H. W. LEVERING.

THERMODYNAMIC ENGINE.

APPLICATION FILED AUG. 14, 1914.

1,178,653.

Patented Apr. 11, 1916.

2 SHEETS—SHEET 1.

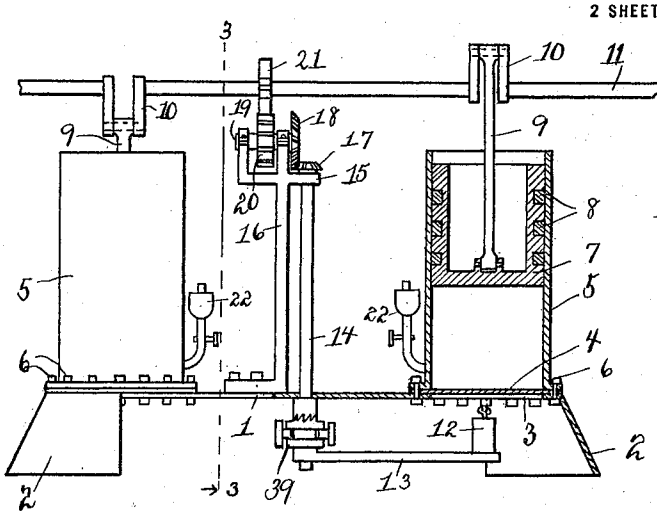

Fig. 1.

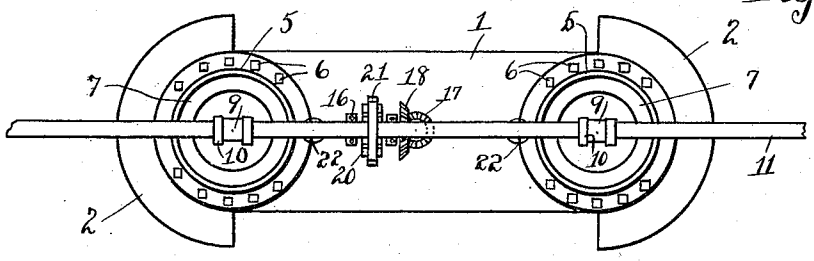

Fig. 2.

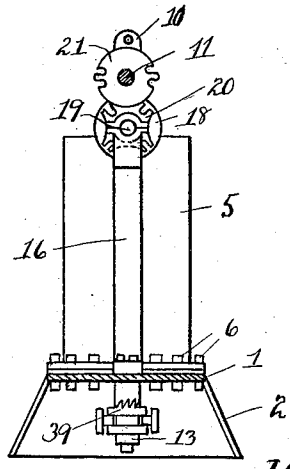

Fig. 3.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 4.

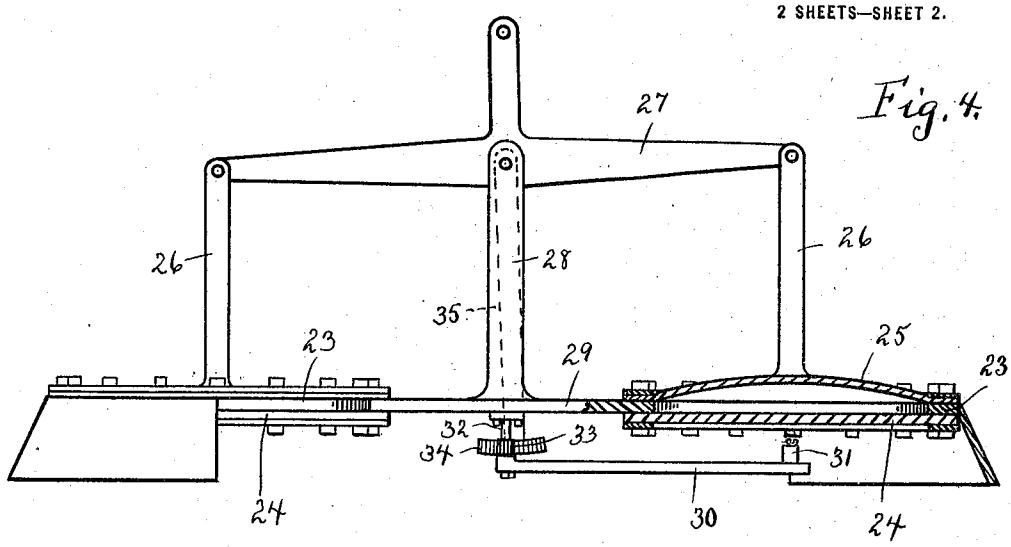
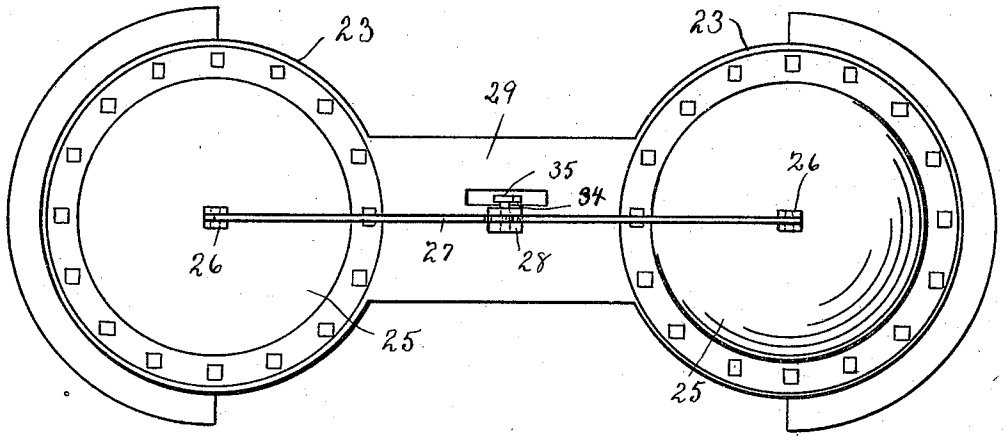


Fig. 5.



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THERMODYNAMIC ENGINE.

1,178,653. Specification of Letters Patent. Patented Apr. 11, 1916.

Application filed August 14, 1914. Serial No. 856,713.

To all whom it may concern:

Be it known that I, HARRY W. LEVERING, a citizen of the United States, residing at Darby, in the county of Delaware and State of Pennsylvania, have invented new and useful Improvements in Thermodynamic Engines, of which the following is a specification.

My invention relates to new and useful improvements in thermodynamic engines, and has for its object to provide an exceedingly simple and effective engine of this class, in which a highly volatile fluid is used, and a source of heat alternately applied to and removed from that portion of the engine containing the volatile or motor fluid, and the applying and removing of the heat source so timed as to act in harmony with the movements of the pistons.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, I will describe its construction in detail, referring by numeral to the accompanying drawing forming a part of this specification, in which—

Figure 1, is a side elevation of one form in which my invention may be embodied, one half thereof being in section to show the interior of one of the cylinders. Fig. 2, is a plan view of this device. Fig. 3, is a section at the line 3—3 of Fig. 1. Fig. 4, is a view similar to Fig. 1, illustrating modifications of my improvement in which flexible diaphragms are substituted for the cylinders and pistons; and Fig. 5, is a plan view of the device shown in Fig. 4.

While I have here shown two forms of embodying my improvement it is obvious that my invention may be utilized in various forms and designs of machines, and therefore do not desire to limit myself to these constructions.

In carrying out my invention as embodied in Figs. 1 to 3 inclusive, 1 represents a base plate having the flanges 2 formed therewith which act as feet for supporting the machine, and this base plate has formed therein two circular openings 3 over each of which is placed a disk 4 of copper phosphorus bronze or other high heat conducting material.

5 represents the engine cylinders here shown as two in number, each of which is secured upon one of the copper disks 4 by the bolts 6. Within each cylinder is fitted a piston 7 carrying suitable packings 8 for preventing the leakage of the motor fluid, and each piston has coupled thereto a pitman 9 which is attached to the crank 10 of the crank shaft 11.

As the crank shaft 11 may be supported in any convenient frame work and may transmit power in any well known manner to any desired machine, I have not shown these supports or connections as they form no part of my invention.

12 represents a source of heat such as an acetylene lamp carried by the outer end of the revolving arm 13 which latter is secured upon the vertical shaft 14, said shaft being journaled in the base plate and the extension 15 of the support 16. Upon the outer end of this shaft 14 is secured a beveled pinion 17 which meshes with the beveled gear 18, the latter being secured upon the short shaft 19 which shaft is journaled in the forked upper end of the support 16. Upon the short shaft 19 is secured a locked gear wheel 20 with which meshes the actuating and locked gear wheel 21, the latter being secured to the crank shaft 11.

The actuating gear wheel 21 in the construction here shown, has two teeth which alternately meshes with one of the teeth of the locked gear wheel 20, the latter being so proportioned as to be revolved one fourth of a revolution for each engagement through one of the teeth of the actuating gear wheel 21. Thus the beveled gear 18 will be revolved a half revolution for every revolution of the crank shaft 11, and since the beveled gear 18 is twice the diameter of the beveled pinions 17, the latter will be given a half revolution of the crank shaft as will be readily understood.

From this description it will be seen that each half revolution of the crank shaft, one of the teeth of the actuating pinions 24 will revolve the locked gear wheel a quarter of a revolution, and then lock the same, and this quarter revolution of the locked gear wheel will swing the source of heat 12 from

beneath one cylinder to a like position beneath the other cylinder, and this operation will be repeated at every revolution of the crank shaft, whereby heat will be alternately applied to one of the copper disks 4, and then the other, so long as the engine is in operation.

22 represents the intake which is carried by each cylinder, and by means of which the volatile fluid is introduced into the cylinder, and when the cylinders have been thus charged with the proper motor fluid, it is only necessary to light the lamp 12, when the heat applied to the copper disk under which the lamp is at that time will convert this motor fluid into a high expansive gas, which will force the piston in this particular cylinder upward, thus turning the crank shaft 11 a half revolution, which as before described will carry the lamp 12 from under this particular cylinder to a like position under the opposite cylinder, where the heat is transmitted to the copper disk of the cylinder, will expand the motor fluid, force this piston upward as just described, thus continuing the revolving of the shaft 11.

While the lamp 12 remains under the second cylinder the motor fluid in the first cylinder will have given up sufficient heat to permit the piston in this first cylinder to descend, which operations will continue indefinitely so long as the lamp remains lighted.

For convenience in stopping and starting the machine a clutch 39 is fitted upon the shaft 14, whereby this shaft may be clutched to or released from the revolving arm 13, as will be readily understood.

In Figs. 4 and 5 I have shown a construction, in which two shallow casings 23 are used instead of cylinders, and each of these diaphragm casings has a copper bottom 24 and a flexible top 25, from which latter projects upwardly a standard 26, and each of these standards are pivoted to the walking beam 27.

28 is a support projecting upwardly from the bed plate 29 and in the upper end of this support is trunnioned the walking beam. In this construction 30 represents the oscillating arm, carrying the source of heat such as a lamp 31, and this oscilating arm is journaled upon the shaft 32, and has secured thereto a pinion 33.

A segmental gear 34 carried upon the arm 35 meshes with the pinions 33, and as said arm is secured to the walking beam 27 the movements of said walking beam will cause the arm 30 to oscillate first in one direction and then in the other, thus carrying the lamp 31 first under one copper bottom, and then under the other.

The motor fluid is introduced into the diaphragm casings in any suitable manner, and thereafter this construction will work in the same manner as described in the former construction.

Of course I do not wish to be limited to the exact details of construction as here shown, as these may be varied within the limits of the appended claims without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new and useful, is—

1. In a thermo-dynamic motor a bed plate having two openings therethrough, a copper disk located over each of said openings, a cylinder bolted upon each of said plates, a piston fitted to slide in each cylinder, a crank shaft, a pitman connecting each piston with one of the cranks of the shaft, an actuating and locking wheel secured upon the crank shaft, a locking wheel with which said actuating wheel meshes, a beveled gear carried upon the same shaft with the locked wheel, a beveled pinion meshing with the beveled gear, a vertical shaft, upon which the beveled pinion is secured, a revolving arm carried by said vertical shaft, a clutch for engaging and disengaging the revolving arm, and a source of heat carried upon the outer end of the revolving arm, whereby the heat is automatically applied to one cylinder and then to the other.

2. In a thermo-dynamic motor a bed plate having two openings therethrough, a copper disk located over each of said openings, a cylinder bolted upon each of said plates, a piston fitted to slide in each cylinder, a crank shaft, a pitman connecting each piston with one of the cranks of the shaft, an actuating and locking wheel secured upon the crank shaft, a locked wheel with which said actuating wheel meshes, a beveled gear carried upon the same shaft with the locked wheel, a beveled pinion meshing with the beveled gear, a vertical shaft, upon which the beveled pinion is secured, a revolving arm carried by said vertical shaft, a clutch for engaging and disengaging the revolving arm, a source of heat carried upon the outer end of the revolving arm, whereby the heat is automatically applied to one cylinder and then to the other, and means for introducing a motor fluid within the cylinder as specified.

Intestimony whereof, I have hereunto affixed my signature in the presence of two subscribing witnesses.

HARRY W. LEVERING.

Witnesses:
MARY E. HAMER,
H. W. BENTON.