L. G. WOOLLEY, LUNATIC.
J. A. MORISON, GUARDIAN.
CALORIC ENGINE.
APPLICATION FILED MAR. 5, 1908.

925,975.

Patented June 22, 1909.

3 SHEETS—SHEET 1.

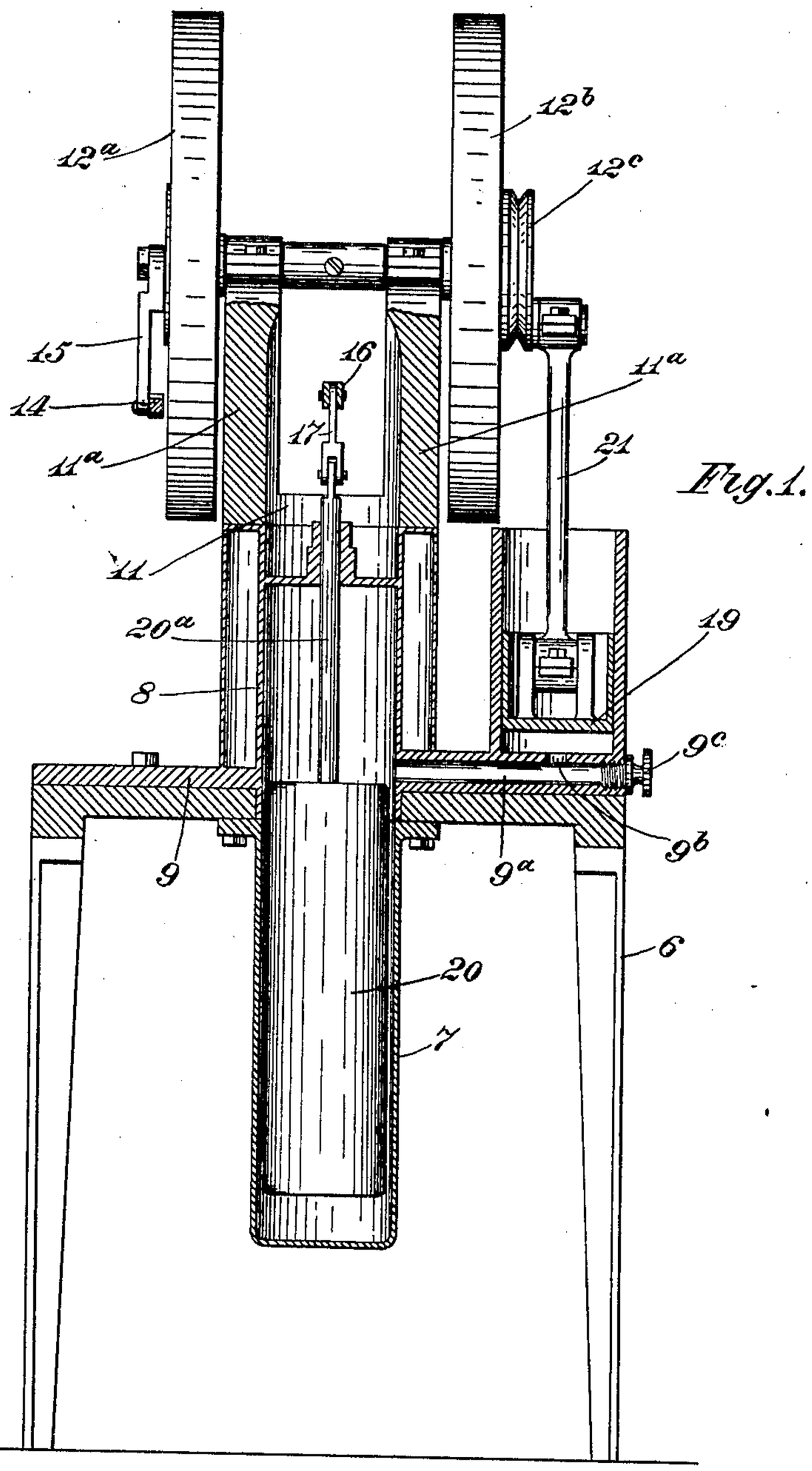

Fig. 1.

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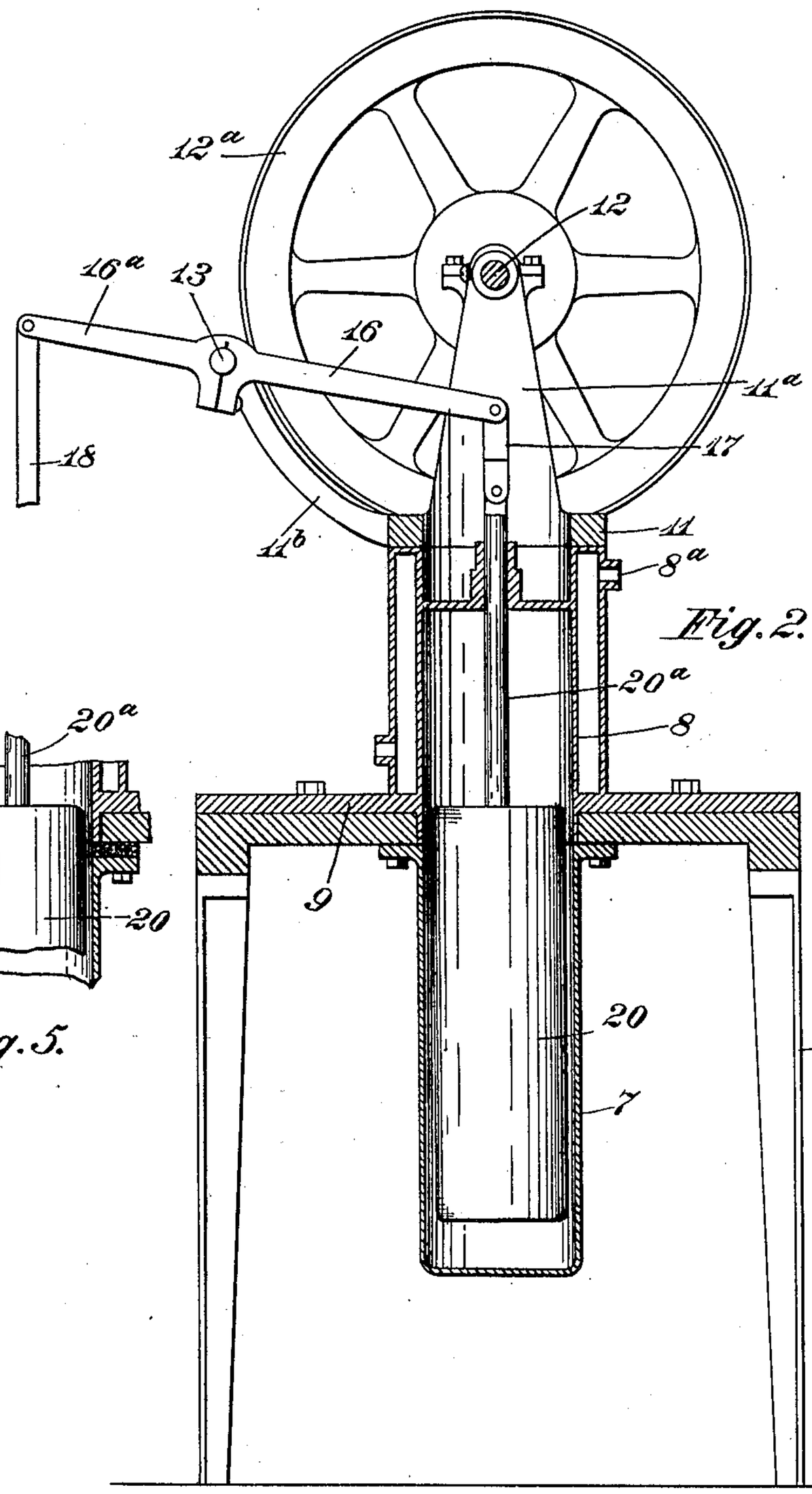

Fig. 2.

Fig. 5.

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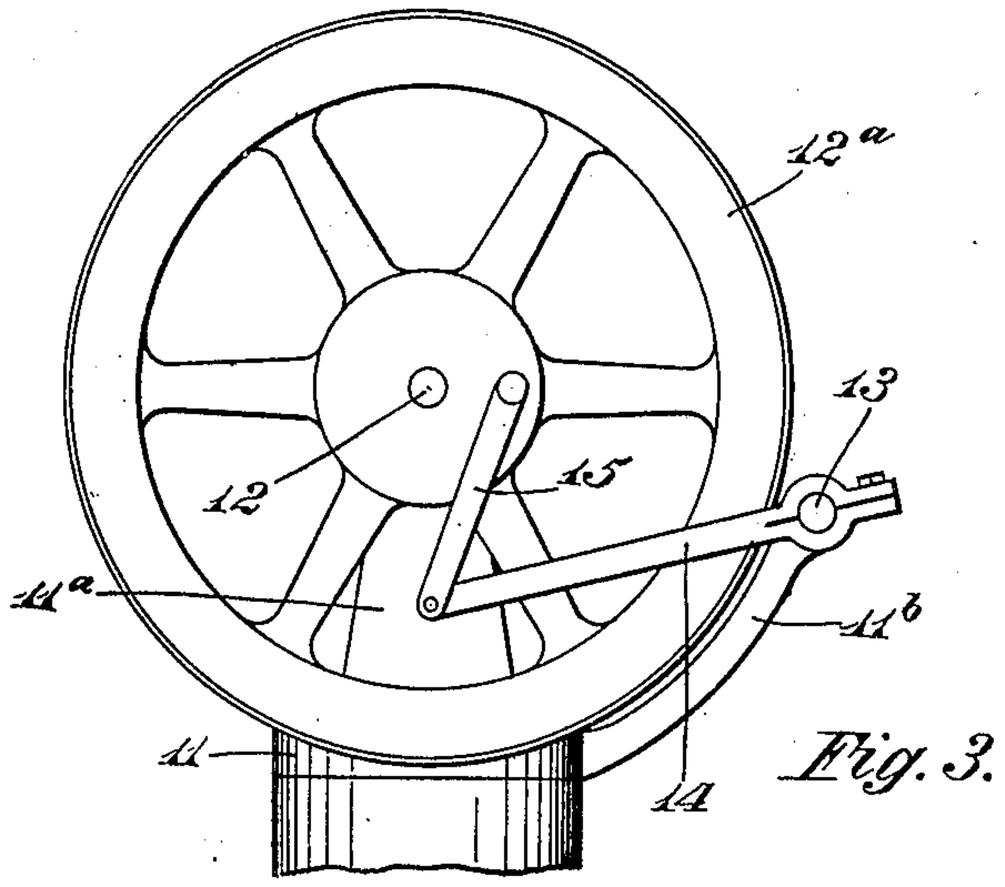

Fig. 3.

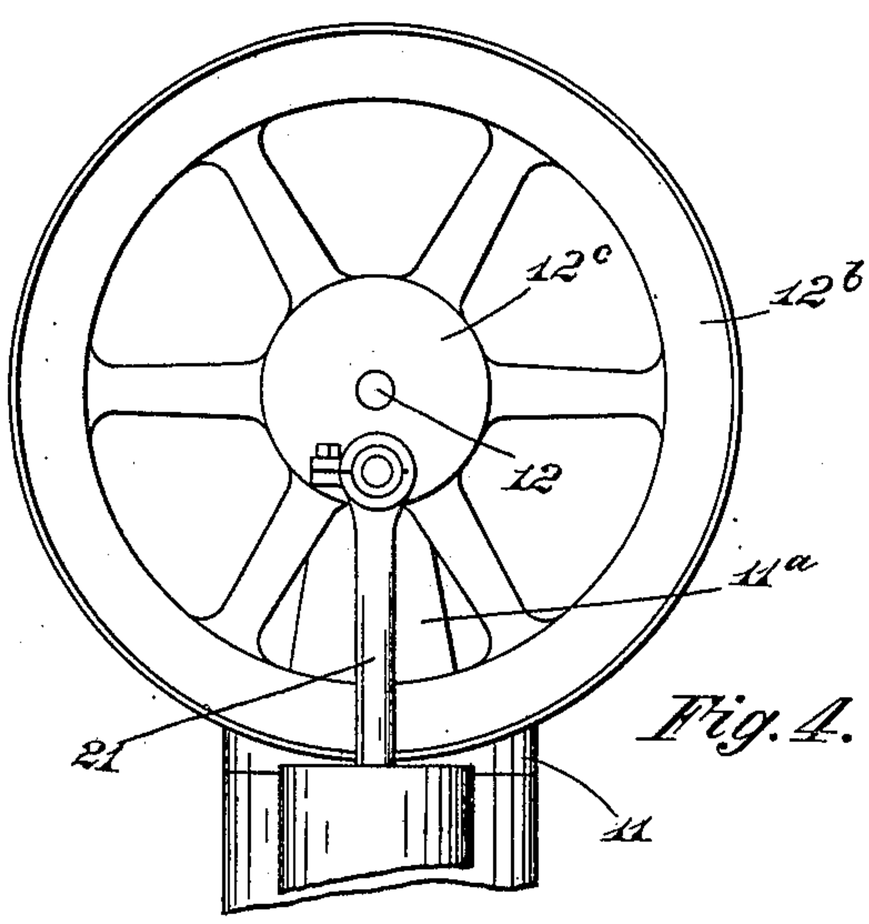

Fig. 4.

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UNITED STATES PATENT OFFICE.

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CALORIC-ENGINE.

No. 925,975. Specification of Letters Patent. Patented June 22, 1909.

Application filed March 5, 1908. Serial No. 419,243.

To all whom it may concern:

Be it known that I, LEONIDAS G. WOOLLEY, a citizen of the United States, residing at Kenton, in the county of Hardin and State of Ohio, have invented a certain new and useful Improvement in Caloric-Engines, of which the following is a specification.

The principal object of this invention is to simplify and cheapen the construction of hot air or caloric engines and at the same time provide a connection between the rod of the transfer piston and its operating lever so that the action of the lever on said rod shall be more nearly in a straight line than heretofore.

A further object is to insulate as much as practicable the lower portion of the expansion chamber from the upper portion, so that said upper portion is maintained in a cooler condition than the lower portion, and the lower portion is capable of being more highly heated with the same quantity of fuel.

The invention consists in the construction hereinafter fully described and claimed, the invention not being confined to the precise forms of the parts shown in the accompanying drawings.

In said drawings—Figure 1 is a vertical sectional view taken through both the expansion cylinder and power cylinder, some parts being in full; Fig. 2 is a vertical sectional view taken on a plane at right angles to that on which Fig. 1 is taken through the expansion cylinder, some parts appearing in full; Fig. 3 is a side view looking at the left-hand side of the left-hand fly wheel, as shown in Fig. 1, showing the connection with said fly wheel for operating the transfer piston; Fig. 4 is a side elevation of the right-hand fly wheel, as viewed in Fig. 1, showing the connection of the rod of the power piston with said wheel. Fig. 5 is a vertical sectional detail illustrating the means and mode of insulating the lower portion of the expansion cylinder from the upper portion.

In the views the character 6 designates a suitable base or stand having a table-like top for supporting the operating parts of the engine. To the under side of this, in line with an opening therein, is bolted the lower or heater portion 7 of the expansion cylinder. Secured to the upper side of the base or standard and in line with the heater portion of the expansion cylinder, is the upper or cooling portion 8 of said cylinder. The cooling portion 8 of the expansion cylinder can be provided with a surrounding water-jacket having a suitable water inlet and outlet, as seen at 8^a and 8^b. The cooling portion 8 is provided with a flange 9 in one side of which is formed a horizontal port 9^a which leads through a lateral port 9^b to a power cylinder 10 extending upward from said flange above the outer end of the port 9^a. The outer end of the port 9^a is ordinarily tightly closed by a plug screw 9^c that may be removed entirely to permit cleansing of the port or said plug may be loosened to permit a slight passage of external air to slow down the engine.

Within the expansion cylinder is the usual loosely-fitting hollow transfer piston 20 having a rod 20^a attached to its upper end, said rod passing through and guided by a suitable stuffing box in the head at the upper end of the cooling portion 8 of the expansion cylinder.

Resting on the upper end of the cooling portion of the expansion cylinder is a frame comprising a circular 11 from which rises two upright standards, as seen at 11^a, and two outwardly and upwardly extending arms, as seen at 11^b. The base 11, the standards 11^a, and arms 11^b are all cast together in a single piece to promote cheapness of construction and accuracy in fitting. The upper ends of the standards 11^a are made or provided with suitable bearings to receive the fly-wheel shaft 12, which shaft has keyed or secured to its opposite projective ends the two fly wheels 12^a and 12^b. The upper ends of the arms 11^b are made with suitable bearings to support a rock shaft 13. Secured to the rock shaft 13 is a lever 14 that has its rear end connected to the fly wheel 12^a by a link 15, said link being eccentrically connected to said fly wheel as best seen in Fig. 3, so that the rotary motion of the wheel will impart a rocking motion to the shaft 13.

Connected with the rock shaft 13 is a lever 16 extending inwardly to a point over the upper end of the cooling portion 8 of the expansion cylinder, where said lever is connected with the upper end of the transfer piston rod 20^a by means of a link 17. Said lever 16 can have an extension 16^a to which a pump rod 18 or other device to be usefully operated may be connected if desired.

Within the power cylinder is closely fitted, by means of suitable packing, if desired, the power piston 19, that is connected, by means of a suitable rod 21, with the fly wheel 12^b, the connection with the fly wheel being, of course, eccentric. The fly wheel 12^b has cast with it a small grooved wheel-like concentric extension 12^c which can be belted for transmitting power if desired. The connections of the link 15 and the rod 21 are approximately forty-five degrees apart, and when the piston 19 descends, the transfer piston 20 makes the turn at the upper end of its stroke, so that after the heated air has performed its work in impelling the piston 19 upward, said piston on its down stroke forces the heated air into the cooling portion 8 of the expansion cylinder and thence down around the ends of the transfer piston to the lower end of the expansion chamber to be reheated. The lower end of the expansion chamber is heated by any suitable form of fire, as usual.

I propose to lessen the conduction of heat from the lower portion or section of the expansion chamber, which might properly be called the heater, to the upper cooling section or portion, by means of a suitable packing ring or material 22 constituting a poor conductor of heat, interposed between the adjacent ends of said sections or portions at a plane approximately coinciding with the upper end of the transfer piston when that member is at the lower end of its stroke, substantially as shown in Fig. 5. The advantage of this construction is that the lower end of the heating chamber 7 is more highly heated and the heat not so rapidly dissipated; and further, the difference between the temperatures of the upper and lower portions of the expansion chamber made greater and more sharply marked.

By reason of the great length of the arm 16 it will be observed that the point of connection of it with the link 17 moves through a very flat arc, hence there is little or no wear of the rod 20^a on the orifice or stuffing through which said rod is guided, it being understood, of course, that said connection is made at a point as near as practicable to move directly above the end of said rod.

What I claim and desire to secure by Letters Patent is:

In a caloric or hot air engine, a base or stand having a table-like top provided with an opening, a heating cylinder 7 secured to the under side of said top with an interposed heat insulating ring 22, a cooling cylinder 8 secured above said opening and in line with the heating cylinder, said cooling cylinder provided with a surrounding water chamber, said cooling cylinder also provided at its lower end with a horizontally projecting flange 9 integral with the cylinder and secured to the table top, said flange having a horizontal port 9^a, a power cylinder, said horizontal port 9^a provided with a lateral port 9^b establishing communication between the horizontal port and said power cylinder, an adjustable screw plug for closing the outer end of the horizontal port 9^a, a frame resting on the upper end of the cooling cylinder comprising the ring 11, upright standards 11^a and outwardly and upwardly extending arms 11^b, all cast in one piece, fly wheels having a shaft journaled in said standards 11^a, said shaft provided with a crank, a rock shaft supported on said arms 11^b, an arm 14 connected with said rock shaft, and a link connecting said arm to the fly wheel, a lever 16, a transfer piston in the heating and cooling cylinders, and a link connecting said piston with said lever 16, a power piston in the power cylinder and a rod connecting the same with the crank of the fly wheel shaft, all combined and operating substantially as shown and described.

LEONIDAS G. WOOLLEY.

Witnesses:

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