J. STEWART.

Turbine-Wheels.

No. 198,429. Patented Dec. 18, 1877.

Fig. 1.

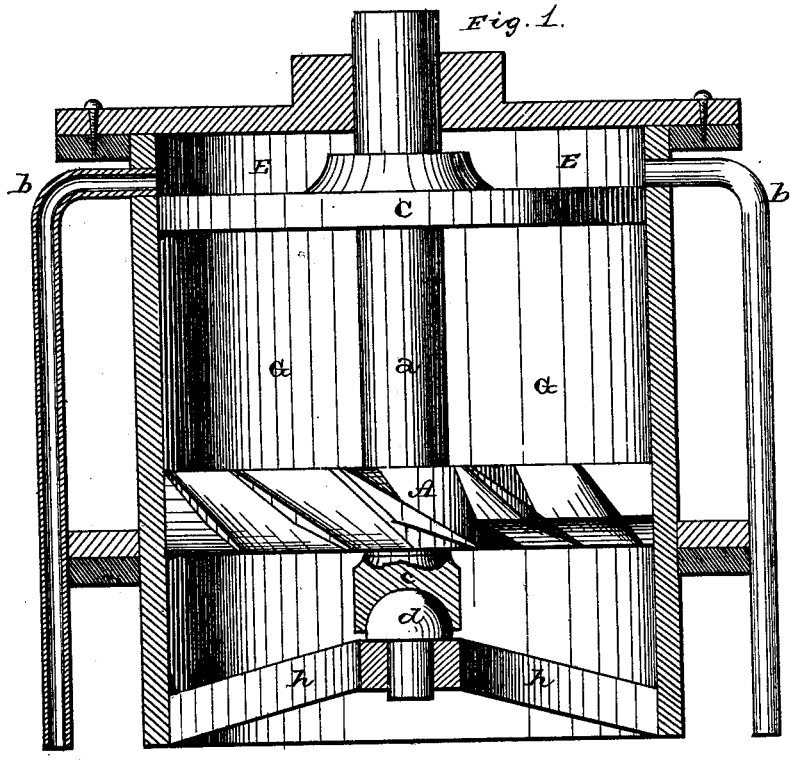
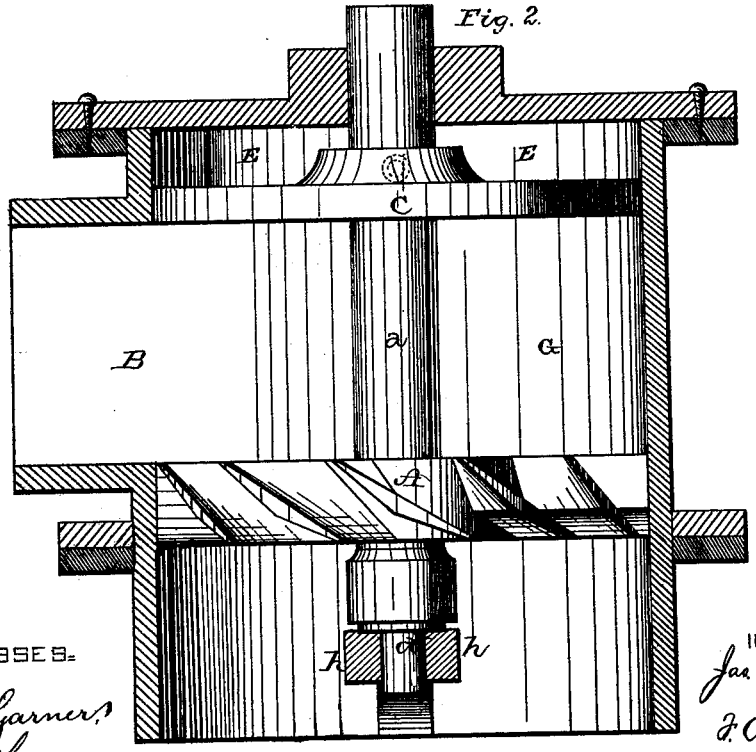


Fig. 2.



WITNESSES:

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INVENTOR:

Jas. Stewart

per

F. A. Lehmann,

Atty.

UNITED STATES PATENT OFFICE.

JAMES STEWART, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN TURBINE WHEELS.

Specification forming part of Letters Patent No. **198,429**, dated December 18, 1877; application filed November 3, 1877.

To all whom it may concern:

Be it known that I, JAMES STEWART, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Turbine Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in turbine wheels; and it consists in the introduction of a rotating disk, by which the weight of the wheel and the downward pressure of the water upon the wheel are counterbalanced and neutralized, so that the velocity of the motion of the wheel is not impeded by friction, as will be fully described hereinafter.

The accompanying drawings represent my invention.

A represents a turbine wheel, and *a* its shaft; B, the opening through which the water is admitted into the chamber G of the cylinder; C, the disk, of nearly the same diameter with the cylinder. This disk is secured to the shaft *a* at a suitable distance above the wheel, and revolves with it. E, a chamber between the disk and top of the cylinder, and *b b* are escapes for water from E; *c*, a globular socket in the lower end of the shaft; *d*, a globular gudgeon for the shaft to rest or revolve upon, supported by the arms *h*.

The water, when admitted through B and filling the chamber G, would press in all directions alike; but, owing to the outlet downward between the buckets of the wheel, the upward pressure overbalances the downward. The disk which forms the top of the chamber G is therefore acted against with greater force than the wheel at the bottom, and consequently pushed upward, and being secured to the shaft, the shaft would be lifted from its position, together with the wheel, were it not held by a collar or other device, and confined in a limited space, with sufficient play only to lift both shaft and wheel enough to remove the great downward pressure, and consequent friction, from the gudgeon upon which the shaft revolves.

By the upward pressure a quantity of water is necessarily forced through the small interstice unavoidably existing between the rotating disk and the walls of the cylinder, and a downward pressure thus created on the top of the disk would, to some extent, counteract the lifting power under it; but the escapes *b b* carry off the water as fast as it passes by the disk into the chamber over it, and prevent such counteracting force to accumulate.

The object of my invention is to remove from the wheel and shaft the great downward pressure, and consequent friction, which not only retard the velocity of turbine wheels, but also cause the great wear of the machine.

The escapes *b*, of which there may be any number, lead the water from the chamber E, through tubes or pipes, into a tank or vessel containing water. In this the ends of the conducting-pipes are submerged, to exclude the air from the outside. The air, after being expelled by the water when entering the chamber E from below, is thus prevented from resisting the flowing out of the escape-pipes.

Having thus described my invention, I claim—

The combination of the wheel-shaft *a*, having the disk C attached thereto, chamber E, and pipes *b*, the said pipes serving to convey the water from the chamber, substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of October, 1877.

JAMES STEWART.

Witnesses:
T. F. LEHMANN,
H. R. MCCLELLAND.