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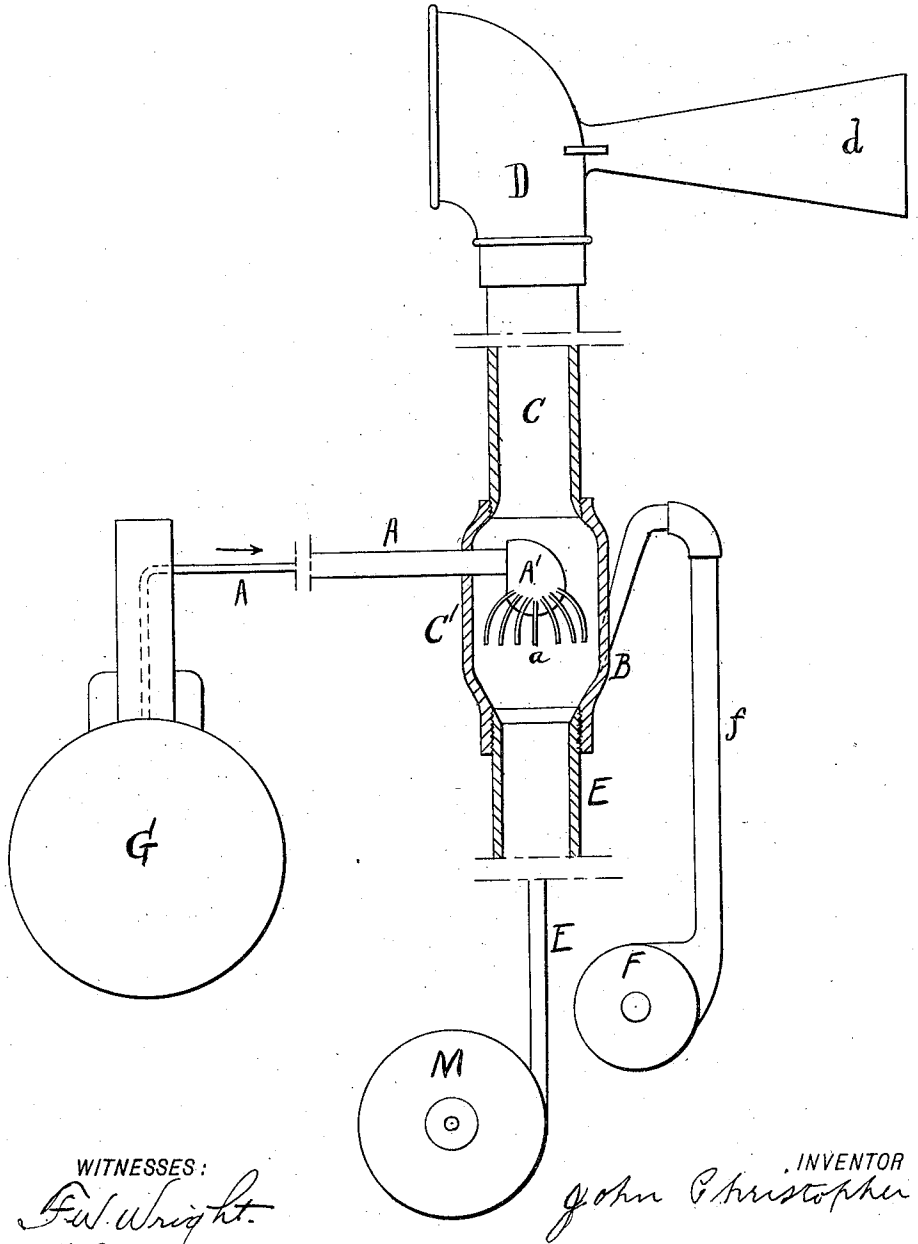
J. C. LAKE.

MOTIVE POWER APPARATUS.

APPLICATION FILED DEC. 3, 1900.

NO MODEL.



WITNESSES:

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No. 770,468. Patented September 20, 1904.

UNITED STATES PATENT OFFICE.

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MOTIVE-POWER APPARATUS.

SPECIFICATION forming part of Letters Patent No. 770,468, dated September 20, 1904.

Application filed December 3, 1900. Serial No. 38,517. (No model.)

To all whom it may concern:

Be it known that I, JOHN CHRISTOPHER LAKE, a citizen of the United States of America, residing in the borough of Brooklyn, in the county of Kings, State of New York, have invented an Improved Motive-Power Apparatus, of which the following is a specification.

The main object of my invention is to provide a motive-power application which will be more economical of power than the steam-engine and other like motive-power apparatus as now constructed.

The chief losses of power in steam and heat engines as now made and operated are due to radiation and inability to utilize high-temperature pressures, (owing to their injuring the engines, packing, lubrication, &c.,) and it is chiefly this loss which I seek to avoid and to utilize the highest temperature pressures for the production of useful work.

Heat force confined under pressure has expansive force according to its temperature. The present practice is to try to turn the heat energy into work through its expansive force while it is hot and in confinement in cylinders or engines of various types; but therewith come the difficulties above referred to—enormous loss of the prime energy—and despite various efforts made to overcome or mitigate such losses they have succeeded in turning only ten per cent. to fifteen per cent. of the heat energy into work against eighty per cent. to ninety per cent. lost through wastage.

I have invented a new means of applying heat energy to work, and the principal feature of this invention is to engender the conditions to produce an explosive effect and utilize the powerful quality of generated heat energy when suddenly released from high-temperature pressure into a volume of air conveying the impulsed energy to the point of utilization.

The figure in the accompanying drawing is a diagram showing a heat-generator, a motor, and an intermediate device which I term my "converter." In this view the generator and motor are for convenience indicated on a smaller scale than the intermediate converter.

The generator G may be of any suitable kind and construction for the production of heat force. I have indicated it as a steam-generator, the heat force being delivered through a pipe A to what I may term the "converter" B.

Whenever the term "heat force" is used in this specification I mean accumulated pressure force generated by heat, either gaseous or steam, or both.

The motor M may be of any suitable kind for the purpose desired without regard to form, or the motive medium may be applied direct to work in many cases without an intermediary motor, and I use the term "motor" in its broadest definition, which is "to move" or "to put in motion."

In the converter B, I provide a proportionately large free air-exploding space or spacious chamber C′, located at the entrance to a collecting, confining, and transmitting channel E, and means to keep said air space or chamber constantly supplied with a sufficient quantity of free air for the purpose required, together with an atomizing spreader device A′, projecting into the spacious air-chamber to divide, proportion, and distribute the exploding or propulsive heat force across the entire area or cross-section of the air-chamber. By these means I accomplish the result desired through the employment of a substitute equivalent motive medium of air so disposed to the high-pressure explosive impact in the air-chamber and in such proportioned volume as to receive the full impulsive shock of the high-pressure explosion and be thereby driven and impelled with the force and velocity thereof from the air-space into the collecting, confining, and transmitting channel E as a substituted power medium of the prime heat force to be turned into work. By the same means I also supplement said primary explosive effect with a subsequent expanding effect through the heat being absorbed by the substitute air medium. This expands its volume and further accelerates its motion. I thus get a double action of the heat effects, first, by the high-pressure explosive impulse to the substituted air medium, and, secondly, the expansive effect of the heat on the substitute motive medium. The rela-

tively large quantity of air thus energized and impulsed into forceful motion will so reduce the temperature, while maintaining the prime energy in the established velocity, that it can be applied in its converted state to any purposes without injury from the heretofore troublesome high temperatures and without excessive radiation, the heat force having first been expended impulsively on the air thereby put in motion and the heat subsequently and secondly used to expand the substituted medium with accelerated motion before being turned into work. The converter has an inlet-pipe C for the admission of a sufficiently large quantity of air into the air-chamber C′ and means for the projection of the heat force at its highest temperature pressure from the automizing-spreader A′ in the air-chamber C′, so that it will impact, impulse, and force the air from the air-space into and through the confining and transmitting pipe E with the force and velocity of its highest pressure impulse.

By way of example, the converter B may have the form shown in Fig. 1, where the heat-force pipe A is admitted into the interior of the air-chamber C′ and is there fitted with an atomizing-spreader A′, projecting into the air-chamber and facing in the direction in which the motive fluids are to flow. The atomizing-spreader has a number of separate nozzles *a*, projecting toward a tapering or funnel-shaped part of the air-chamber in the direction of the flow. These nozzles *a* are distributed over nearly the entire cross-sectional area of the air-chamber.

E is a confining and transmitting pipe leading from the air-space to the motor.

The steam or heat force coming from the many nozzles *a* will be projected with its highest-pressure exploding force into the whole volume of air in the air-space, which surrounds and envelops every jet, thus imparting practically its whole impulsive force to the air and forcing it into and through the contracting portion of the air-space into the confining and transmitting pipe E. The proportionally large quantity of air so impulsed with velocity will while passing through pipe E absorb the heat, which will further energize the air and cause it to expand as it is being driven by the constantly-dominant heat force through the transmitting-pipe, from which it will be delivered with the combined impulsive and expanding action to do its work in the motor. Owing to the heat being absorbed by the greatly-increased volume of air thus put in motion it may be reduced in temperature to such a degree as to diminish loss by radiation. It also saves the ordinary waste of heat through the exhaust, its energy having been transferred to and utilized in the increased volume of air as motive force.

An essential feature of this invention is to cause the rapidly-moving heat force to mix with and contact any considerable quantity of air and impulse it into velocity, as a given volume rushing in a solid column through air-space will contact the air only on the periphery of the column. Therefore I multiply and increase the surface area of contact by dividing the given volume of heat force into the greatest available number of jets separated and distributed across the entire area or cross-section of a proportionally large area of the air-chamber, so that each jet will be surrounded and enveloped by its proper proportion of air, so that the escaping heat force as a whole will unite in contact with all the air in said air-space and force it into and through the contracting part of said air-space into the confining and transmitting channel with the force and velocity due to its pressure.

The air may be supplied to the chamber C′ by natural inflow or by artificial means, or both. For instance, I have shown the apparatus as provided with an inlet-pipe *f* from a blower F to be put into use if needed, the purpose being to supply to the air-chamber the quantity of air required to receive and transmit the heat force for any purpose.

If desired, there may be provided a vane-hood D, to be connected to the air-inlet end of the pipe C, so as to supply to the air-space the quantity of air required to receive and transmit the heat force and to add to the impulsive action of the heat force the impulsive action of the wind, either natural wind force or that produced artificially by the force of air-resistance when the apparatus is used on a moving body—such as a vessel, automobile, &c.—the vane *d* serving to keep the open hood facing the air-current.

I claim as my invention—

1. The combination of a heat-generator, a motor and connecting-pipes with an intermediate means having an enlarged air-chamber into which the discharge end of the heat-pipe projects for applying the heat energy impulsively to the propulsion of air from said air-chamber into a confining and transmitting channel of reduced diameter, said discharge end of the heat-pipe having a number of jets distributed over the cross-sectional area of the chamber, substantially as described.

2. A steam-generator, a converter and a motor, said converter having an enlarged chamber terminating in a pipe leading to the motor, a pipe from the generator passing into the interior of the enlarged chamber and having a number of openings therein distributed over the cross-sectional area of the chamber and adapted to direct the steam in the direction of said motor-pipe, and air-openings on that side of said steam-openings farthest from said motor-pipe, substantially as described.

3. The combination of a steam-generator, a motor and connecting-pipes with an interme-

diate converter, comprising a spacious air-chamber into which the heat-pipe projects with a number of projecting nozzle-outlets for the propulsion of the air with expansion, to be used in the motor, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN CHRISTOPHER LAKE.

Witnesses:
S. C. CONNOR,
F. WARREN WRIGHT.