PATENT SPECIFICATION

234,317

Application Date: Feb. 14, 1924. No. 17,451/24.

(Patent of Addition to No. 185,022 : Aug. 31, 1921.)

Complete Accepted: May 14, 1925.

COMPLETE SPECIFICATION.

Improvements in Power Transmission.

I, GEORGE CONSTANTINESCO, of "Carmen Sylva," Beechwood Avenue, Oatlands Park, Weybridge, in the County of Surrey, a subject of the King of Great Britain and Ireland, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

This invention relates to improvements in or modifications of the invention claimed in the specification of my prior patent No. 185,022, in which I have shown methods of transmitting power from a prime mover to a shaft which is to be rotated against a variable resisting torque by splitting alternating or reciprocating motion derived from a steadily rotating shaft into component alternating motions of the same frequency; one component motion being caused to give alternating motion to a mass without absorbing energy, while another is caused to give alternating motion to a pair of unidirectional driving devices working in opposite phase and rotating a shaft.

This invention consists in means for deriving the reciprocating motion as above set forth by making use of the inertia of a periodically moving unbalanced mass, which mass may either act by itself as the inertial mass between which and the driven shaft the motion of the prime mover is distributed, as in my former specification No. 185,022, or it may share this function with another mass.

The accompanying drawings show various forms of the invention.

Figure 1 shows means for generating oscillatory motion from the gyration of an unbalanced mass which shares with another mass the functions of the inertial mass described in my former specification.

Figure 2 is a similar but somewhat simplified form of the same apparatus.

Figures 3 and 4 are different views of a device in which the mass which generates the oscillations by its inertia also acts by itself as the inertial mass of my former specification, without assistance from any supplementary mass.

Figure 5 shows an electrical power unit in which the oscillations are set up by the gyrations of masses rotated by electric motors. These masses together with the mass of the casing act as the inertial mass of my former specification.

Figure 6 shows an internal combustion power unit similar to Figure 5, but in this case the oscillations are set up by the reciprocating piston.

Figure 7 is a modified form of the apparatus shown in Figures 1 and 2, and

In the form of the invention shown in Figure 1, 21 is a mass connected by an arm 22 to an axis 23, which axis is suspended by a link 24 from a fixed support 25. Collinear, or approximately collinear, with the axis 23 when in the position shown is the shaft of the prime mover, which is connected to the axis by a flexible coupling, such as a double Cardan joint. This arrangement is not shown, but it is similar to that shown in Figure 4 at 80, 82, 81 and 84, as will be described.

The axis 23 is connected by a link 26 to the rod 28 of a pendulum 30 at the point 27. The pendulum has a heavy bob 30 and it is suspended from a fixed point 29. A link 32 connects a point 31 on the pendulum rod with a link 34 which turns about a fixed pivot 35, and oscillating arms 36, 37, carrying pawls 38, 39, are connected to the end 33 of the link 34. The arms 36, 37, turn about the axis 41 of the rotor 40.

In this arrangement it will be seen that the rotary motion of the prime mover

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is coverted into lateral oscillation of the axis 23 in virtue of the gyration of the mass 21. This axis oscillates the pendulum 28, 30, if the latter is free to move, and thus the oscillators 36, 37, are driven. The motion of the prime mover is therefore shared between the centre of gravity of the two masses 21 and 30 and the rotor. If, for example, the torque on the rotor becomes infinite so that the rotor cannot move, the mass 30 becomes fixed, and therefore also the axis 23. But the mass 21 continues to gyrate, and consequently the centre of gravity of the two masses moves to and fro. Under these circumstances this motion of the centre of gravity will be a maximum. If, however, the torque on the rotor is zero, the pendulum is free to oscillate the mass 21 continuing to gyrate. In this case the lateral motion of the centre of gravity of the masses 21 and 30 is zero or nearly so. Torques on the rotor of intermediate value produce intermediate lateral oscillations of the centre of gravity.

Figure 2 is a similar arrangement. In this case the link 26 of Figure 1 is dispensed with, the axis of gyration of the mass 51 being situated at 52 on the rod 53 of the pendulum bob 55. The rod is suspended at 54. Links 56 and 57 connect the axis 52 directly with the arms 36 and 37. The action is the same as before.

In the form of the invention shown in Figures 3 and 4, a single mass performs the functions of the two masses in Figures 1 and 2. The primary shaft 80 is arranged to drive an intermediate shaft 81 through a Cardan coupling 82. The intermediate shaft 81 rotates the flywheel 83 through a Cardan coupling 84, so that the centre of the wheel 83 can describe a circular or elliptic path as indicated by the dotted circle 86, Figure 5. A pivot 87 is provided in the flywheel 83 and is connected by a rod 88 to a triangular oscillating member 89 pivoted at the fixed point 90. Another pivot 91 on the triangular member 89 is connected by connecting rods 92, 93, to oscillating members 94, 95, carrying ratchet devices 96, 97, adapted to drive the rotor 100. The pivot 87 is also connected by a rod 101 with a lever 102 pivoted at a fixed point 103, the other end of this lever carrying a pivot 104 which is connected by two rods 105, 106, with a pair of oscillating members 107, 108, carrying ratchet devices 109, 110, acting on the rotor 100. The mean angle between the connecting rods 88 and 101 is about 90 degrees. This arrangement produces practically continuous rotation of the rotor as the phase difference of the impulses of the four ratchets is 90 degrees.

The principle of action is the same as in the previous cases. For example, if the rotor be fixed, the pivot 87 is fixed, and the centre of gravity 85 of the wheel 83 revolves about 87 as a fixed point. If the rotor turns perfectly freely the point 87 revolves round the centre of gravity 85 as a fixed point.

In the modification of the invention shown in Figure 5, there is provided a casing 111 carrying a pair of electric motors, driving the shafts 112, 113. The casing 111 is suspended by links 114, 115, from fixed pivots 116, 117. The two motors rotate in opposite directions and carry on their shafts arms 118, 119, having at their ends masses 120, 121. Symmetrical intermediate points on these arms are connected by a link 122. A pivot 123 is provided on the motor casing and is connected by a connecting rod 124 to a pivot 125 at the end of a link 126 pivoted at a fixed point 127, the pivot 125 being connected by rods 128, 129, to a pair of unidirectional driving devices 132, 133, acting on the rotor 40.

In this instance the casing 111 acts as the second mass, the mass which sets up the oscillations being represented by the gyrating masses 120 and 121. If the rotor cannot turn the casing is held stationary, and the masses 120, 121, continue to gyrate, thus producing the maximum lateral movement of the common centre of gravity of the three masses 111, 120 and 121. If the rotor turns perfectly freely, this common centre of gravity has no lateral movement.

In a modification of this arrangement a single electric motor may be employed, the second motor shaft merely carrying round a rotating weight, rotating in opposition to the weight on the motor shaft.

In the form of the invention shown in Figure 6, the crank case 140 of a single cylinder internal combustion engine is supported by links 141, 142, from fixed points 143, 144, and is connected through the pivot 145 by connecting rods 146, 147, with oscillating members 148, 149, carrying ratchet devices driving the rotor 150 which turns about the fixed axis 151. The piston 152 of the engine is connected by the usual connecting rod 153 with a crank 154, a balancing mass 155 being provided to balance the crank. In this instance the reciprocations of the piston set up the necessary oscillations. The casing 140 acts as in the form shown in Figure 5. The operation of the mechanism is the same as in Figure 5.

In the form of the invention shown in Figure 7, the rotating mass 160 is driven about the pivot 161 by a Cardan shaft

or other suitable means. The pivot 161 is suspended by a link 162 from a fixed point 163 and co-axial with the pivot 161 and moving with it there is provided a mass 164. The pivot 161 drives a pair of oscillating members 36, 37, through links 165, 166, and these oscillating members carry ratchet devices alternately driving the rotor 40. In this case the motion of the prime mover is split so that one component of the motion oscillates the point *g* which is the centre of gravity of the masses 160, 161, while the other component of the motion oscillates the members 36, 37, carrying the unidirectional devices which drive the rotor 40.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :—

1. Means for producing or modifying reciprocating motion by making use of the inertia of a periodically moving unbalanced mass, consisting in setting the mass in periodic motion about a point or axis which is connected by linkage to one or more fixed points so that the point or axis can oscillate in response to the motion of the periodically moving mass, and means for using the said unbalanced mass to act as the whole or part of the inertial mass which is used to split the reciprocating motion as claimed in my prior specification No. 185,022.

2. A device as claimed in Claim 1, consisting in the combination of a mass caused by a prime mover to perform unbalanced gyrations about an axis suspended by linkage from a fixed point, an auxiliary inertial mass to which the axis imparts oscillations about a second fixed point, and a rotor driven by unidirectional gear from the auxiliary mass, the motion of the prime mover being divided between the common centre of gravity of the two masses and the rotor according to the torque or speed of the rotor, substantially as described.

3. A device as claimed in Claim 1, consisting in the combination of a mass caused by a prime mover to perform unbalanced gyrations about an axis supported by linkage from a fixed point and a rotor driven by unidirectional gear from the axis, the motion of the prime mover being divided between the centre of gravity of the mass and the rotor according to the torque or speed of the rotor, substantially as described.

4. The several apparatus substantially as described and illustrated in the drawings.

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W.C. 2.

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Fig. 1.

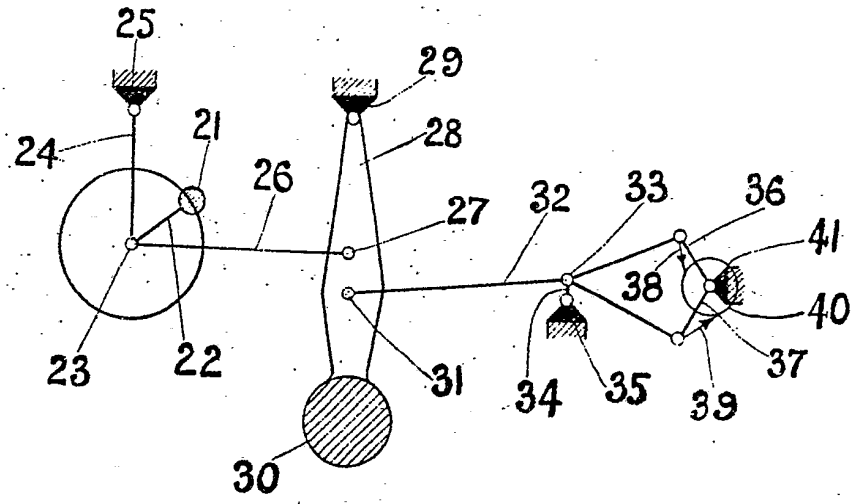
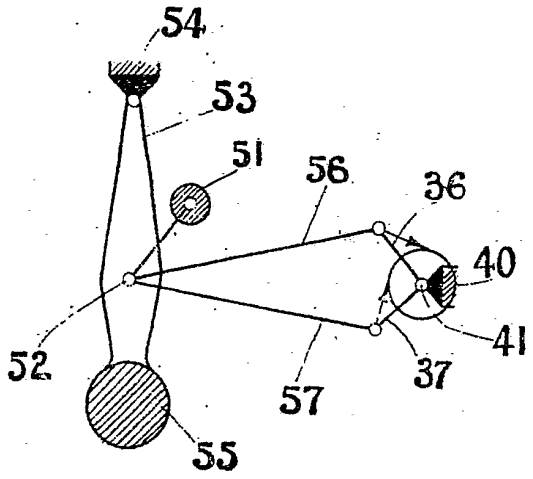


Fig. 2.



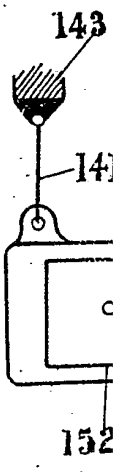
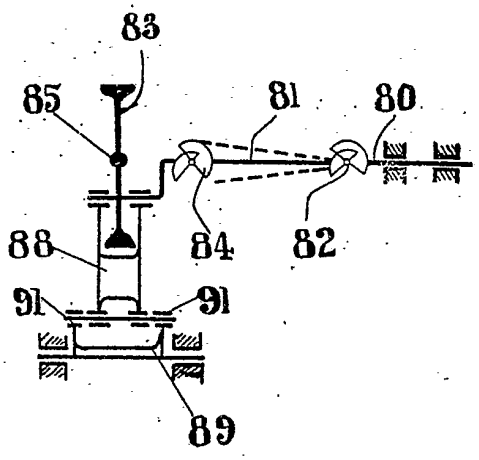


Fig. 4



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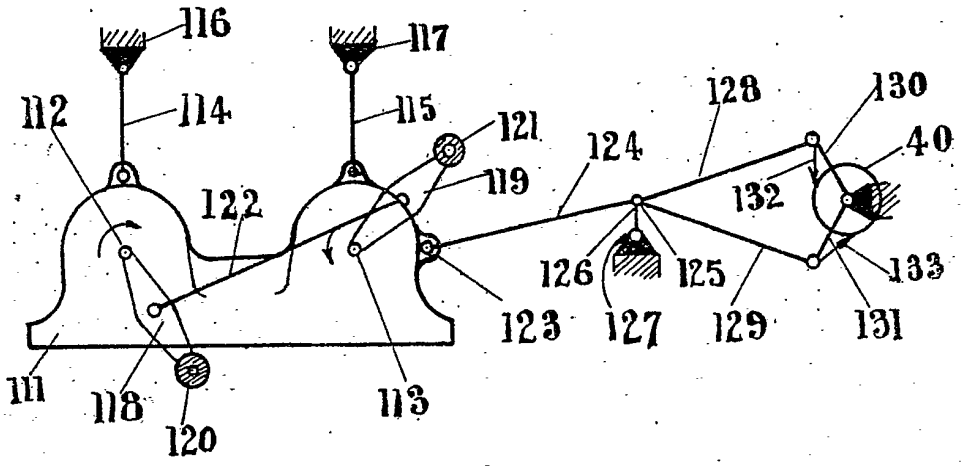

Fig. 5.

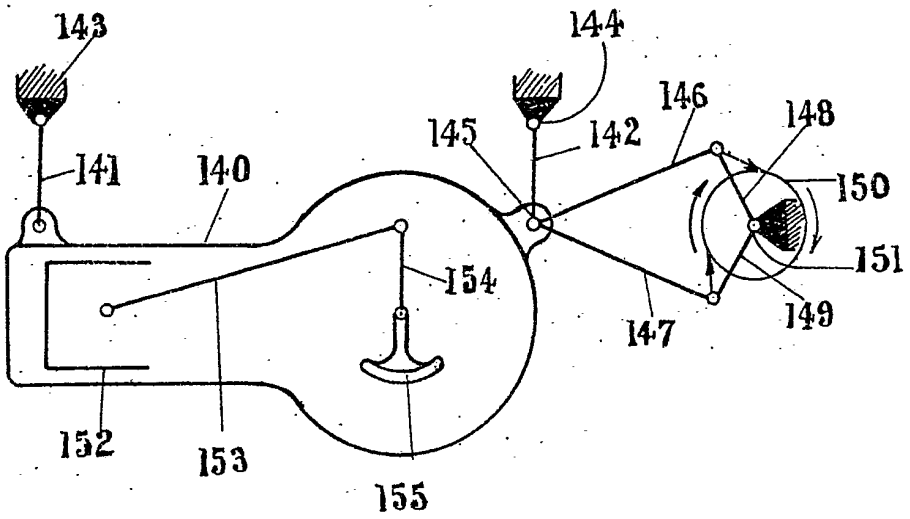

Fig 6

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SHEET 1

Fig. 1.

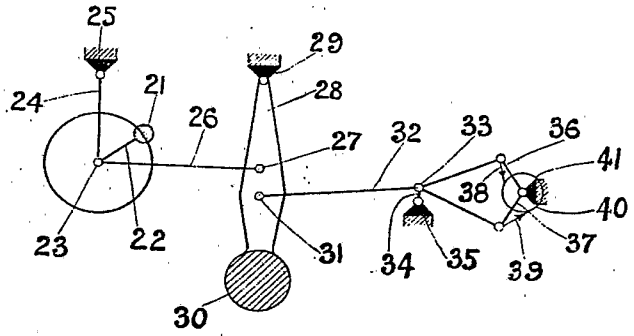
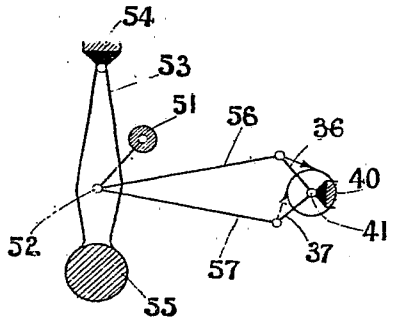
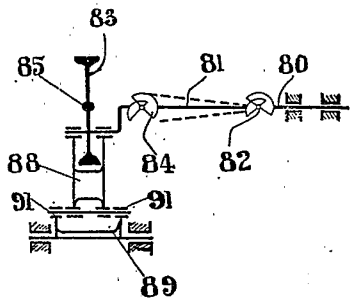


Fig. 2.



SHEET 3

Fig. 4



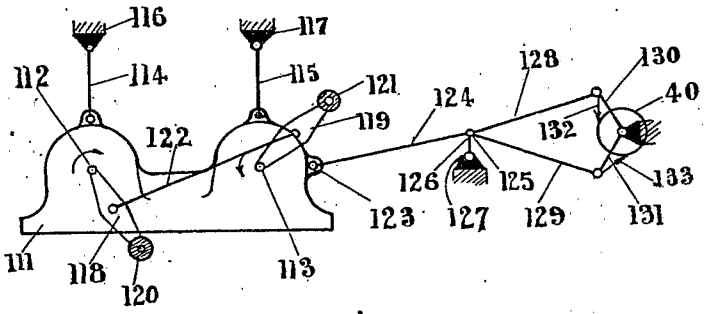


Fig. 5.

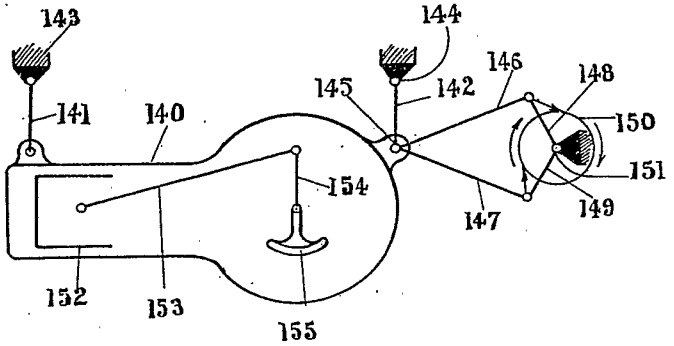


Fig 6

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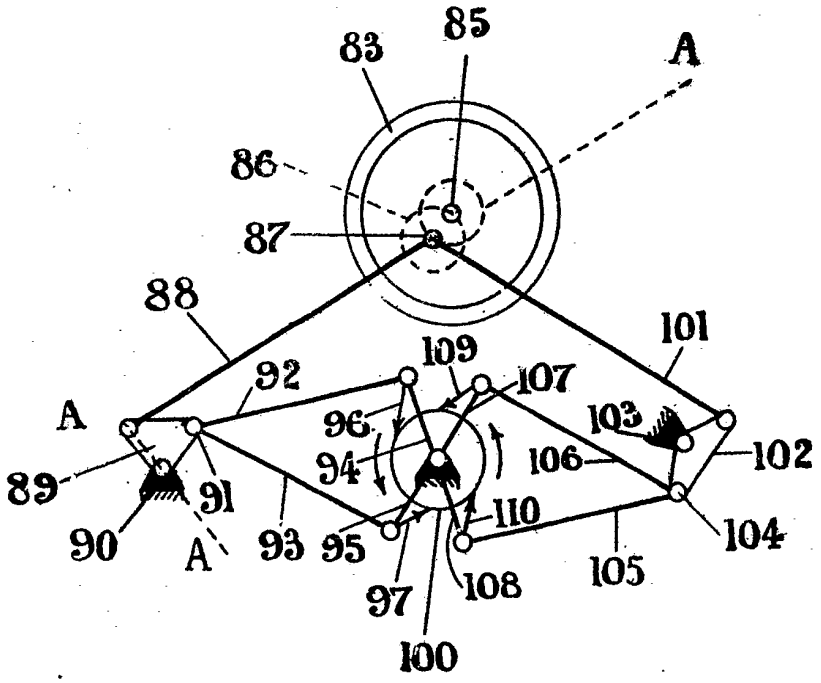
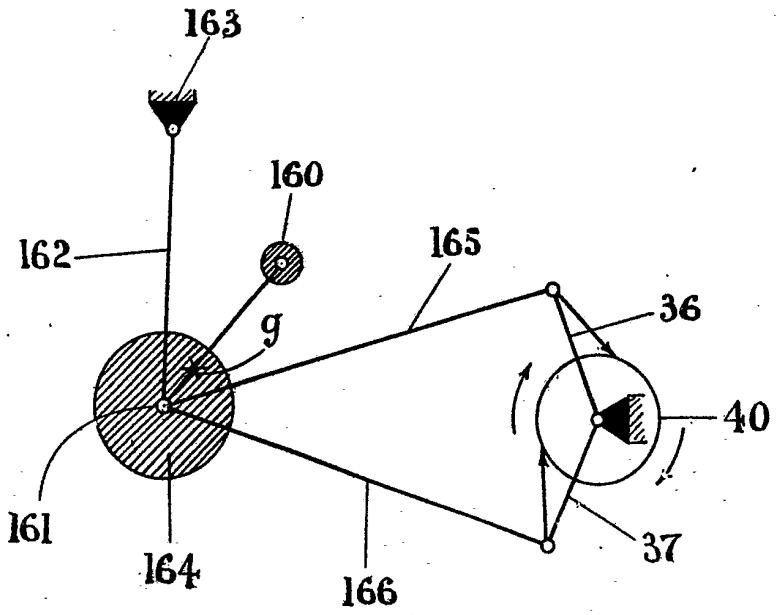
SHEET 2

Fig. 3.



SHEET 4

Fig. 7.



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