D. G. HASKINS.

Double-Acting Fluid-Motor.

No. 204,728. Patented June 11, 1878.

Fig. 1.

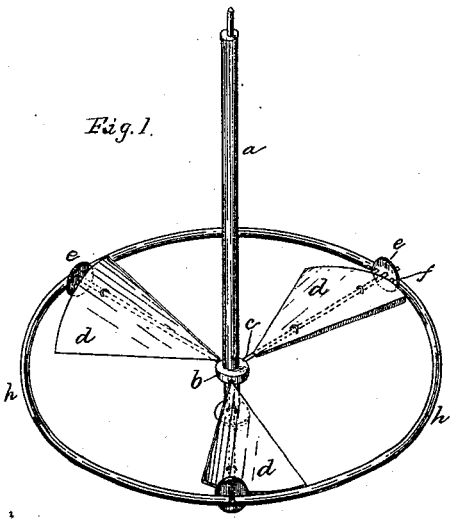


Fig. 3.

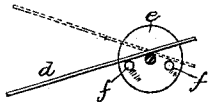
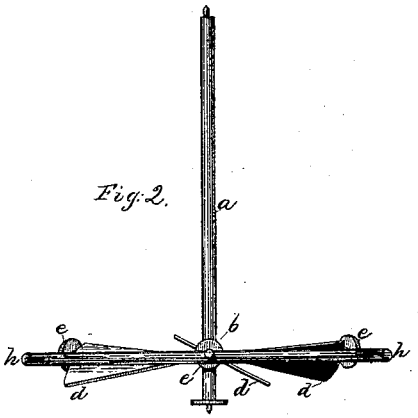


Fig. 2.



Witnesses.

L. H. Latimer.

Wm. Greene

Inventor.

D. G. Haskins.

by J. H. Adams atty.

UNITED STATES PATENT OFFICE.

DAVID G. HASKINS, OF CAMBRIDGE, MASSACHUSETTS.

IMPROVEMENT IN DOUBLE-ACTING FLUID-MOTORS.

Specification forming part of Letters Patent No. **204,728**, dated June 11, 1878; application filed November 22, 1877.

To all whom it may concern:

Be it known that I, DAVID GREENE HASKINS, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented a Double-Acting Fluid-Motor, of which the following is a specification:

My invention relates to a means of utilizing water or other fluid as a motive power, to impart motion to machinery through the medium of a shaft, which is caused to turn or rotate in one and the same direction at all times, irrespective of the direction of the fluid used as the motive power.

The invention consists of a series of sectoral plates or blades hinged or hung at one of their radial sides to bars or rods extending at right angles from a shaft, the motion of the plane of the said swinging sectoral plates or blades being limited to forty-five degrees, more or less, above and below the plane of the projecting arms, the effect of which is that as the water or other fluid impinges or acts upon the said sectoral plates upon either side they will, with the shaft with which they are connected, always rotate in one and the same direction.

Referring to the drawings, Figure 1 is a perspective view of my invention. Fig. 2 is an elevation of the same, and Fig. 3 shows the method of limiting the extent of motion of the blades or sectoral plates.

a represents a shaft, which is to be properly stepped or supported at each end and connected with any desired machinery to which motion is to be imparted.

Attached to the shaft *a*, by means of a hub, *b*, or otherwise, is a series of metal rods or bars, *c*, extending at right angles from the shaft.

To the rods *c* are hinged or hung, at or near one of their radial sides, so as to allow them to turn or swing freely, wings or blades *d d*, consisting of sectoral plates of metal or other suitable material.

The outer ends of the axial rods *c* are attached to a ring or wheel, *h*, inside of which, and secured to the said rods, are plates *e e*.

The plates *e e* are each provided with two pins or projections, so arranged as to limit the movement of the free edges of the sectoral plates *d d* to an inclination of forty-five degrees (more or less) above or below the plane of the axial rods *c c*.

Any other equivalent device for limiting the movement of the blades *d d* may be employed.

Instead of the ring *h*, a flat rim may be used and pins *f f* be secured to the same, or the ring or wheel *h* may be dispensed with entirely, and the plates or blades *d d* be fixed to the rods *c c*, and the latter be attached to the hub *b* or shaft *a*, so as to admit of the swinging movement of the said blades.

I have shown only three sectoral plates as attached to the shaft *a;* but there may be as many as would occupy the entire space in a plane around the shaft, if desirable.

Where greater power is required, two or more sets of plates may be applied to the same shaft, one above the other.

My invention is capable of numerous applications, among which may be mentioned the following: As a tidal motor, to be put in operation by the action of the tides; to impart motion to a propeller for vessels or rafts by the action of the waves or the swell of the ocean; to operate a vessel's pumps; to operate a windlass, at sea or elsewhere, where the force of the water can be utilized; and. by attaching two sets of blades or plates to one shaft, so that they will rotate in opposite directions, for application to a churn.

In the construction of my motor in any of its applications the axes of the blades may be set at any desired angle with the shaft of the motor.

The blades are to be provided with a regulator, conveniently placed and easily adjusted to change the angle of their exposure to the water or other fluid.

What I claim as my invention is—

1. A fluid-motor consisting of a series of swinging plates or blades connected with a shaft and operating in such a manner that as the fluid acts upon either side or face of the said swinging plates their rotation with the shaft will always be in one and the same direction, substantially as set forth.

2. The combination, with the hinged or

swinging plates, of means for limiting the degree of inclination of the said plates, as and for the purpose set forth.

3. The combination of the hinged or swinging plates *d d*, the shaft *a*, and the rim or wheel *h*, substantially as and for the purpose specified.

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

D. G. HASKINS.

Witnesses:
J. H. ADAMS,
L. H. LATIMER.