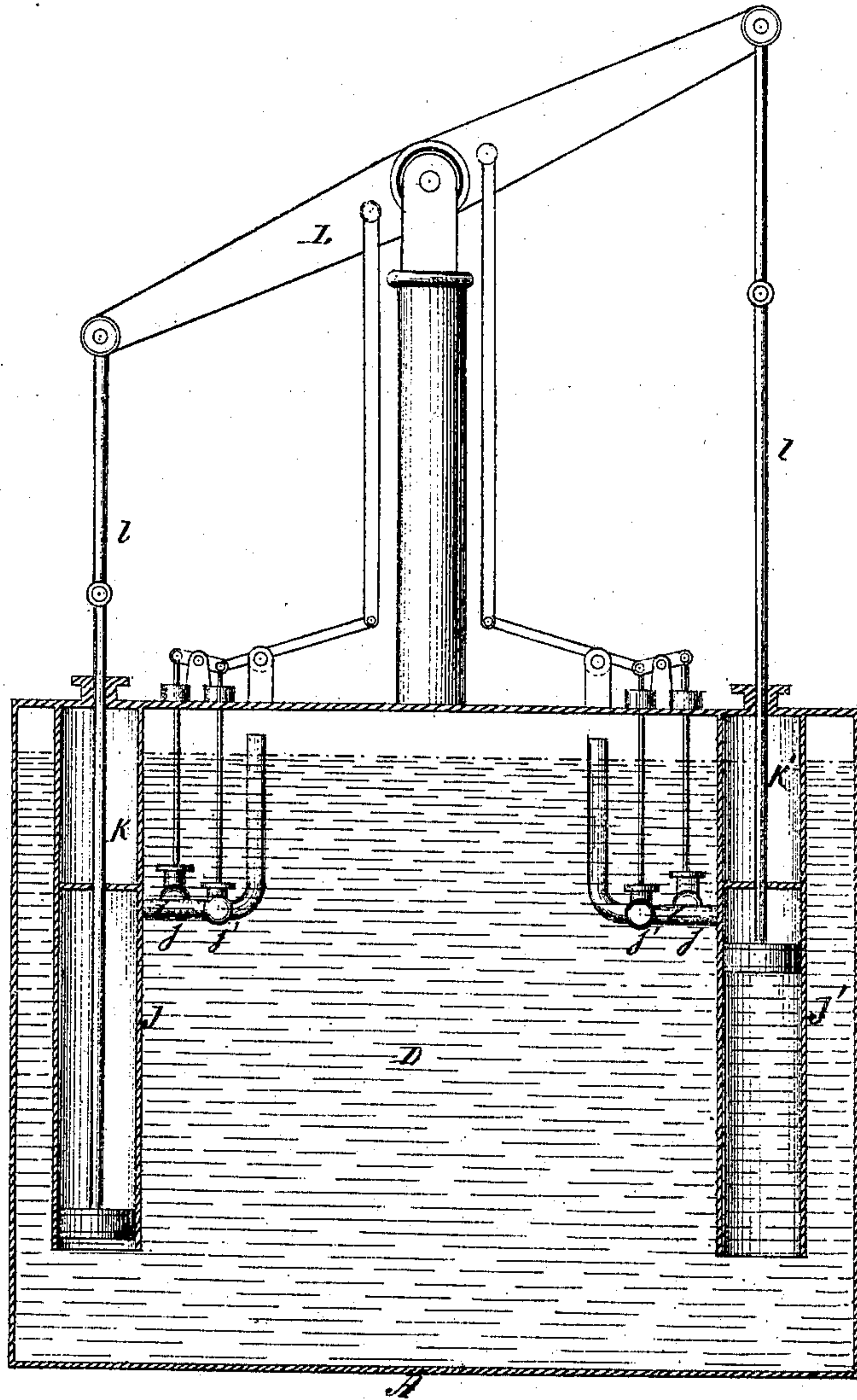


J. E. Culver,

Reciprocating Steam Engine.

No. 99855.

Patented Feb. 15, 1870.



Witnesses:

Victor Hagmann
A. M. Garner

Inventor:

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Attorneys.

United States Patent Office.

J. E. CULVER, OF HUDSON, NEW JERSEY.

Letters Patent No. 99,855, dated February 15, 1870.

STEAM-ENGINE.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, J. E. CULVER, M. D., of the city and county of Hudson, in the State of New Jersey, have invented new and useful Improvements in Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings forming part of this specification.

My application relates to high-pressure engines, and my present purpose is to introduce to the public one which, admitting steam and water into its cylinder, is adapted to work steam, of a very wide range of temperature, with economy.

The invention consists—

First, in the method of operating a piston to and fro in a cylinder, by the continuous application of steam pressure to one side of it, and the alternate application of steam and atmospheric pressure to the other side.

Second, in the means I employ to carry out this method, which consists of a cylinder and piston, arranged in combination with a steam-boiler, the cylinder being open at one end, to permit the contents of the boiler to have ingress and egress, and to act continuously against one side of the piston, and having at the other end a suitable head, a steam inlet-pipe, an exhaust-pipe, and a valve mechanism, so operated that the exhaust shall be open, and the inlet closed, during the force-stroke of the piston, and that during the return-stroke of the piston the exhaust shall be closed, and the steam-inlet open.

Third, in the arrangement of the cylinder and its valves, wholly or partly beneath the water in the boiler, for the purpose of lubricating and cooling the bearings and utilizing the heat force.

A, in the drawing, represents a steam-boiler.

J J', two vertical cylinders, open at their lower ends, and reaching nearly to the bottom of the boiler. The openings may be graduated in their size to regulate the velocity of the piston.

In those cylinders are pistons K K', which are connected to a working-beam, L, through the rods I.

In the upper or steam section of the chamber D project the open ends of steam inlet-pipes *i i'*, which at the other end form a junction with the cylinders J J',

at a point above the highest upward throw of the piston.

j j represent valves in the said pipes *i i'*.

The water will exert an effective and continual force on the bottom of the piston, and cause a constant tendency therein to rise. Whenever, therefore, the exhaust-valve of J and the inlet-valve of J' are opened simultaneously, the pressure of the water in the latter being balanced by the steam, the piston in J will be rapidly carried up, and that in J' forced down. By this process the water is utilized, and the engine is enabled to work steam of very high temperatures.

The cylinders J J' may be arranged outside of the boiler and connected with the same by suitable means, so as to be operated by steam alone, or steam and water combined, each being conveyed thereto by inlet-pipes.

The mechanism for operating the various valves may be of any suitable kind. That given is merely illustrative, and not a necessary part of my invention. Also, the cylinders are represented as operating in duplicate, but each engine may be made independent.

Having thus described my new method of operating the piston of an engine, and the mechanism which I preferably employ for that purpose,

What I consider as of my invention, and desire to protect by Letters Patent, is—

1. The method, above described, of applying steam pressure continuously to one side conjointly with steam pressure intermittently to the other side, to reciprocate a piston.

2. A cylinder, through one end of which steam presses continuously, and through whose opposite end steam is intermittently supplied to and exhausted from it, by suitable mechanism, in combination with a steam-boiler to supply the steam for both purposes.

3. The arrangement of the steam-cylinder J or J' and its valves within the boiler, and wholly or in part beneath the water therein, as and for the purpose specified.

J. E. CULVER, M. D.

Witnesses:

FRANK BLOCKLEY,
WM. DEAN OVERELL.