No. 676,667. Patented June 18, 1901.

J. PATTEN.

DRAINER FOR VERTICAL STEAM CYLINDERS.

(Application filed Nov. 26, 1900.)

(No Model.)

Fig. 1.

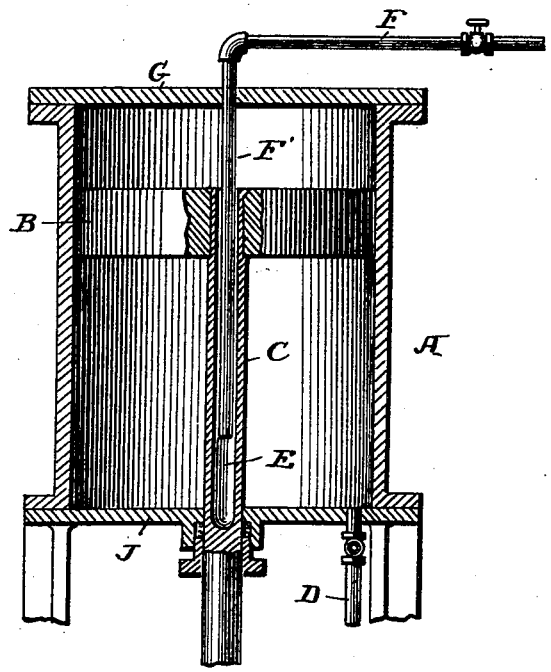
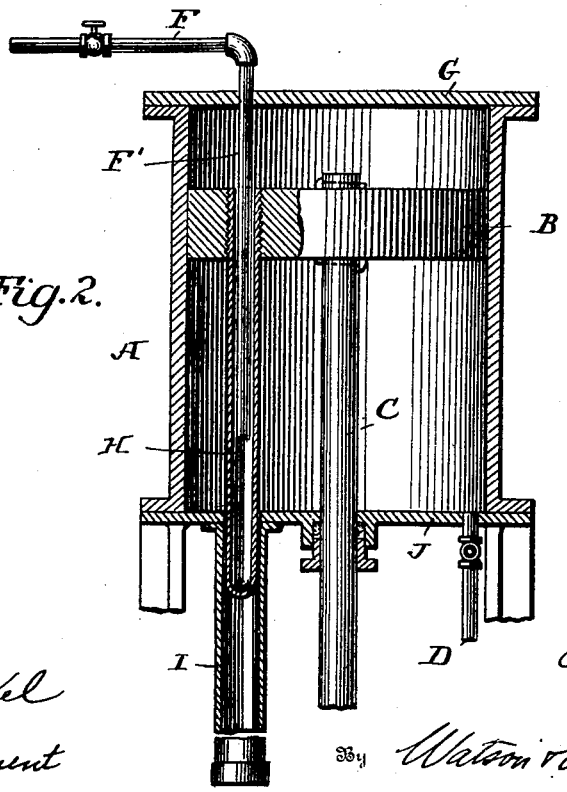



Fig. 2.

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# UNITED STATES PATENT OFFICE.

JOHN PATTEN, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE PATTEN VACUUM ICE MACHINE COMPANY, OF SAME PLACE.

## DRAINER FOR VERTICAL STEAM-CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 676,667, dated June 18, 1901.

Application filed November 26, 1900. Serial No. 37,828. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN PATTEN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Drainers for Vertical Steam-Cylinders, of which the following is a specification.

The purpose of my invention is to provide means for removing the water of condensation from vertical steam-cylinders on the upper side of the piston. While the lower ends of such cylinders are easily drained by gravity, the drainage of the upper ends presents a more difficult problem, and for lack of suitable means for releasing the water from said upper ends parts of the engines are frequently damaged and broken. By means of my improvements these difficulties are obviated, and the cylinders are drained in a very simple manner.

In the accompanying drawings, which illustrate my invention, Figure 1 is a central sectional view through the cylinder of a vertical engine, showing my improvement in its preferred form; and Fig. 2 is a similar view showing a modification which it may be desirable to use in some instances.

Referring to Fig. 1 of the drawings, A indicates the cylinder of a vertical steam-engine, B the piston, and C the piston-rod. The water of condensation in the lower end of the cylinder is carried off in the usual manner by gravity and the force of the steam through a drain-pipe D. In order to dispose of the drainage occurring in the cylinder above the piston, I form in the piston-rod C a longitudinal cavity E, extending from its upper end downward, preferably for a distance somewhat greater than the length of the stroke of the piston, which cavity forms a well or sump into which the condensed water flows, and I locate the drainage-pipe F in the center of the cylinder-head G and extend a portion F′ of said pipe downward into the well E, also for a distance preferably somewhat greater than the length of the piston-stroke. The diameter of the well is great enough to permit water and steam to pass downward between the drainage-pipe and the walls of the well.

In operation it will be seen that the water on the upper side of the piston will flow or be forced downward into the well and will be forced out by the steam through the drainage-pipe, thus preventing any accumulation of water in that end of the cylinder.

The arrangement shown in Fig. 1 is applicable to new engines and to engines already in use in which there is no objection to boring out the piston-rod to form a well. In some cases, however, there may be objections to boring out the piston-rod—as, for instance, where the piston is secured to the rod by keys passing through the latter. In such cases I provide a well at one side of the piston-rod in the form of a tube H, Fig. 2, having its open end secured in the piston and its lower end sealed and extending through the lower cylinder-head J and into a guide I, secured to said head. The guide may be merely a stuffing-box or it may be a tubular casing, as shown, with a cap at its lower end to prevent the escape of steam from the lower end of the cylinder. In single-acting engines in which the lower cylinder-head is absent of course the guide is unnecessary. In operation the tube H is moved by the piston and the water of condensation from the upper side of the piston flows into the well and is forced out through the fixed drainage-pipe F′ in the same manner as described in connection with Fig. 1.

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

1. The combination with a steam-cylinder, of a piston therein having a drainage-well extending downward from its upper surface, and a fixed drain-pipe extending through the upper part of the cylinder and arranged to enter said well and drain the same.

2. The combination with a steam-cylinder and the piston therein, of a drainage-well extending downwardly through the piston and movable through an opening in the lower cylinder-head, and a fixed drain-pipe extending

through the upper part of the cylinder and downwardly into said well to drain the same.

3. The combination with a steam-cylinder and the piston therein, of a piston-rod extending through the lower head of the cylinder, said rod having a drainage-well extending downwardly therein from the upper side of the piston, and a drain-pipe secured in the upper end of the cylinder and extending downwardly into said well.

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

JOHN PATTEN.

Witnesses:
JOHN F. KREIN,
P. JOHANNSEN.