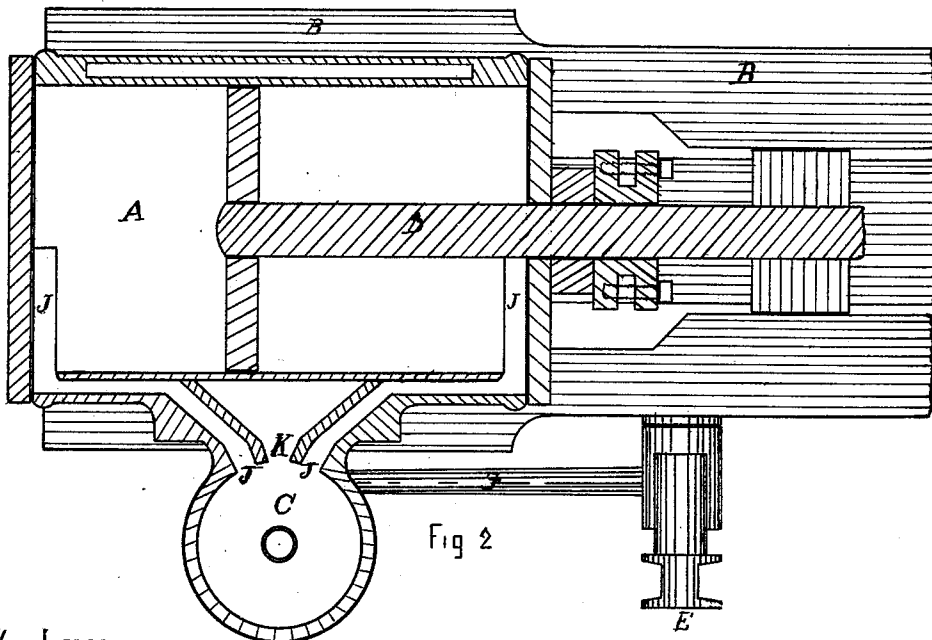
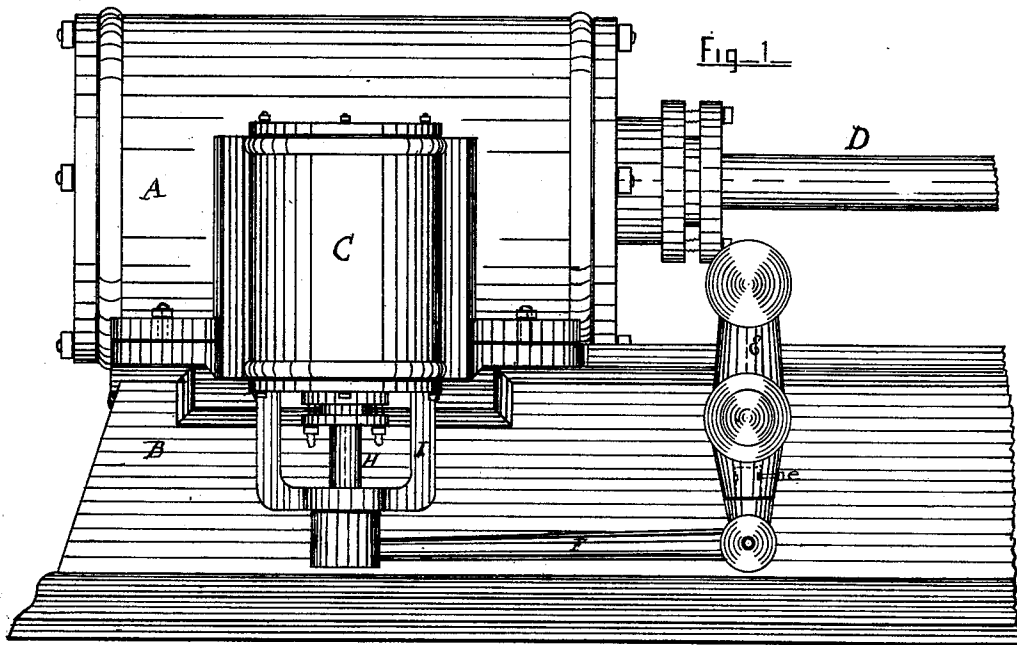


L. H. HALL.
STEAM-ENGINE.

2 Sheets—Sheet 1.

No. 190,851.

Patented May 15, 1877.



WITNESSES

Geo. A. Sturgeon
H. B. Graham

INVENTOR

Lionard H. Hall
Geo. A. Sturgeon & Co.

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Fig 3

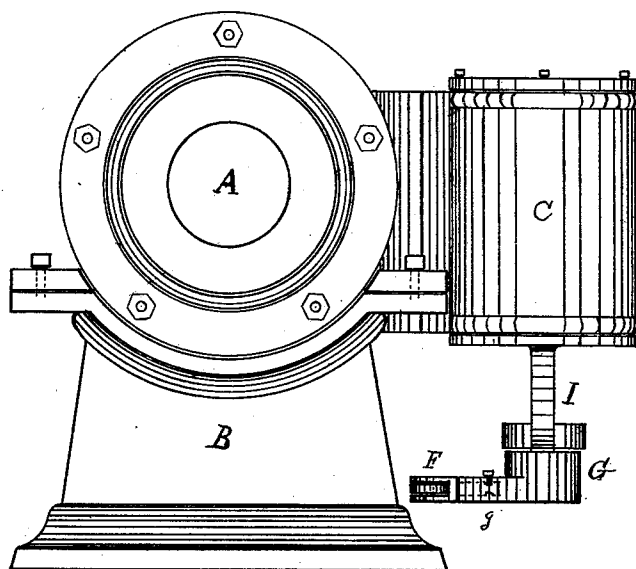
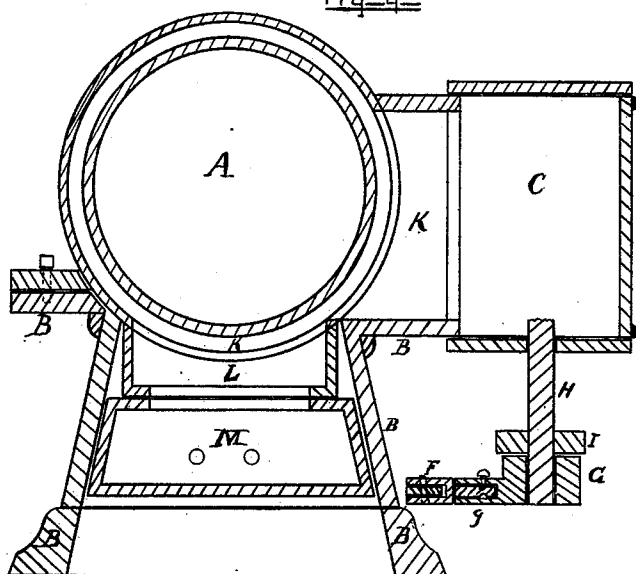


Fig 4



WITNESSES

Geo A. Sturges
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INVENTOR

Leonard H. Hall

by J. Sturges & Hall
attys

UNITED STATES PATENT OFFICE.

LEONARD H. HALL, OF ERIE, PENNSYLVANIA.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **190,851**, dated May 15, 1877; application filed October 21, 1876.

To all whom it may concern:

Be it known that I, LEONARD H. HALL, of Erie, in the county of Erie and State of Pennsylvania, have invented a new and useful Improvement in the Construction of Engines; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the construction of that class of steam-engines wherein the valve is so located as to drain the engine-cylinder.

My invention consists wholly in the arrangement of ports and the form given to the ports to procure said arrangements.

My device is shown in the accompanying drawings, as follows:

Figure 1 is a side elevation of an engine embodying my construction. Fig. 2 is a horizontal section through the same on a line through the piston-rod. Fig. 3 is an end elevation of the same parts; and Fig. 4 is a vertical section of the same through the valve-stem of a rotary valve, and hence through the exhaust-port.

The parts shown are lettered as follows: A is the cylinder; B, the bed; C, the steam-chest and valve-chamber; D, the piston and rod. J J are the ports; K, the exhaust-port. L is a chamber formed by a drop formed of the shell of the cylinder, and which I call the "exhaust-chamber." M is the feed. *m* is the feed-water-pipe heater.

The construction of my engine is as follows: The bed is unchanged, except a drop is made at the point where the steam-chest is located. This is done to allow the cylinder, which has the valve farther down on its side, to be seated on the bed, as usual. The position given to the steam-chest is to allow the ports to reach down to the lowest point in the cylinder, and have a fall from that point into the chest, to carry off accumulated water from the cylinder to the chest, and thence pass with the exhaust out at the exhaust-port into the chamber which surrounds the cylinder, in the usual manner; but when there is a large amount of water, as in the cases I

have named, it would not do to fill this chamber with it; so I provide a means for a quick and rapid discharge of the water, as follows: The shell of the cylinder, below the valve and within the bed, is bagged or dropped down, forming the exhaust-chamber L. This chamber opens into the exhaust-feed heater, and the walls forming it fit closely upon the upper face of the heater, making a close joint. By this construction there is a wide opening for all the water that can pass through the cylinder and valve to exhaust freely, directly away from the cylinder. As far as exhausting steam is concerned, the action is the same as in the old forms; but any water that may accumulate by any means passes off directly into the feed-heater M.

What I claim as my invention is—

1. In combination with an engine-cylinder from which the exhaust steam is discharged between the walls of the engine frame or bed, a heater located between, and supported by, the said walls of the bed or frame, as and for the purposes mentioned.

2. A steam-engine having the following arrangement of parts: a cylinder which has a surrounding shell, which terminates between the walls of the frame in an extension, L, which extension connects with the heater M, which is located between, and supported by, the walls of the said frame, said ports being connected with the piston-chamber of the cylinder by a steam-chest located in a depression of the side of the frame, at a point low enough to admit of the free flow of condensation from the piston-chamber into the exhaust-chamber of the valve, thence into the extension L, and thence into the heater M, said arrangement of ports being substantially as and for the purposes set forth.

In testimony whereof I, the said LEONARD H. HALL, have hereunto set my hand.

LEONARD H. HALL.

Witnesses:

JNO. K. HALLOCK,
CHAS. BURNHAM.