

CHRISTOPHER JOHN LAKE (NAME CHANGED FROM JOHN CHRISTOPHER LAKE
BY JUDICIAL ORDER).

ELASTIC FLUID MOTOR.

APPLICATION FILED MAY 24, 1907.

919,289.

Patented Apr. 20, 1909.

2 SHEETS—SHEET 1.

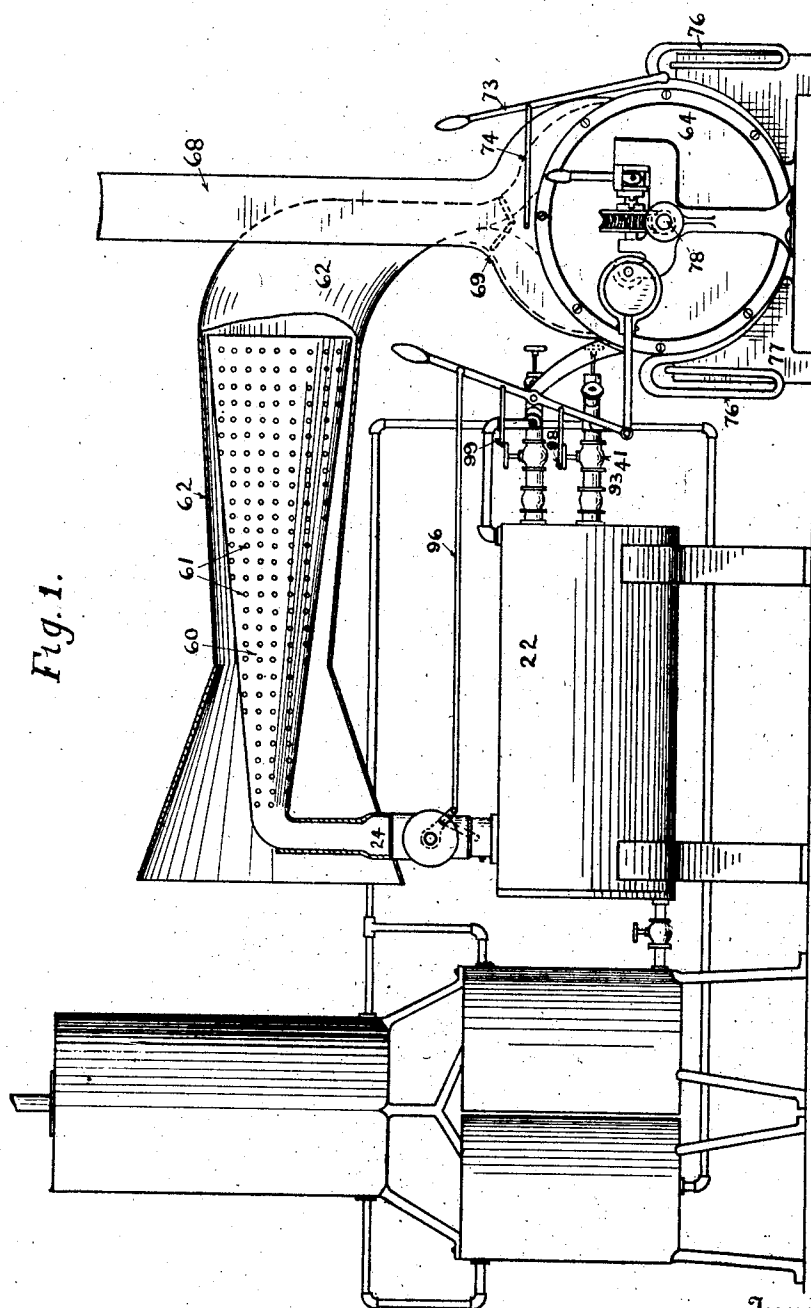


Fig. 1.

Witnesses

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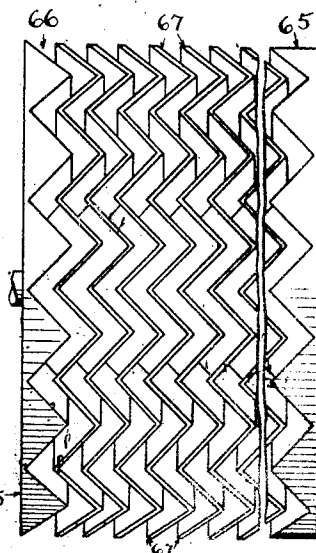
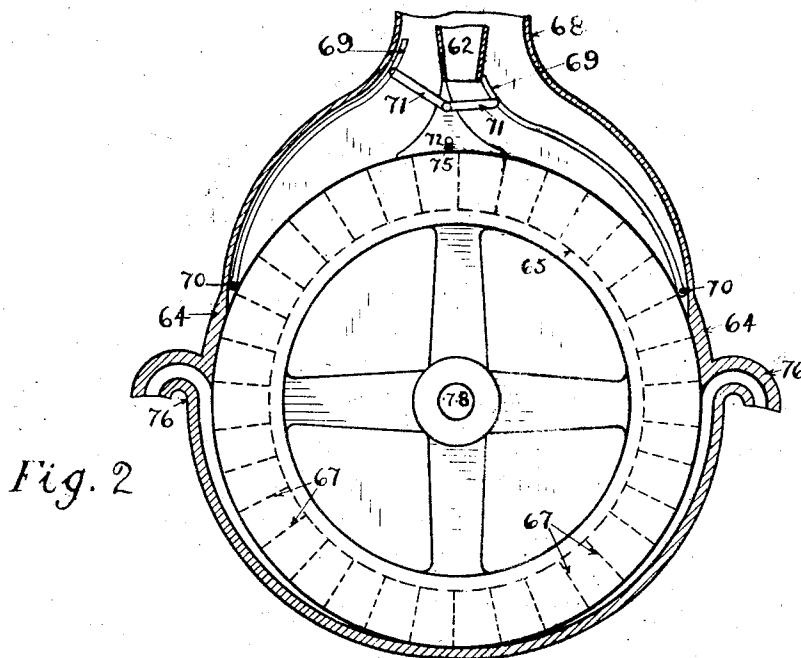


Fig. 3.

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UNITED STATES PATENT OFFICE.

CHRISTOPHER JOHN LAKE (NAME CHANGED FROM JOHN CHRISTOPHER LAKE BY JUDICIAL ORDER), OF BRIDGEPORT, CONNECTICUT.

ELASTIC-FLUID MOTOR.

No. 919,289.

Specification of Letters Patent.

Patented April 20, 1909.

Original application filed January 4, 1906, Serial No. 294,552. Divided and this application filed May 24, 1907. Serial No. 375,425.

To all whom it may concern:

Be it known that I, CHRISTOPHER JOHN LAKE (formerly JOHN CHRISTOPHER LAKE), a citizen of the United States, and resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Elastic-Fluid Motors, of which the following is a specification.

This is a divisional application pertaining to subject-matter shown and described in my former application filed January 4, 1906, Serial Number 294,552, and which was divided out of the claims in said former application pursuant to a requirement of division in Office letter of October 6, 1906.

The present invention consists in certain new and useful improvements in elastic fluid motors for the conversion of the kinetic energy of power fluids into useful mechanical power.

The object of my invention is to produce a rotary engine in which the power fluid will be distributed over the largest number of impact surfaces at the maximum volume and velocity constantly maintained throughout the engine circuit, and therefore, with the highest efficiency.

A further object is to produce an engine in which the direction of rotation may be readily reversed and which will operate at its highest efficiency in either direction.

A further object is to produce an engine in which water or other liquid condensed therein will be constantly and automatically removed without any escape of the power fluid.

With these objects in view and further objects which will appear as the nature of my invention is more fully set forth, I have produced an engine that embodies one form of my invention as hereinafter described by reference to the annexed drawings, in which:

Figure 1 shows an external end view of my improved engine in connection with a power fluid generator which I have described and claimed in said former application. Fig. 2 is an end sectional view through the engine casing showing an end view of the wheel therein. Fig. 3 is a side elevation of the wheel of my engine removed from the casing.

Similar reference characters refer to corresponding parts throughout the several views. 65 represents the wheel proper inclosed in

the casing 64 provided with an inlet pipe 62, and an exhaust passage 68 surrounding the inlet pipe. The power fluid entering through the casing 62, is deflected tangentially to the wheel by means of the block or fluid directing means 72, and the valve or gate 69 which are connected together by the link 71. The valve or gate 69 and the link 71 are duplicated on the opposite side of the block 72 and connected in such manner that the inlet and exhaust pipes respectively will communicate tangentially with either side of the wheel according to the position of the block 72 which is shiftable by means of lever 73 and link 74, shown in Fig. 1, for moving it along the periphery of the wheel to either side of the inlet pipe. When the block 72 is in the position shown in Fig. 2, the power fluid is conveyed to the right hand side of the wheel causing it to rotate in that direction and exhausts on the left hand side to the exhaust passage 68. It will be readily seen that when the block is moved to the right hand side of the inlet pipe, all the conditions will be reversed and the wheel will rotate in the opposite direction.

The special construction of the rotatable element in my motor is such as to make it specially suitable for a power fluid of low pressure, but large volume and high velocity. Accordingly, I prefer to expand the high pressure fluid from a source of supply in a funnel shaped passage 60 within the supply conduit 62 and having the holes 61 through which air is entrained to still further augment the volume of the power fluid before it enters the casing of the motor.

Passing now to the special construction of the rotatable element of my engine, it consists of a disk or cylinder 65 mounted on a shaft 78 and having one or more circular zigzag grooves or channels 66 separated from each other by corresponding zigzag partitions 67 which may have rounded corners or sharp angles and corners as shown, the latter form being the one affording greater resistance to the passage of the power fluid. The wheel, being inclosed in the casing 64, when the power fluid is applied it must pass through the zigzag grooves 66 where its rapid alternate deflection from side to side will cause it to impart its energy to the wheel. By this arrangement of zigzag chan-

nels the impact upon any given portion of the wheel is continuous throughout nearly an entire revolution from the point of admission to the point of exhaust, so that nearly the entire peripheral portion of the wheel is constantly under the influence of the power fluid instead of only a few blades or vanes that are passing the inlet ports at a given time as in most impact motors as hitherto constructed.

The arrangement of my exhaust conduit 68 around my inlet conduit 62 is also an important feature of my invention. This arrangement allows the power fluid to act upon a given unit of impact surface of the wheel through nearly an entire revolution before coming to the point of exhaust. This late exhaust is especially desirable in connection with my special form of wheel in which nearly the entire grooved peripheral portion is constantly and continuously under the influence of the power fluid. My arrangement of the exhaust passage around the inlet has also the further advantage of providing a convenient exhaust opening from either side of the wheel without duplication of pipes for that purpose, and it also prevents excessive radiation from the inlet pipe and consequent loss of power.

The pipes 76 are placed in the casing 64 to provide an outlet for any condensation that may collect in the bottom of the casing. These pipes are bent into a U shape and kept filled with liquid which prevents escape of the gaseous power fluid from the casing. The pipes are placed in opposite sides of the casing at about its mid-height so that one of them will carry off the liquid in the exhaust side of the wheel in whatever direction it may be running. These passages may be omitted in any case where it is desirable to invert the engine or where the power fluid is such that condensation is not met with.

Having now fully described one of the forms in which my invention may be embodied, what I claim is:

1. In an impact motor, a rotatable element having a circular zigzag channel with sharp angles and corners to give abrupt changes of direction therein.

2. In an impact motor, a rotatable element having a plurality of circular zigzag channels with sharp angles and corners in said channels to give abrupt changes of direction therein, and corresponding continuous, imperforate zigzag walls or partitions separating said channels.

3. In an impact motor, the combination of a rotatable element having a plurality of circular zigzag channels with sharp angles and corners to give abrupt changes of direction therein and formed by continuous, imperforate walls or partitions, means for conducting a power fluid simultaneously to the said

circular zigzag channels, and means whereby the power fluid may be fully expanded before it enters the said circular zigzag channels.

4. In an impact motor, the combination of a casing, inlet and exhaust pipes, and a rotatable element having a circular zigzag channel with sharp angles and corners to give abrupt changes of direction therein, said channel being formed by continuous, imperforate corresponding zigzag walls.

5. In an impact motor, the combination of a casing, inlet and exhaust pipes and a rotatable element having a plurality of circular zigzag channels with sharp angles and corners to give abrupt changes of direction therein, said channels being separated by continuous, imperforate, unbroken, corresponding zigzag walls or partitions.

6. In an impact motor, the combination of a casing, an inlet passage, an exhaust passage surrounding said inlet passage and a rotatable element having circular zigzag channels separated by corresponding zigzag walls or partitions.

7. In an impact motor, the combination of a casing, an inlet passage, an exhaust passage surrounding said inlet passage, and a rotatable element having circular zigzag channels with sharp corners and angles therein.

8. In an impact motor, the combination of a casing, a rotatable member therein, an inlet passage, an exhaust passage surrounding said inlet passage, and means whereby a power fluid may be conducted in either direction from the inlet passage around the rotatable member to the exhaust passage.

9. In an impact motor, the combination of a casing, an inlet passage, an exhaust passage surrounding said inlet passage, a rotatable member having circular zigzag channels separated by corresponding zigzag walls or partitions, and means whereby a power fluid may be conducted in either direction from the inlet passage around the rotatable member to the exhaust passage.

10. In an impact motor, the combination of a casing, a rotatable member therein, a fixed inlet passage, an exhaust passage surrounding said inlet passage, and a movable block at the mouth of said inlet passage adapted to deflect the power fluid to either side of said rotatable member.

11. In an impact motor, the combination of a casing, a rotatable member therein, inlet and exhaust passages for the power fluid, a movable block at the mouth of said inlet passage adapted to deflect the power fluid to either side of said rotatable member, and gates or valves hingeably fixed in said casing and connected with said movable block in such manner as to connect one side of the rotatable member with the inlet passage and the other side with the exhaust passage when

the block is on either side of said inlet passage.

12. In an impact motor, the combination of a casing, a rotatable member therein, an inlet passage, an exhaust passage surrounding said inlet passage, a movable block at the mouth of said inlet passage adapted to deflect the power fluid to either side of said rotatable member, and gates or valves hingeably fixed in said casing and connected with said movable block in such manner as to connect one side of the rotatable member with the inlet passage and the other side with the exhaust passage when the block is on either side of said inlet passage.

13. In an impact motor, the combination of a casing, an inlet passage, an exhaust passage surrounding the said inlet passage, a rotatable member having circular zigzag walls or partitions, a movable block at the mouth of said inlet passage adapted to deflect the power fluid to either side of said rotatable member, and gates or valves hingeably fixed in the said casing and connected with said movable block in such manner as to connect one side of the rotatable member with the inlet passage and the other side with the exhaust passage when the block is on either side of said inlet passage.

14. In an impact motor, the combination of a casing, and U shaped pipes leading therefrom to provide outlet for water or other liquid condensed in the casing.

15. A reversible rotary motor comprising a casing and a rotatable element therein, in combination with devices arranged at and communicating with opposite sides of the casing to exhaust the liquid of condensation therefrom, each device consisting of an outlet so shaped as to form a liquid seal.

16. In an impact motor, the combination of a casing, a rotatable member therein, an inlet passage, an exhaust passage adjacent to and extending to opposite sides of the inlet passage, a movable member at the mouth of the inlet passage adapted to direct the power fluid to either side of the rotatable member, and gates or valves in the casing connected with said movable member in such manner as to connect either side of the rotatable member with the exhaust passage when the opposite side is connected with the inlet passage.

17. In an impact motor, the combination of a casing, a rotatable member therein having a circular zigzag passage, a device exterior to the casing to expand the power fluid so as to convert its pressure into volume and velocity, and means for directing the expand-

ed fluid from said device to the said rotatable member.

18. In an impact motor, the combination of a casing, a rotatable member therein, a fixed inlet conduit, an exhaust conduit surrounding said inlet passage and an adjustable device between the inlet conduit and the rotatable member for directing the power fluid from said conduit to either side of the said rotatable member.

19. In an impact motor, the combination of a casing, a rotatable member therein having fluid impinging surfaces, an inlet conduit for conducting the power fluid to said surfaces, and an exhaust conduit surrounding said inlet conduit.

20. In an impact motor the combination of a casing, a rotatable element therein having circular zigzag channels separated by corresponding zigzag walls or partitions and a device connected with the casing for expanding the power fluid to the casing and mingling air therewith.

21. In an impact motor the combination of a casing, a rotatable element therein having circular zigzag channels separated by corresponding zigzag walls or partitions and a device connected with the casing for expanding the power fluid to the casing and mingling air therewith, said device comprising a funnel having slant perforations and an outer conduit for collecting and leading air to said perforations.

22. In an impact motor the combination of a casing, an inlet passage, an exhaust passage surrounding said inlet passage, a rotatable element having circular zigzag channels separated by corresponding zigzag walls or partitions and a device connected with the inlet passage for expanding the power fluid to the said passage and mingling air therewith.

23. In an impact motor the combination of a casing, an inlet passage, an exhaust passage surrounding said inlet passage, a rotatable element having circular zigzag channels separated by corresponding zigzag walls or partitions and a device connected with the inlet passage for expanding the power fluid to the said passage and mingling air therewith, said device comprising a funnel having slant perforations and an outer conduit for collecting and leading air to said perforations.

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