

W. BURNETT.

Hydrodynamic Steam-Engines.

No. 137,759.

Patented April 15, 1873.

Fig. 1.

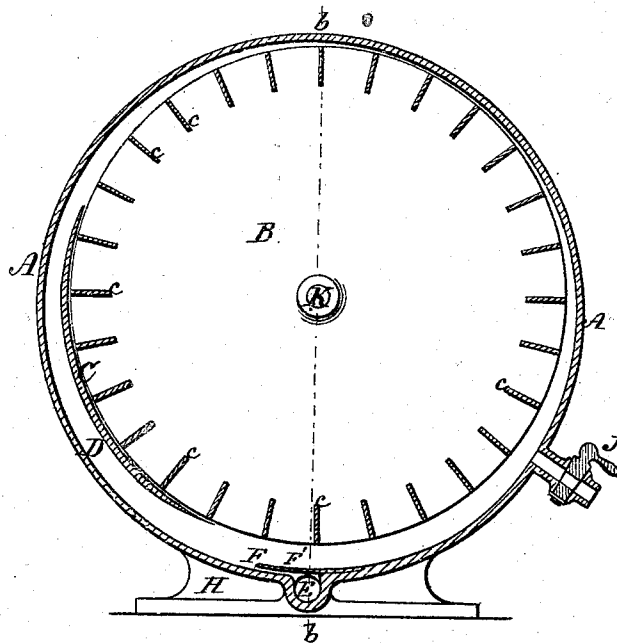
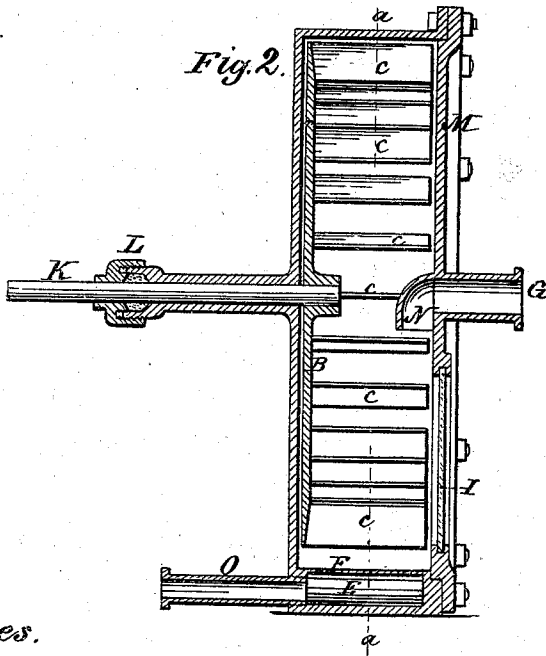


Fig. 2.



Witnesses.

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Fig. 3.

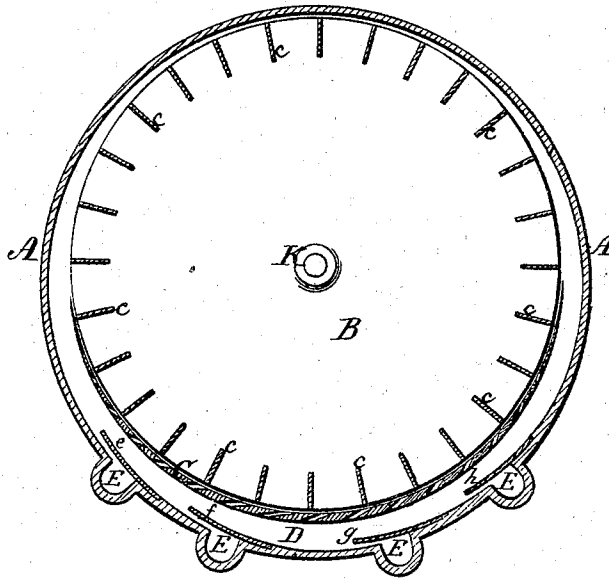


Fig. 4.

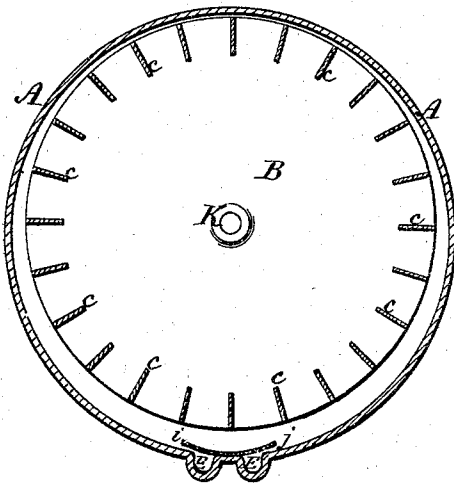
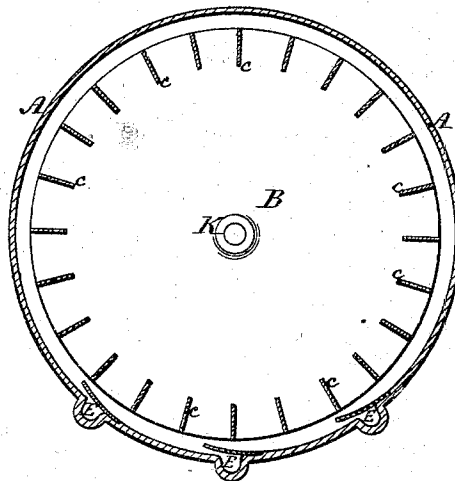


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM BURNETT, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN HYDRODYNAMIC STEAM-ENGINES.

Specification forming part of Letters Patent No. **137,759**, dated April 15, 1873; application filed August 28, 1872.

To all whom it may concern:

Be it known that I, WILLIAM BURNETT, of San Francisco, in the county of San Francisco and State of California, have invented a Hydrodynamic Steam-Engine, of which the following is a specification:

The nature of my invention consists in inclosing in a cylindrical case, which contains a wheel provided with paddles at its periphery, a certain quantity of water, mercury, or other liquid, and introducing currents of steam into the said case, in such a manner that the contained liquid is made to rotate rapidly within it in a continuous circumferential current, impelling the inclosed wheel.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation, reference being had to the accompanying drawing.

Figure 1 is a vertical transverse section of my hydrodynamic steam-engine taken on the line *a a*, Fig. 2, showing that part of the engine to the left of said line. Fig. 2 is a vertical longitudinal section taken on the line *b b*, Fig. 1, showing that portion to the left of said line. Figs. 3, 4, and 5 are diagrams exhibiting modifications of arrangement of certain parts of my invention.

In Figs. 1 and 2, A is a circular case containing the plate or disk-wheel B, the axis of which is eccentric to the inclosing-case, so that the periphery of the wheel shall almost touch the case at one point, as shown. Projecting from one side of the plate-wheel B are a number of paddles, *c*, the outer edges of which conform to the extreme diameter of the wheel. The space occupied by the wheel B within the inclosing-case A is for a certain distance separated from the remaining space by a partition, C, forming a channel, D, through which the liquid medium employed is impelled by a steam-jet issuing from a steam-chamber, E, by means of a narrow port or slit, F, through which the steam enters case A in a direction nearly coincident with the line of its circumference, the liquid medium thus impelled making a complete circuit of the interior circumference of the case; and, by the eccentric position of the wheel B relatively to the case A, the said liquid is compelled in its course to enter among the paddles *c*, imparting to the

wheel B a high velocity, by means of which the liquid, having expended upon the wheel the accelerated velocity imparted to it by the steam-jet, is thrown forward from the paddles, as soon as the eccentricity will permit, with a velocity equal to that of the wheel's periphery, while the steam, ceasing to intermingle with the water, (which is separated from it by centrifugal action,) flows toward the center of the wheel and escapes through exhaust-pipe G. The flange H cast upon case A is used to secure the engine to its foundation. The case A may be made of any desired length, and one or both ends of the same may be made removable, as in the case of an ordinary steam-engine cylinder. In the movable head, as shown in Fig. 2, there is a piece of thick plate-glass, I, inserted, and properly packed and secured, of sufficient size to allow of observing the height of the water when the engine is at rest, and also its depth from the inner surface of the case when being swept around the interior circumference when the engine is in motion. A waste-cock, J, Fig. 1, is also inserted in a position to allow any surplus water to run off before starting, the same being gaged to permit any water accumulating from condensation to pass off while the engine is in motion. The shaft K, upon which the wheel B is secured, and through which the power exerted is transmitted, passes through a long bearing cast upon or affixed to the head opposite to that on which the exhaust-pipe G is mounted. At the outer end of this bearing there is an ordinary screw packing-box, L, to prevent the escape of steam. On the inside of the head M there is a metal hood, N, covering the entrance to the exhaust-pipe G in such a manner as to prevent any of the liquid falling in spray from entering the exhaust-pipe. The narrow port or slit F from which the steam-jet issues is formed by securing to the interior of the case A, immediately over the steam-chamber E, a thin rigid plate of metal, F', which forms at the same time the covering of chamber E and the upper surface of the jet-channel, this plate of metal F' being firmly secured to case A at the side of the chamber E opposite the jet-opening, while the other side of the plate is left free and sufficiently open for the passage of the steam.

Before starting the engine a charge of water, mercury, or other suitable liquid is introduced and heated to the highest possible temperature by permitting steam to enter slowly by means of the steam-pipe O, which communicates with the steam-chamber E. The engine is then ready for use. This engine must be run at a very high velocity to secure the best effect, as is the case with all dynamic engines.

In the modification shown at Fig. 3 the partition C is made full of oblique slits *d*, as shown, which, in addition to the water sweeping through the channel D, as before described, allow the water on the upper side of the partition to pass through it into the steam-current which is supplied by the several jets *e*, *f*, *g*, and *h* distributed along the length of the channel.

In the modification shown at Fig. 4 the partition C is dispensed with, and two steam-jets, *i* and *j*, leading in opposite directions, are employed, making the engine reversible, as only one of said jets is used at a time. There may, however, be two or more jets employed, in the manner shown in Fig. 3, for propelling the wheel in either direction.

In the modification shown at Fig. 5 the wheel B is placed concentrically with the case A, a small space being left between the periphery of the wheel and the inner diameter of the case, so that the liquid medium, which is swept over the steam-jets by the rotation of the wheel, will be projected by the entering steam against the paddles of the wheel, causing it to revolve with great velocity. I also contemplate the employment of the modifica-

tion shown at Fig. 5 with the wheel revolving horizontally, the shaft K being vertical, and the paddles extending from the periphery of the wheel nearly to its center, so that any liquid thrown toward the center of the wheel will be returned to the interior circumference of the case by centrifugal action, while the steam will escape at the center of the case, substantially as described in reference to Figs. 1 and 2.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a hydrodynamic steam-engine, the method of propelling an inclosed wheel in an inclosing-case by means of a body of water within the case forced circumferentially around it in a continuous rotary current by a jet or jets of steam, substantially as described.

2. In combination with wheel B and case A, the partition C, forming the channel D within the case A for preserving the circumferential direction of the operating-current, constructed and operating substantially as hereinbefore set forth.

3. In combination with case A and steam-chamber E, the rigid plate F' forming the jet-channel, substantially as and for the purpose set forth.

4. The combination of the hood N with the exhaust-pipe G and case A, substantially as and for the purpose set forth.

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Witnesses:

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