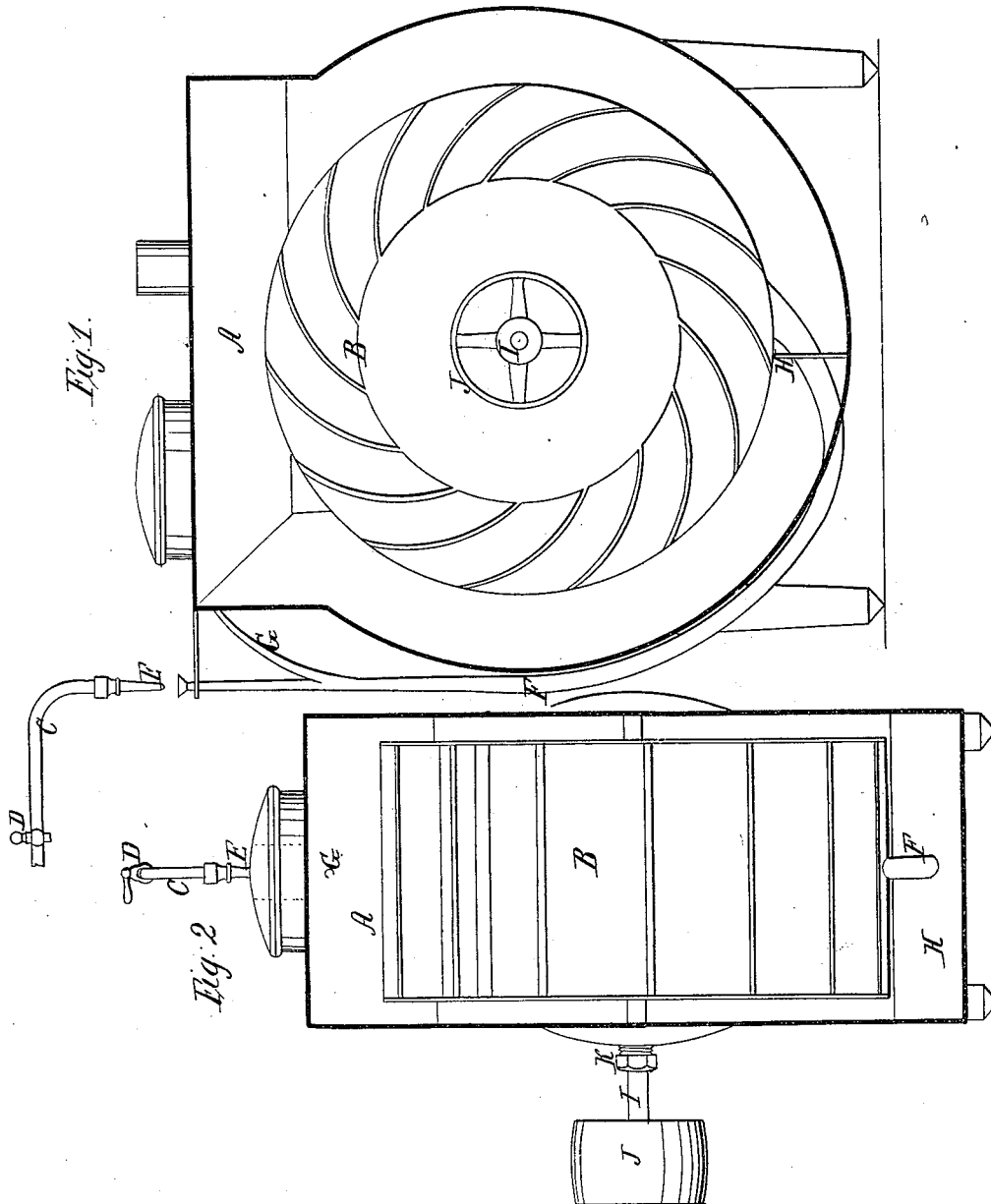


J. BLACK.

ENGINE OPERATED BY STEAM AND WATER.

No. 6,995.

Patented Jan. 8, 1850.



# UNITED STATES PATENT OFFICE.

JAMES BLACK, OF PHILADELPHIA, PENNSYLVANIA.

ENGINE OPERATED BY STEAM, AIR, AND WATER.

Specification of Letters Patent No. 6,995, dated January 8, 1850; Antedated November 19, 1849.

*To all whom it may concern:*

Be it known that I, JAMES BLACK, of the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Submerged Water-Wheels Wherein Steam and Air Combined Constitutes the Motive Power; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a geometrical side-elevation, and Fig. 2 an end-elevation of a wheel with said improvements, sufficient of the outer casing or reservoir being removed, so as to show the interior arrangement.

Inclosed in the vessel, box, or reservoir A is placed, and revolves the submerged over-shot water-wheel B, in such a manner as to leave sufficient room for the free circulation of the water in said reservoir. By means of the pipe C, which is provided with a stop-cock D, the steam is conveyed from the steam-boiler; and, through a small orifice in the nozzle E of said pipe, a jet of steam is thrown into the conical tube or pipe F, carrying with it and introducing therein simultaneously a certain quantity of atmospheric air, by the momentum whereof buoyancy and motive power is given to the wheel. Another conical tube or pipe G is connected with the pipe F, in such a manner as to have a suction through the latter, in consequence of a vacuum being produced by the steam and air introduced therein. The object of this tube G is to draw the hot air or steam, gathered or accumulated above the wheel, into the conical pipe F, the top or cover of the reservoir being made sufficiently tight for this purpose. The lower extremity of this main pipe F enters the reservoir on its bottom at or near the center thereof, and passing through the partition H, its orifice

approaches the periphery of the wheel as near as possible, without interfering with its revolution. The combined steam and air rushing from the mouth of the pipe F into the buckets presenting themselves successively for its action, the momentum thereof displaces the water contained therein, and the weight of the water in the opposite buckets preponderating, the wheel consequently revolves. The object of introducing the partition H is to prevent the steam and air from rushing back. One extremity of the wheel-shaft I projects beyond the side of the reservoir, and is furnished with a pulley J, from which, by means of a band or otherwise, motion is communicated to any desired machinery. An appropriate stuffing-box K is applied, where said shaft passes through the side of said reservoir.

What I claim as my invention and desire to secure by Letters Patent, is:

The manner of combining steam and air for the urpose of giving motive power to the wheel B, consisting in a jet of the former being thrown from the nozzle E of the pipe C into the pipe F, simultaneously introducing therein a quantity of the latter, which together are discharged through the lower orifice of said pipe F into the buckets of the wheel, and, displacing the water therein, causing said wheel to revolve, in combination with the pipe G, through which the hot air is drawn from the top of the box or reservoir into the pipe F, and reintroduced with the steam into the box at its bottom, thus using it repeatedly over again. The apparatus, by means of which the above is accomplished, is constructed and arranged, substantially, in the manner described in the foregoing specification.

JAMES BLACK.

Witnesses:

ANDREW FINLEY,  
FRANCIS BERNE.