2 Sheets—Sheet.1.

H. W. WOODBURY & W. WOOD.

Water-Engine.

No. 197,987. **Patented Dec. 11, 1877.**

Fig. 1.

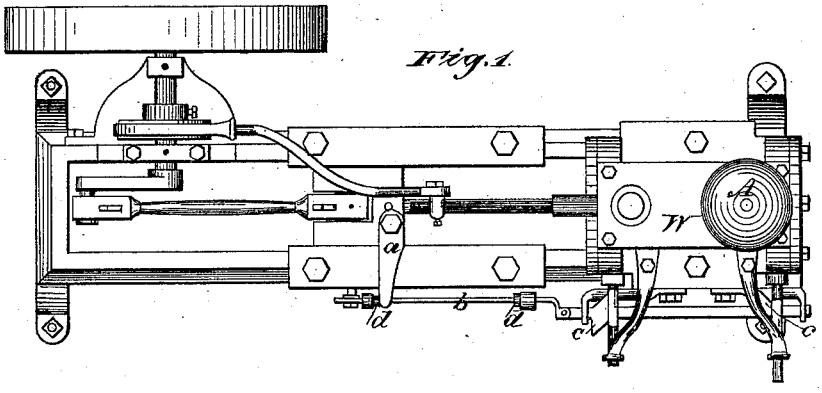


Fig. 3.

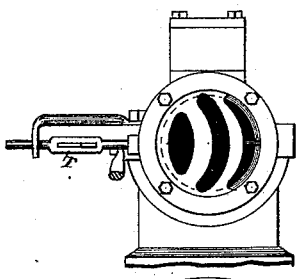
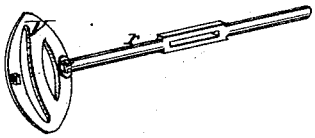


Fig. 4.



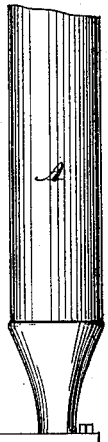
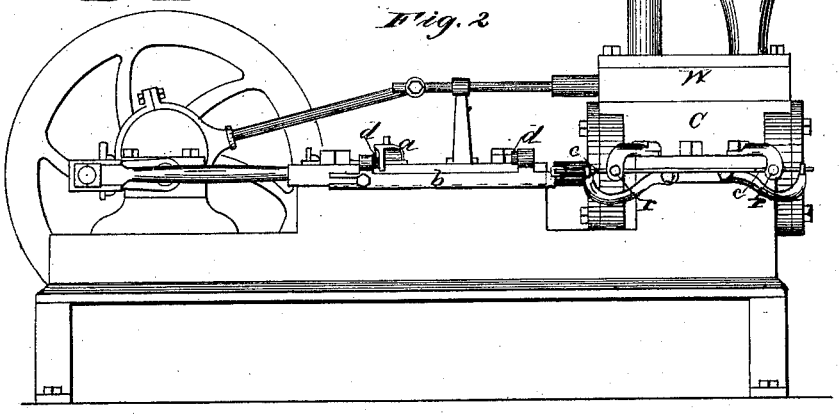


Fig. 2.



Attest;
Tracy L Hall
Hiram W Hake

Inventors
Henry W. Woodbury
William Wood

2 Sheets—Sheet 2.

H. W. WOODBURY & W. WOOD.

Water-Engine.

No. 197,987. **Patented Dec. 11, 1877.**

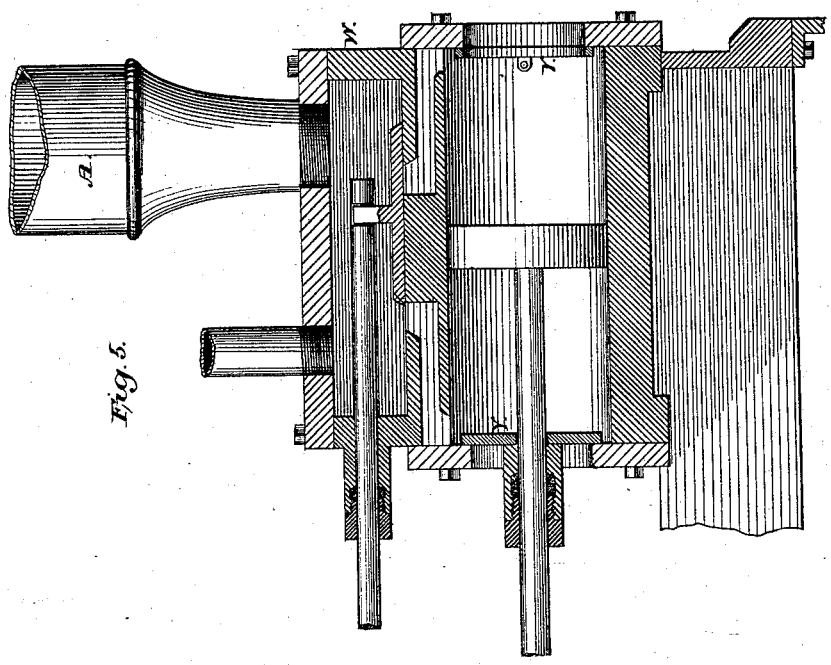


Fig. 5.

Attest:
Tracy L. Hall
Hiram Blake

Inventors:
Henry W Woodbury
William Wood

UNITED STATES PATENT OFFICE.

HENRY W. WOODBURY AND WILLIAM WOOD, OF KEENE, N. H.

IMPROVEMENT IN WATER-ENGINES.

Specification forming part of Letters Patent No. **197,987**, dated December 11, 1877; application filed June 15, 1877.

To all whom it may concern:

Be it known that we, HENRY W. WOODBURY and WILLIAM WOOD, both of Keene, in the county of Cheshire and State of New Hampshire, have invented certain new and useful Improvements in Water-Engines; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our invention consists of an engine similar in many respects to the ordinary stationary steam-engine, as shown in the drawing. It is provided with horizontal slide-valves V at either end of the cylinder C, so constructed as to furnish a direct and free exhaust for the water at the head of the cylinder as soon as its force is spent.

The openings in the cylinder-head are constructed of sufficient size to insure an easy and instantaneous exhaust for the water when it has completed its work.

The valves V are operated by cams *c c*, formed of inclined planes passing through slots or openings in the valve-rods *r r*.

The cams are attached to the horizontal bar or rod *b*, which is operated by the arm *a*, attached to the follow-head of the piston-rod. The arm *a* plays against rubbers *d d*, attached to the bar *b*.

The water-chamber W, equivalent to the steam-chest of a steam-engine, is provided with an upright air-chamber, A, which, being placed over the port-valves in the water-chamber W, causes a continuous and even pressure of the water as it enters the cylinder, and insures a more rapid and uniform motion of the piston than could be obtained by placing the same upon the supply-pipe or in any other position.

We claim as our invention—

1. The cylinder C for a water-engine, having direct exhausts in both heads of the same, together with the valves V, combined and arranged substantially as set forth.

2. The bar *b*, constructed with the cams *c c*, passing through the slots of the valve-rods *r r*, substantially as described.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

HENRY W. WOODBURY.
WILLIAM WOOD.

Witnesses:
TRACY L. HALL,
HIRAM BLAKE.