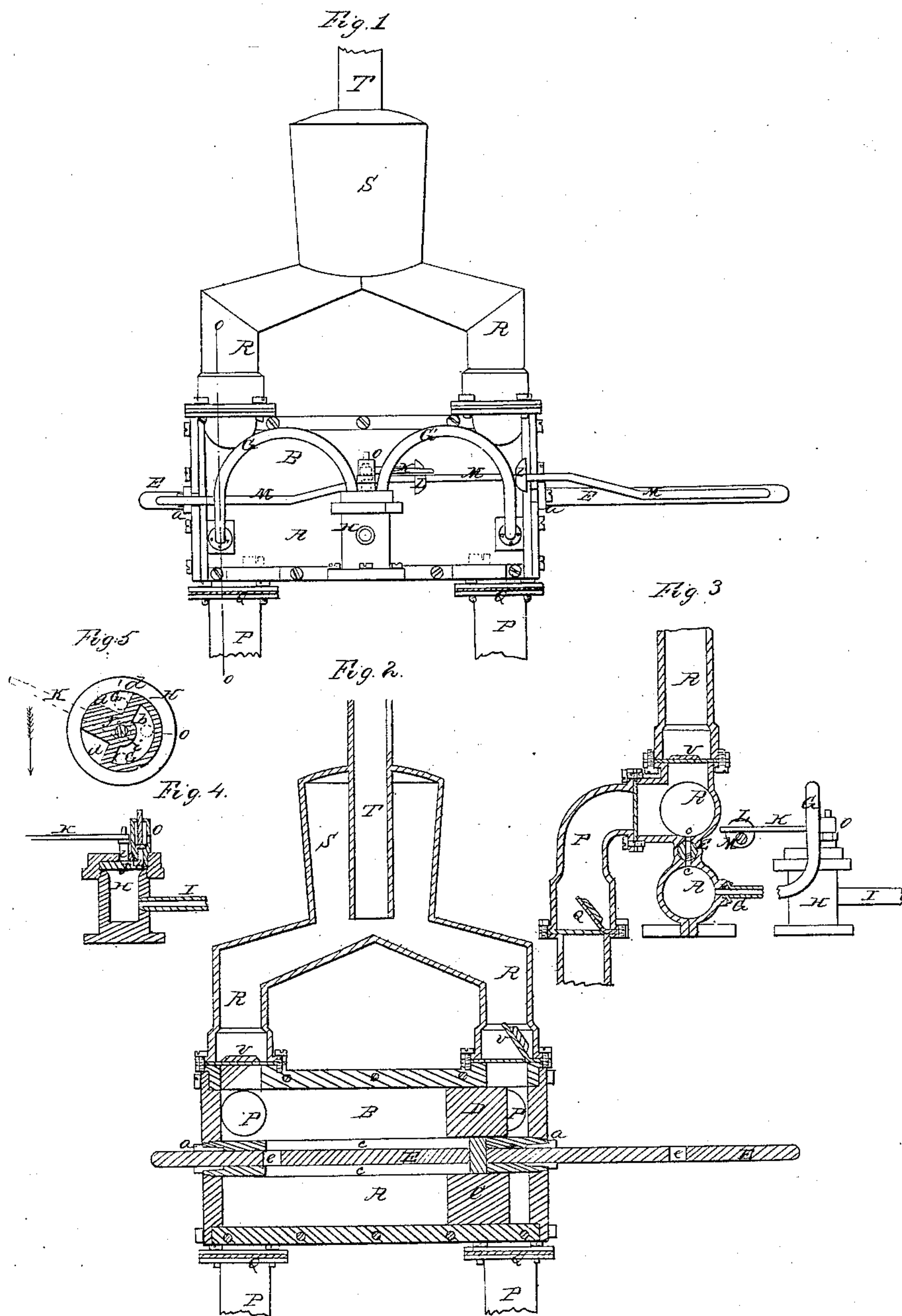


H. N. Black,

Steam Pump.

N^o 9,622.

Patented Mar. 22, 1853.



UNITED STATES PATENT OFFICE.

HORATIO N. BLACK, OF PHILADELPHIA, PENNSYLVANIA.

HYDRAULIC STEAM-PUMP.

Specification of Letters Patent No. 9,622, dated March 22, 1853.

To all whom it may concern:

Be it known that I, HORATIO N. BLACK, of the city and county of Philadelphia and State of Pennsylvania, have invented a
5 new and useful Improvement in the Steam-Engine, being a combined engine and pump for raising and forcing water; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing and letters of reference marked thereon, forming part of this specification, in which—

Figure 1 is an elevation of the engine,—Fig. 2 is a longitudinal section,—Fig. 3 is a
15 transverse section taken as denoted by the red line *o, o*, of Fig. 1,—Fig. 4 is a section, showing the oscillating cut off valve of the steam chamber, and the puppet exhaust valve,—and Fig. 5 is a top view of the
20 oscillating valve, showing the relative position thereof, with the ingress and egress steam pipes, as well as the exhaust valve O.

The same letters of reference seen on the several figures, denote the same parts.

25 My invention refers to a combined pump and engine,—and the nature of it consists in, placing at the juncture of a double or twin cylinder a piston rod, united to, and carrying two pistons working the one in
30 the steam cylinder, and the other in the water or pump cylinder.

My improvement also relates to the formation of openings in the piston rod, and juncture of the twin cylinder, whereby at
35 the proper time, communication of the cylinders is effected, for the purpose of causing a small quantity of cold water to pass into the steam cylinder, and thereby effect the partial condensation of the exhaust steam,
40 in the cylinder itself.

My improvement also relates to the combination of the double or twin cylinder, with the intermediate piston rod, and connected or twin pistons, having a movement simultaneous with the piston rod.
45

To enable others to make and use my invention, I will proceed fully to describe it.

A, B, are two cylinders, cast in two halves of equal length, and diameter, with an intermediate (that is at the juncture of the
50 cylinders when united) cylindric bore, of the same length as the cylinders, but of less diameter. In the cylinder A, moves the steam piston C, and in the cylinder B, moves the water or pump piston D, and between
55 the pistons, and in the intermediate bore,

moves the piston rod E. The two pistons are united by a center bar F, which also permanently connects them to the piston rod situated between the pistons. At the juncture of the cylinders, and equal in length
60 to the movement of the pistons, are formed grooves or slits *c c* within which the cross bar F, of the pistons moves back and forth. The piston rod E, extends through, and beyond the ends of the intermediate bore, a
65 distance sufficient to accommodate its travel, and is furnished with stuffing boxes *a a* inserted into each end of the bore, thereby rendering the piston rod steam tight. Near
70 each end of the piston rod, are formed small openings *e, e*, which, at the extreme movement of the piston rod, alternately effect communication with the twin cylinders, through means of the grooves *c c* at the
75 juncture of the cylinders as shown in Fig. 2. The object of this is to allow a small quantity of cold water to pass from the pump cylinder, into the steam cylinder for the purpose of partially condensing the exhaust
80 steam, and thereby create a vacuum to assist the action of the next supply.

G, G', are pipes leading from near each end of the steam cylinder, to the steam chamber H, which latter communicates with
85 the boiler through a pipe I. The steam chamber H, is provided with a valve J, shown in Fig. 5, having in its upper surface a semi-circular recess *b*, and in its perimeter spaces *d, d*, and from its center projects, through the cap of the steam chamber, a short spindle or axle *i*, on the square
90 end whereof, is placed an arm K, extending horizontally toward the cylinders in a position to receive the alternate action of
95 buttons L, L, fixed a suitable distance apart on a rod M, attached to the ends of the piston rod, and lying parallel therewith as seen in Fig. 1, so that the reciprocating movement of the piston rod, operates, through the arm
100 K, the oscillating valve J,—thus in Fig. 5 the steam pipe G' has communication with the boiler, while the pipe G, communicates with the exhaust valve O, through the semi-circular recess *b* in the valve, through
105 which the exhaust steam escapes;—and when the position of the valve is altered by the return movement of the piston in the direction of the arrow in Fig. 5 the steam pipe G' communicates with the exhaust
110 valve, and the pipe G, with the boiler.

The exhaust valve O, is mounted upon

the steam chamber, directly above the semi-circular recess *b*, and the steam pipes *G G'* communicate alternately with the recess. Near each end of the water or pump cylinder *B*, there is connected an induction pipe *P*, furnished with a valve *Q*;—and to the top of the cylinder is united the branch pipes *R, R*, of an air chamber *S*, having a central pipe *T*, extending to near the bottom thereof, the use of which in connection with the air chamber is for the discharge of the water. The eduction pipes *R*, have valves *U*, similar to the induction pipes,—and each stroke of the pump piston acts to draw, and force the water, by opening and closing two of the valves simultaneously.

I do not claim a double cylinder pump or water engine nor do I claim opening a

valve at the end of the stroke of a steam piston and injecting water into a steam cylinder for producing a partial vacuum, but

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

The combination of the double slotted water and steam cylinder *A* and *B*, double piston *C* and *D*, and slotted piston rod *E*, arranged and operating in the manner and for the purpose set forth in the foregoing specification.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

HORATIO N. BLACK.

Witnesses:

JOEL COOK,
G. B. COOK.