all burnt as fuel to power vast power generating stations that emit harmful gases and compounds to atmosphere causing wide scale pollution.

OBJECTS OF THE INVENTION

It is an object of the invention to provide a method of and apparatus for the generation of usable energy such as electricity without the need to use fossil fuels.

Accordingly, a primary object of this invention is to provide a method and apparatus for generating electrical power without the need to burn fuels, to employ chemical reactions, or the use of solar radiation, wind or water as the primary energy source for use in practicing the method and in the operation of said apparatus.

STATEMENTS OF THE INVENTION

Broadly according to a first aspect of the invention, there is provided a method for producing usable energy serving as a primary means of producing usable power by converting oscillatory motion into rotation, in conjunction with a secondary means for producing additional energy for maintaining the oscillatory motion.

Preferably the rotary motion is derived from the oscillatory movements of an oscillatory element/pendulum.

In a preferred method the rotation motion is used to generate electricity.
Broadly in accordance with a further aspect of the invention there is provided a prime mover apparatus including means for converting oscillatory movement into rotational movement, and means responsive to a secondary source of energy for maintaining said oscillatory motion...

Preferably the prime mover includes a pendulum mounted for swinging movement, means are provided for converting the oscillatory movements of the pendulum into rotational movement for use as a source of energy, and secondary means for producing a independent energy sufficient to maintain the oscillatory movements of the pendulum.

In a preferred arrangement the oscillatory movements of the pendulum are converted into rotation by means of a crank mechanism.

Preferably the oscillations of the pendulum are maintained by electromagnetic forces derived from the secondary source of power.

In a preferred construction the secondary source includes a air driven turbine and/or solar panel or the like arranged to produce an electrical current that is utilisable to energise the means for producing said electromagnetic force.

In a preferred arrangement the pendulum carries magnets that are such as to be magnetically co-operable with stationary electromagnets that are selectively energisable in relation to the position of the pendulum during its oscillatory movements.

In a further arrangement there is provided apparatus including a second pendulum, the arrangement being such that each pendulum has its own independent suspension shaft and is arranged to oscillate in tandem with the other
pendulum but in opposite direction/, and wherein the two pendulums are arranged
to drive a common output shaft through an associated drive transmission.

Preferably, the drive transmission of each pendulum includes a one way drive
means.

In a particular construction the one way drive means includes a freewheeling one
way drive.

BRIEF DESCRIPTION OF THE DRAWINGS

For better understanding of the invention and to show how to carry the same into
effect reference will now be made to the accompanying drawings in which:-

Figure 1 is a schematic theoretical diagram highlighting the principles of
operation of a method incorporating the concepts of the invention;

Figure 2, schematically illustrates details of a component of the apparatus of
Figure 1;

Figure 3 schematically illustrates a first embodiment of apparatus for producing
electrical power from the oscillations of an element/pendulum.

Figure 4 schematically illustrates in front view an embodiment of the apparatus of
Figure 1 and particularly the production of linear motion from bi-directional
rotating motion;

Figure 5 is a side view of the embodiment of Figure 4;
Figure 6 schematically an embodiment of the invention applied as the prime mover in a power generating system such as indicated in Figure 3;

Figure 7 schematically illustrates an embodiment of apparatus for producing linear motion from bi-directional rotating motion;

Figure 8 schematically illustrates the principles of a double pendulum assembly driving a common shaft; and

Figure 9 schematically illustrates in front view a practical embodiment of the apparatus of Figure 8 and particularly the production of linear motion from bi-directional rotating motion; and

Figure 10 is an side view of the embodiment of Figure 9;

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to Figure 1 an oscillatable member 1 (hereinafter termed pendulum) in the form of a rigid bar is mounted at one end 2 thereof for oscillatory movement by a shaft 3 rotatably mounted from a framework 4, (of which only a fragmentary portion is illustrated) which allows the pendulum 1 to swing between first and second limit positions indicated in the Figure by lines 5 and 6.

A load 7 is provided at the lower end 8 of the pendulum. This load serves to increase the forces arising from the oscillations of the pendulum 1.

The pendulum is provided with a short extension 9 that extends in co-linear prolongation of the pendulum bar to provide a stub arm.
The free end 10 of the extension 9 is connected by way of a pivotal connection to a rod 11 to a length variation compensating means 12 the latter being pivotally connected to the free end 13 of a bar 14 forming part of a crank mechanism 15 incorporating a disc 16 connected with a rotatable shaft 17 suitably arranged in bearings provided on the framework 4. As shown in the Figure the compensating means is positionally slidable in slide guides 12A and 12B.

With this arrangement as the pendulum 1 oscillates the extension 9 oscillates correspondingly and in so doing rotates the disc 16 and its shaft 17.

This combination of the pendulum 1 and the associated rotatable shaft 17 can be regarded as a prime mover since the shaft rotation can be used for whatever purpose required. For example the rotation of the shaft 17 can drive apparatus for generating electricity or for use as a high torque rotating drive source capable of driving for example hydraulic or pneumatic pumps. In practice such pumps could, for example, be used to maintain a pressurised fluid flow for driving a hydraulic or pneumatic motors that in turn drive alternators for producing or other usable power.

It will be clear that the extension 9 acting in combination with the radius of the shaft 17 forms a shorter lever arm that is shorter than the lever arm formed by the pendulum. It therefore follows that the applied force to the main lever (the overall weight of the pendulum) is amplified by the ratio of main and shorter lever arm lengths. In other words, the free end of the extension becomes the location where the applied force arising from the pendulum oscillations is amplified by the ratio of lever arm lengths.

Referring now to Figure 2 this Figure very schematically illustrates an embodiment of the above mentioned length compensator 12. As shown the compensator includes a barrel/cylinder 18 within which a piston 19 is able axially
to slide. The piston 19 is connected to a rod 20 whose free end connects with the rod 11. The piston is resiliently loaded on each axial side thereof by compression springs 21 and 22. The barrel/cylinder connects with a rod 23 that in turn connects with the end 13 of the rod of the crank mechanism.

It should be noted that the barrel 18 slides with respect to the slide guides 12A and 12B. In operation the relative movement between the piston 19 and the barrel 18 serves to provide means for smoothing out the movements and length variations of the rods 11, 14 by way of the piston 19 and its spring loading.

An electromagnetic system including magnets 25 respectively provided on the opposite end faces of the load 7 carried by the pendulum 1. as part of a means for maintaining the oscillatory movements of the pendulum 1 whose arc of swing between the limits 5 and 6 is represented, in the Figure 1, by the arrow headed line 26. the electromagnetic system includes at each such limit point 5 and 6 electromagnets 27,28 respectively. These electromagnets are intended to react with the magnets carried by the pendulum in such manner as to exert a return force on the pendulum 1 at a predetermined point of time after the pendulum has reached the end of its swing distance i.e., its natural gravitational swing swing and has stopped and at which instant the action of gravity upon the pendulum is such as to start to swing the pendulum in the reverse direction, the return force serving to assist the force required for establishing reverse direction of swing of the pendulum. In other words an additional drive force is applied to the pendulum as it effectively commences a reverse movement at each end of its swing.

Control means are provided to ensure that the electromagnetic system produces a timed force of repulsion between the stationary magnets and those carried by the pendulum.
In other words the electromagnetic system is arranged to produce a repulsion force on the pendulum at the ends of the swing of the in the manner of a ‘force kick’ of sufficient magnitude to overcome any loss of energy arising from loss forces acting upon the pendulum and elsewhere in the system.

The electromagnetic system is powered from a secondary power source that is schematically illustrated inter alia in Figure 3.

As shown in the Figure 3 the power required for energising the electromagnetic system is derived from a battery pack 30 serving to energise timer circuits 31 that in turn are control the feed of electricity to the electromagnetic system. In the Figure 3 the previously discussed prime mover is schematically illustrated within the dashed line square 32.

The charge level of the battery pack 30 is maintained by the output of a wind turbine 33 and/or solar panel 34

In use current/voltage derived by the auxiliary power source under the control of the timing arrangements applies a direct current of the appropriate sense as to ensure that the stationary magnets are each of the opposite polarity to that of the oncoming magnet carried by the pendulum thereby ensuring the production of repulsive forces.

With this arrangement oscillation of the pendulum will continue for so long as the respective pairs of electromagnets are energised at the appropriate positions of the pendulum relative to the stationary magnets i.e., when the pendulum is approaching either of its swing arc limits and the pendulum magnets are in close proximity to the stationary magnets.
It will be clear that with this arrangement the force arising from the oscillating stub arm serves to drive the crank mechanism that in its motion produces rotation of its associated shaft which rotation is utilised to drive a powered system such as a hydraulic arrangement.

Thus for example the rotating crank mechanism shaft can be arranged to drive an electric current generator directly or to drive a hydraulic or pneumatic pumping unit by maintain a pressurised fluid flow in a hydraulic or pneumatic motor that in turn drives electrical alternators.

The Figure 3 also very schematically illustrates a possible embodiment of a basic hydraulic circuit for generating electricity for producing an electrical output.

As shown the prime mover unit indicated by the dashed line square 32 drives a hydraulic pump 35 whose output 36 is arranged to drive a hydraulic motor 37 by way of a variator 38, and whose fluid inlet 39 connects with a reservoir 40. The fluid outlet side 41 of the motor 37 connects with the reservoir 40.

The fluid outlet line 36 also connects by way of a restrictor valve 42 with the reservoir and additionally with an accumulator 43 and a controller 44 is provided in the pressure line 36.

The hydraulic motor 37 is used to drive an alternator 44A whose electrical output is delivered to a multiphase power output unit 45 by way of a frequency regulator 46.

Referring now to Figures 4 and 5 these Figures schematically illustrates as a side and end view a practical installation of the apparatus of Figure 1.
In figures 4 and 5 the pendulum 1 is mounted from the shaft 3 that is rotatably mounted from a support frame 47 located within an outer main frame 48. A pinion gear 49 is mounted to the pendulum shaft 3 and is operationally in mesh with a sliding rack assembly 50. The action of the pendulum causes the pinion to undergo bi-directional motion which in turn induces reciprocatory linear displacement movement of the rack assembly which is utilised to drive for each such movement direction a ram pump units 51 and 52. As will be noted from Figure 4 the anti-clockwise movements pinion gear 49 actuates the ram pump 51 and clockwise movements actuates the ram pump 52 of the rack assembly.

The action of the two ram pumps is used to provided a pressurised hydraulic fluid pressure for a hydraulic circuit such as shown in Figure 3.

Referring now to Figure 6 this Figure very schematically illustrates a hydraulic circuit for applying the pressurised fluid to a hydraulic circuit such as shown in Figure 3. In Figure 6 those components that correspond to components of the circuit of Figure 3 are identified by the same reference numerals. As will be seen the circuitry of Figure 6 includes hydraulic valve arrangements 53 for routing the pressurised fluid from the ram pugs 51 and 52 into the hydraulic circuit 3.

In the case of the figure 6 the power for the electromagnetic circuit associated with the pendulum can be produced by arrangements similar to those disclosed in relation to Figure 3.

Referring now to Figure 7, this Figure illustrates an alternative embodiment for driving a hydraulic pump from the oscillations of the pendulum 1. In this Figure the same reference numerals are sued for components previously mentioned in relation to other embodiments shown in the preceding Figures 1 to 6.
In the embodiment of Figure 7 the movements of the pendulum 1 are transmitted to a hydraulic pump 35 by way of a free wheeling drive sprocket 54, driving by way of and associated interconnecting drive including pinions 55 and 56 and drive connections belts etc., 57.

As will be noted the hydraulic circuit involves components such as have been discussed in relation to Figures 3 and 6 is essentially the same as those shown in Figures 3, and 6.

The embodiment of Figure 7 would include auxiliary power derived, as in the case of Figures 3 and 6, from a wind generator or solar panels. (not shown)

With the embodiments so far described a single pendulum is involved.

However, as is as shown in Figures 8 and 9 more than a single pendulum may be used.

Referring now to Figure 8 which illustrates the use of a first pendulum 1A and a second Pendulum 1B respectively mounted upon support shafts 3A and 3B respectively which are bi-directional in rotation each pendulum is associated with a drive sprocket 60A and 60B such that as the associated pendulum 1A, 1B swings the sprockets 60A and 60B rotate. In the Figure the arcs of swing of each pendulum is indicated by the arrow 61A and 61B. The drive sprockets 60A and 60B are respectively arranged to rotate a common drive shaft 62 by way of a drive transmission 63A and 63B each respectively including a free wheeling one way drive sprocket 64A and 64B. the direction of the drive of the transmission is illustrated by the references 65A and 65B.

In operation the pendulums are arranged to oscillate in tandem but in opposite directions i.e., whilst pendulum 1A is moving from right to left the pendulum 1B
is moving from left to right thereby ensuring the shaft 62 is continuously driven.

Referring now to Figure 9 which schematically illustrates in front view an assembly of twin balanced pendulums 1A and 1B mounted in a common support frame 70.

Referring now to Figure 10 which is a side view of the assembly shown in Figure 9. As shown, the pendulums 1A and 1B are arranged side by side in the frame 70 and are respectively associated with a drive mechanism 63A and 63B as has been discussed in relation to Figure 8. With this arrangement the support shafts 3A and 3B for the pendulums are bi-directional in motion and by reason of the transmission systems 63A and 63B including the free wheeling one-way drive sprockets 64A and 64B, the motion of the pendulums 1A and 1B continuously rotate the output drive shaft 62 in a single direction of rotation. As shown the output shaft mounts a drive sprocket 66 for external use.
CLAIMS

1. A method for producing usable energy/power, including the steps of deriving oscillatory motion from a first form of natural energy/force, deriving from the oscillatory motion linear/rotational motion, using the linear/rotational motion to provide said usable power, producing secondary energy/power from an alternative source of natural force and utilizing at least a part of the secondary energy/power to counteract any energy/power loss arising from the production of the linear/rotational motion from the first form of energy.

2. A method a claimed in claim 1, in which the first source of energy involves the production of oscillatory motion using the force of gravity.

3. A method for producing usable energy/power including the steps of producing usable power by converting linear/oscillatory motion derived from the use of gravitational force into rotation, producing additional energy from a alternative source of natural energy/force, using at least a portion of the additional energy for replacing any loss of energy arising from the production of said rotation.

4. A method for producing an usable form energy/power from gravitational force including, the steps of using the gravitational force to produce rotation, producing from an alternative source of natural force additional energy/power, and using at least a portion of the additional energy/power to counteract any energy losses arising from the production of the usable form of energy derived from gravitational force.

5. A method as claimed in claim 4, and in linear/oscillatory motion is initially produced by using gravitational force, and the linear/oscillatory motion is converted to rotational motion that is utilised to produce electrical power.
6. A method as claimed in claim 4 or 5, and in which the rotation motion is produced from the oscillatory movements of at least one pendulum,

7. A method as claimed in claim 6, and in which any energy/power losses arising from the production of the rotational motion are restored/counteracted by electromagnetic forces derived from the second source natural energy/power.

8. A method for producing usable power from gravitationally derived energy/power substantially as herein before described with reference to the accompanying drawings.

9 Apparatus for producing energy/power from natural forces/sources, including means for producing energy/power from gravity responsive means, and means responsive to a non-gravitational source of natural force for producing secondary energy/power to replace/counteract any energy/power loss arising from the production of the gravity originating energy/power.

10 Apparatus for producing energy/power from natural forces/sources, including gravity responsive means for producing linear/rotational motion, and means responsive to a non-gravitational source of natural force for producing secondary energy, serving to replace/counteract any energy loss arising from the production of the oscillatory movement.

11. Apparatus for producing energy/power using natural forces/sources, including means for producing from gravitation force oscillatory motion, means for converting the oscillatory motion converting the gravitationally derived oscillatory movement into linear/rotational motion, means responsive to a non-gravitational source of natural force for producing secondary energy/power in a form suitable
for replacing/counteracting any energy loss arising from the production of the oscillatory movement.

12. Apparatus as claimed in claim 11, including a pendulum pivotally mounted for undergoing swinging movement to produce oscillatory movement, means for converting the oscillatory movements of the pendulum into linear/rotational movement for use as a source of energy/power, and wherein the secondary means for producing said secondary energy/power is arranged to deliver a pulse of force to the pendulum at each and of a pendulum swing in such sense as to assist in causing the direction of pendulum swing to reverse.

13. Apparatus as claimed in claim 12, and wherein the pendulum is pivoted intermediate the ends therefor, the arrangement being such as to provide a lower main portion extending below the pivot axis of the pendulum, and an upper shorter secondary potion extending above the pivot axis, and wherein the free end region of the secondary portion is connected to means for producing said motion.

14. Apparatus as claimed in claim 12 or 13, and including means for producing rotational motion from the action of the pendulum.

15. Apparatus as claimed in claim 14, and wherein the means for producing the rotational motion includes a crank mechanism, whose crank arm is connected to receive movement from the free end of the shorter portion of the pendulum.

16. Apparatus, as claimed in claim 13, 14 and 15, and wherein the said main pendulum portion carried at its lower end a load providing element, and wherein said element is adapted to provide a part of an electromagnetic means for producing pulses of force that are arranged to act upon the pendulum in such sense as to maintain the swinging action of the pendulum.
17. Apparatus as claimed in claim 16, and wherein the load element mounts permanent magnets that are arranged to be moved into operational relationship with associated positionally fixed electromagnets positioned at the locations of the ends of the swing of the pendulum, and wherein the electromagnets are arranged to be energised from the secondary energy/power.

18. Apparatus, as claimed in claim 17, and wherein the permanent magnets are so located on the load element that a magnet is located on a leading surface of the load element for each direction of swing of the pendulum.

19. Apparatus as claimed in any one of claims 9 to 18, and wherein the secondary source of energy/power includes a air driven turbine and/or solar panel or the like arranged to produce an electrical current that is utilisable to energise the means for producing said electromagnetic force.

20. Apparatus as claimed in any one of claims 12 to 19, and including a hydraulic/pneumatic pump and associated motor connected to receive drive from the from the movements of the pendulum., and a electrical alternator connected to receive operational drive from the motor to produce an electrical power output.

21. Apparatus as claimed in any one of claims 12 to 20 and including a second pendulum, the arrangement being such that each pendulum has its own independent suspension shaft and is arranged to oscillate in tandem with the other pendulum but in opposite direction/, and wherein the two pendulums are arranged to drive a common output shaft through an associated drive transmission.

22. Apparatus as claimed in claim 21, and wherein the drive transmission of each pendulum includes a one way drive means.
23. Apparatus as claimed in claim 22, and wherein the one way drive means includes a freewheeling one way drive.

24. Apparatus for producing energy/power from natural forces/sources, constructed and arranged to operate substantially as herein before described with reference to the accompanying drawings.
Application No: GB0719187.7
Claims searched: 1-23
Examiner: John Cockitt
Date of search: 31 January 2008

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

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<td>US2007/035134 A1 BRISTOW - see whole document esp. fig 3 - solar power to maintain swing.</td>
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<td>GB2413167 A WILLIS - see whole document</td>
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<td>JP2003227456 A TSUKAGOSHI - see figs and EPO/WPI abstracts - example of electromagnetic topup.</td>
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Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC:

F2S; H2A

Worldwide search of patent documents classified in the following areas of the IPC

F03G; H02K
The following online and other databases have been used in the preparation of this search report:

ONLINE: WPI, EPODOC

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