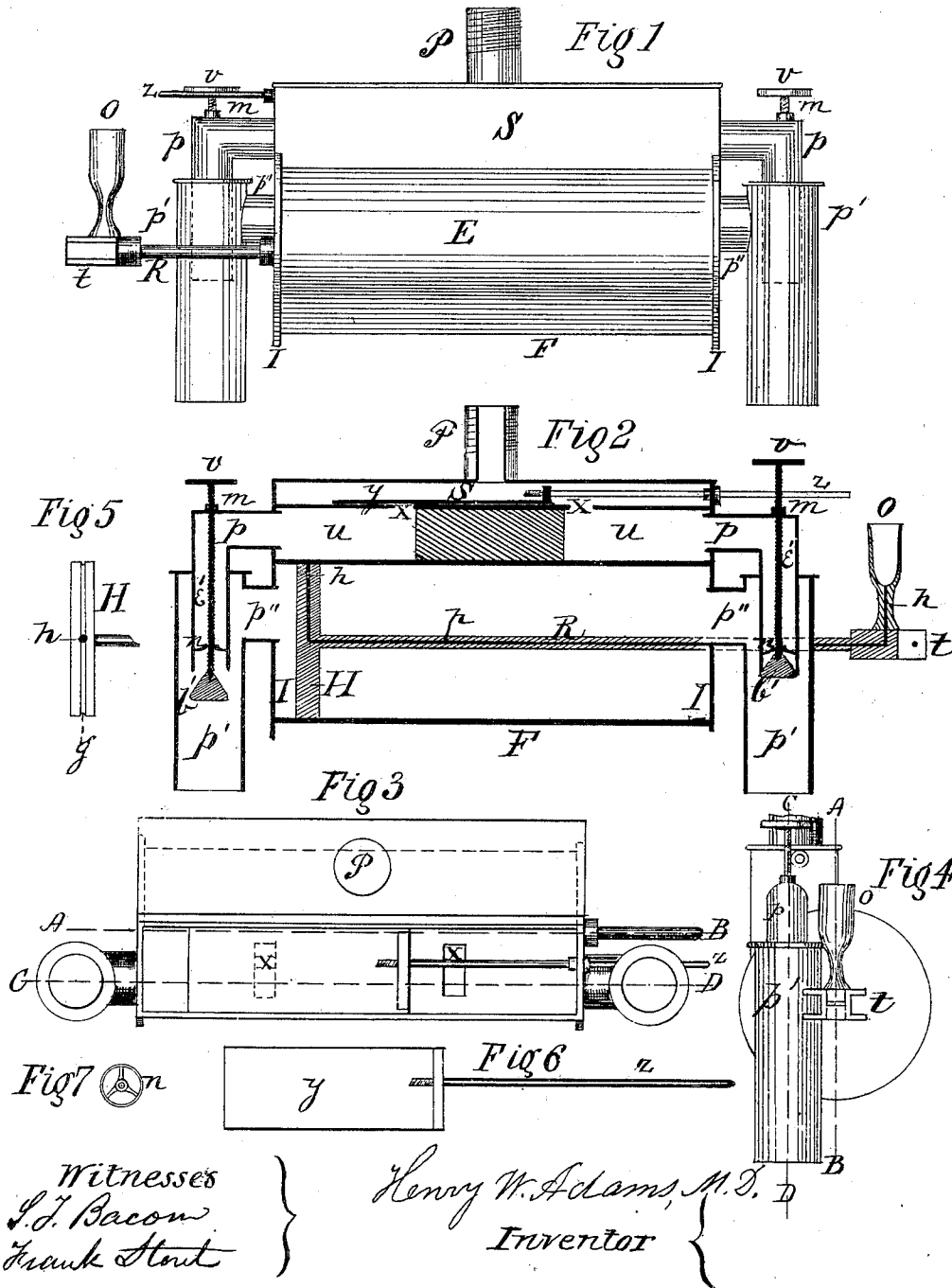


H. W. ADAMS.
VACUUM ENGINE.

No. 114,083.

Patented Apr. 25, 1871.



Witnesses
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Letters Patent No. 114,083, dated April 25, 1871.

IMPROVEMENT IN VACUUM-ENGINES.

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

I, HENRY W. ADAMS, M. D., of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Mode of Utilizing and Transmitting Power from Liquids or Fluids under Pressure, of which the following is a specification.

Nature and Object of the Invention.

My invention consists in utilizing the power from liquids or fluids under pressure by causing a jet therefrom to create, in the manner hereinafter described, a partial vacuum at one side of a piston, or its equivalent, while the opposite side is exposed to the pressure of the atmosphere.

Description of the Accompanying Drawing.

Figure 1 is a side view of mechanism by which my invention may be carried into effect;
Figure 2, a vertical section of fig. 1;
Figure 3, a plan view, with the valve-chest cover removed;
Figure 4, a view of the front end of fig. 1; and
Figures 5, 6, and 7, views of detached portions of the mechanism.

General Description.

F is a cylinder, to which is adapted a piston, H, secured to a piston-rod, R, passing through one of the heads I of the cylinder, furnished at its outer end with a cross-head, t, to be connected by a rod to the crank of a driving-shaft.

At each end of the cylinder is a pipe, *p*, which communicates with the interior of the cylinder through a branch, *p'*, and through the top of each of these pipes *p* passes a smaller pipe, *p*, communicating with one of the passages *u*, both passages communicating, through ports *x x*, with the valve-chest S, containing a slide-valve, *y*, by the operation of which steam or other fluid under pressure admitted to the valve-chest through the pipe P is directed alternately to the pipes *p p* at the opposite end of the cylinder F.

Each of the pipes *p* terminates within the pipe *p'* at a point below the passage *p'*, and to a screw-rod, *n*, within each pipe *e*, is connected a conical valve, *b*, which, by operating the said rod, can be adjusted nearer to or further from, or so as to entirely close the mouth of the pipe *e*, as circumstances may require, the said rod passing through a guide, *n*, fig. 7, fitted to the interior of the pipe *p*.

As shown in fig. 2, the piston H has reached or nearly reached the limit of its rearward movement, and the port *x* to the right has been opened by the operation of the slide-valve, which may be accomplished by an eccentric, cams, or other appliances on or connected with the driving-shaft; the rear end of the

cylinder is consequently left open to the atmosphere, while steam, which we may presume to be the motive agent in the present instance, escapes from the mouth of the front pipe *e* in an annular jet, which, owing to the pressure of the conical valve, is distended so as to strike the sides of the pipe *p'* before it escapes into the air from the mouth of the said pipe.

Owing to this forcible jet of steam a partial vacuum is created in the cylinder in front of the piston H, while the rear is exposed to the pressure of the atmosphere, which consequently forces the piston forward until it arrives at the termination of its forward movement, when, by the operation of the valve, the port *x*, recently open for the passage of steam, is closed, and the other port opened, and a partial vacuum will be caused by the annular jet of steam in the pipe *p'* in the rear end of the cylinder, while the front end is exposed to the atmosphere, and the piston must consequently retreat; thus a constant reciprocating motion is imparted to the piston, and thence to the driving-shaft.

The waste steam from a high-pressure steam-engine may be used as the motive agent, and the power obtained from it through the medium of my invention may be used to re-enforce the power of the said steam-engine, and jets of air, water, or other fluid or liquid under pressure may be used in place of steam as the indirect motive agent for producing a partial vacuum in the cylinder and causing the piston to reciprocate as described.

It is not essential, however, in carrying out my invention, that a reciprocating piston should be used for transmitting the power generated in the manner described, as the mechanism employed in the construction of many rotary engines may be adopted as a means of transmitting the power obtained, the pressure of the atmosphere being the immediate moving agent, in place of the pressure of steam in such engines; in fact, the mechanism employed in carrying out my invention is a secondary matter, the primary or main feature of my invention being that of causing, by jets of fluids or liquids under pressure, in the manner described, a partial vacuum in a chamber on one side of a movable object, through which the power exerted by the pressure of atmospheric air on the opposite side may be transmitted, and this moving object may be the vane or piston, or its equivalent, of a rotary engine, or the piston of a reciprocating engine.

If a cylinder with a reciprocating piston be used, I have found by actual tests that, for a cylinder twenty-six inches in diameter, and a piston of thirty inches stroke, good results may be obtained by making the pipes *p p* an inch in diameter, and the pipes *p' p'* two and a half inches in diameter. These proportions

however, may be varied without departing from the main features of my invention.

It is important that the piston should be effectually lubricated, and this I accomplish by making a passage in the piston-rod, the said passage communicating in one direction with an oil-cup, O, attached to the cross-head *t*, and terminating in the opposite direction at the periphery of the piston, in which is an annular groove, *g*, fig. 5. The oil in the cup O being higher than the top edge of the piston, it will flow through the passage and escape into the annular groove *g*, thereby effectually lubricating the piston.

Claim.

Utilizing and transmitting motive power by causing jets of fluid or liquid under pressure to create, in the manner described, a partial vacuum on one side of a piston, or its equivalent, while the opposite side is exposed to the pressure of atmospheric air.

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Witnesses:

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