(No Model.)

G. T. PILLINGS.

WATER ENGINE.

No. 361,182. Patented Apr. 12, 1887.

Fig. 1.

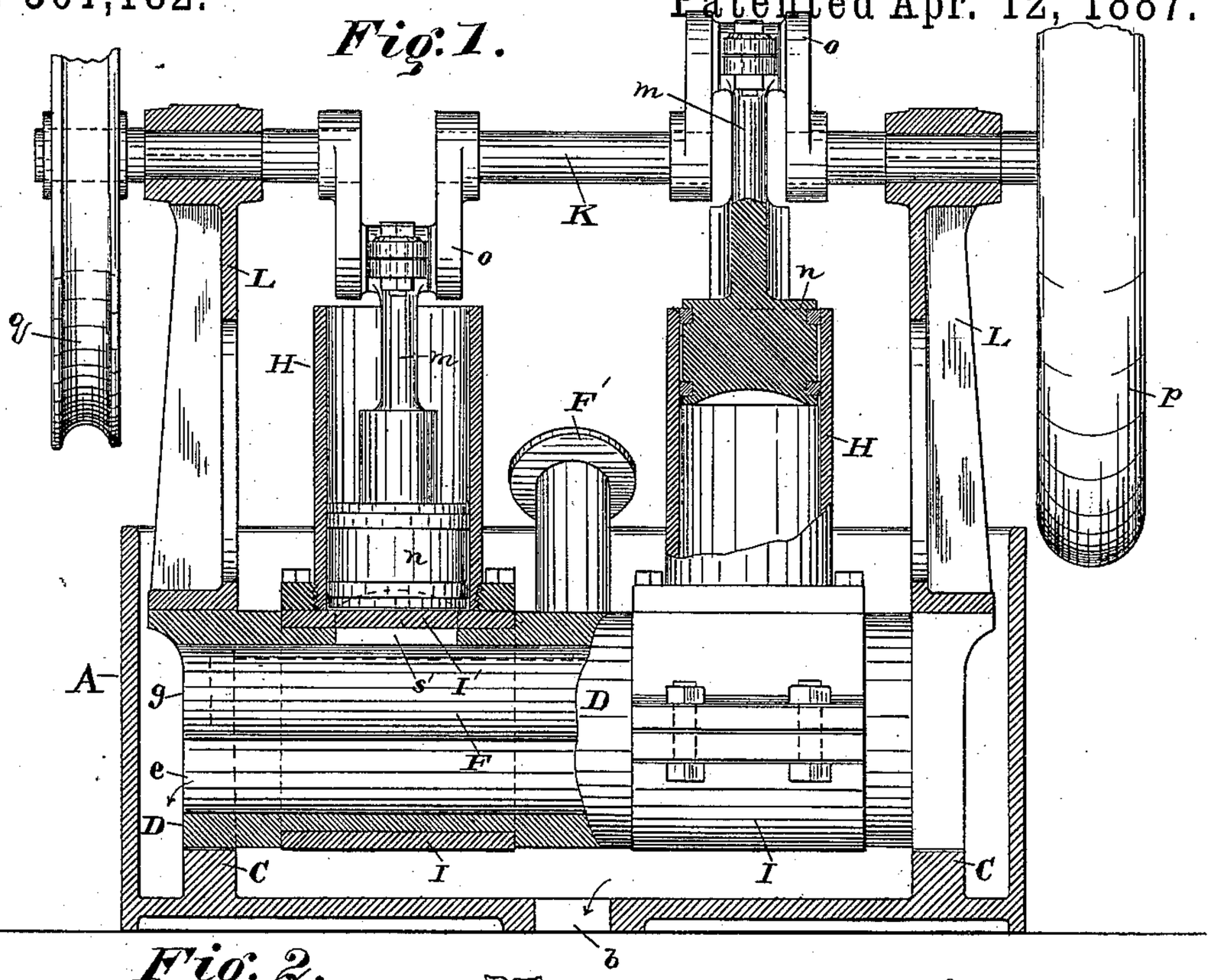


Fig. 2.

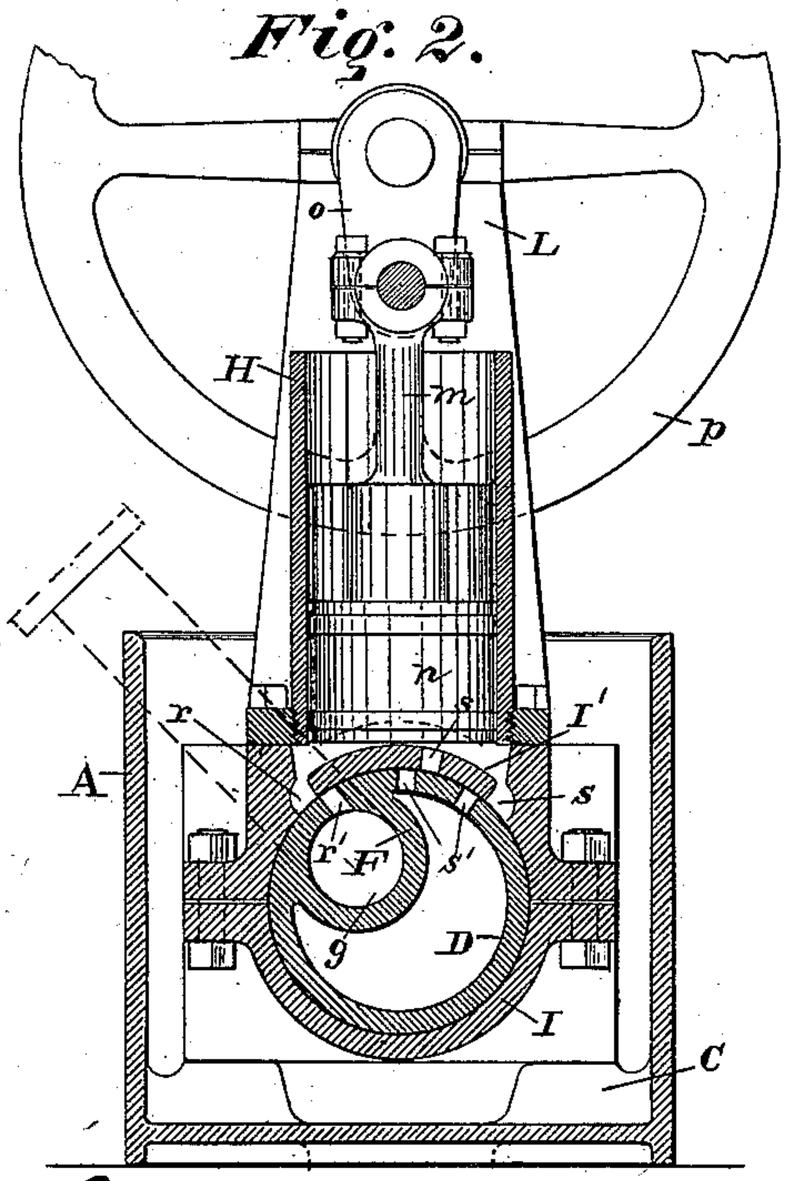
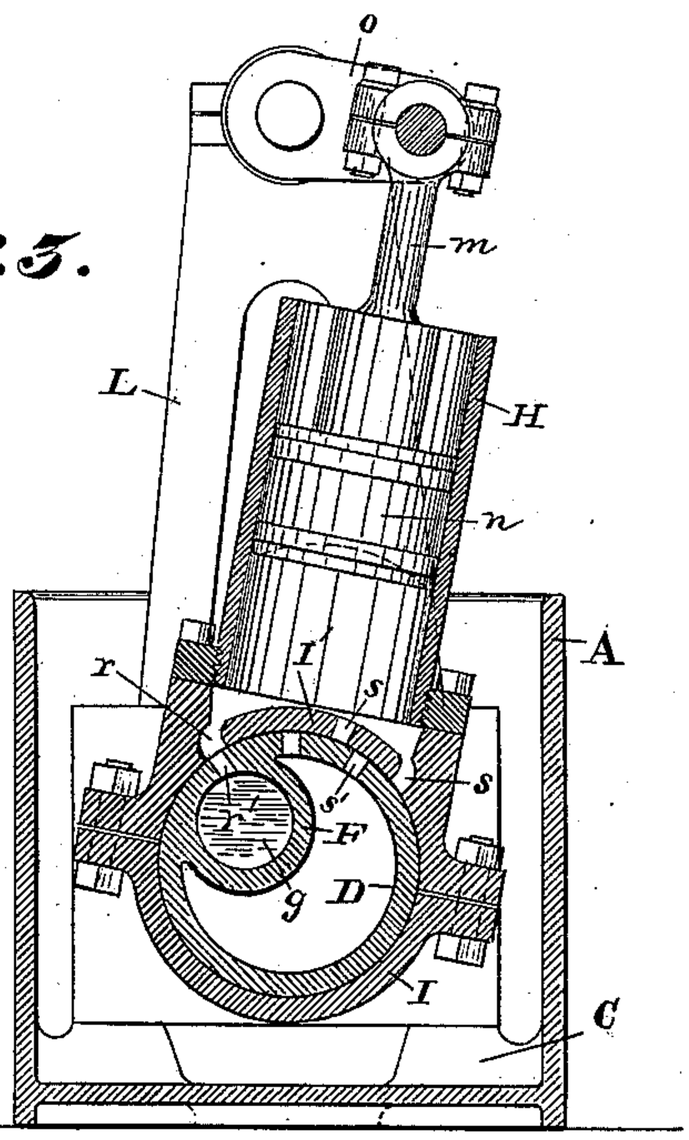


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

GEORGE T. PILLINGS, OF BALTIMORE, MARYLAND.

WATER-ENGINE.

SPECIFICATION forming part of Letters Patent No. 361,182, dated April 12, 1887.

Application filed July 13, 1886. Serial No. 207,858. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. PILLINGS, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Water-Engines, of which the following is a specification.

My invention relates to an oscillating-cylinder water-engine; and it consists in certain novel parts and combinations, which are illustrated in the accompanying drawings, and hereinafter described and claimed.

In the drawings, Figure 1 is an elevation in which the greater part of the engine is shown in section. Figs. 2 and 3 are vertical cross-sections, showing one cylinder in two positions and exhibiting the effect of the cylinder's oscillation on the ports.

The letter A designates a water-box provided with a waste-water outlet, *b*. Two stationary blocks or supports, C, are fixed in the water-box, and a horizontal cylinder, D, is fixed to said blocks or supports. The horizontal cylinder D is stationary, and is open at one or both ends, *e*, the said opening having a capacity equal to the cross-area of the stationary cylinder. The cylinder contains a separate internal water-supply passage, F, formed integral with the cylinder D by casting the cylinder and passage in one piece; or said passage may be secured within the cylinder at one side. The cross-dimension of the water-supply passage F is very much less than that of the stationary cylinder D. The ends *g* of the fluid or water supply passage are closed, and a supply tube or pipe, F′, enters through the cylinder D and connects with the water-supply passage F.

The oscillating cylinders H have pistons, and are mounted vertically upon the stationary cylinder D, and each one is secured thereto by a collar, I, which is fitted around the cylinder D so as to rock or turn thereon, whereby the piston-cylinders H, supported, as they are, upon the stationary cylinder, may oscillate.

A crank-shaft, K, is supported on suitable standards, L, and piston-rods *m* connect the pistons *n* directly with the cranks *o*. The shaft K carries a balance-wheel, *p*, and a drive-pulley, *q*.

The exhaust or waste water is discharged from the piston-cylinders H into the stationary cylinder D, from whence it flows out at the open end *e* into the box A. It is obvious, however, that instead of having an open end *e*, from which the water may flow, the stationary cylinder may have a side opening for this purpose.

The internal dimension of the cylinder D, which serves as an exhaust-receptacle for the waste water which comes from the cylinders H, is equal to or exceeds the capacity of the said cylinders. This is of great importance, as thereby, when the water in any one cylinder has forced the piston up, and when the cylinder has oscillated, all the water in said cylinder may be promptly discharged, and thus avoid the detrimental backlash or reflex action. Another feature is, that the capacity of the box A for holding water is greater than that of the exhaust-cylinder D, whereby the exhaust-water in the cylinder D may flow or discharge promptly and without retardation into the said water-box.

A portion, I′, of the collar I constitutes the head of the oscillating cylinder, and this portion is provided with an inlet-port, *r*, and two outlet-ports, *s*. The stationary cylinder D has a supply-port, *r′*, which communicates from the water-supply passage F, and on the upstroke of the piston *n* the inlet-port *r* is coincident with this supply-port *r′*, as shown in Fig. 3. Water under pressure thereby enters the oscillating cylinder H. The stationary cylinder has two discharge-ports, *s′*, which communicate directly with the interior thereof, and on the downstroke of the piston *n* the outlet-ports *s* will be coincident with the discharge-ports *s′*, as will be readily understood. Thereby the water in the oscillating cylinder is exhausted and finds an immediate outlet into the stationary cylinder, from whence it flows off, as before stated. No valves are employed.

In the present instance two oscillating cylinders are shown; but three or four may be employed in like manner. My invention, therefore, is not limited to any particular number of such cylinders.

I am aware that it is not new to employ in this class of engines a fixed cylinder with an internal water-passage; neither is it new to secure the oscillating piston thereon by means of a collar having ports communicating with

the water-passage and fixed cylinder, and such I do not claim, broadly; but I am not aware that it is old to construct an engine of this character with an inlet-pipe leading directly into the water-passage of the fixed cylinder and permitting the exhaust-water to escape from the water-box, as herein described and shown, the benefit resulting from this construction being that the head of water fed to the water-passage F is directly exerted on the piston to compel the upstroke thereof. The facility of keeping a constant and uniform supply of water is readily apparent.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

In a double-cylinder oscillating water-engine, the water-boxes A, having outlets, in combination with the stationary cylinders D in said boxes, each of said cylinders being provided with the supply-passage F, closed at its ends, the inlet-pipe F′, leading into said passage F from above and outside of the piston-cylinder H, the said cylinder H having collar surrounding the stationary cylinder D, the piston *n* and connections, the shaft K, the collar I, attached to said cylinder H and having the upper portion, I′, the latter having ports *r*, *s*, and *s*, the said cylinder D having ports *s′ s′*, adapted to register with the ports *s s* on the downstroke of the piston, whereby the exhaust-water from the cylinder H flows into the cylinder D, and the supply-passage F, having port *r′*, adapted to register with the port *r*, whereby the water flows from the passage F into the cylinder H, so as to make the upstroke of the piston *n*, the said pistons being connected to the said crank-shaft K, so as to have rising and falling motion alternately, all substantially as shown and described.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE T. PILLINGS.

Witnesses:

JNO. T. MADDOX,

JOHN E. MORRIS.