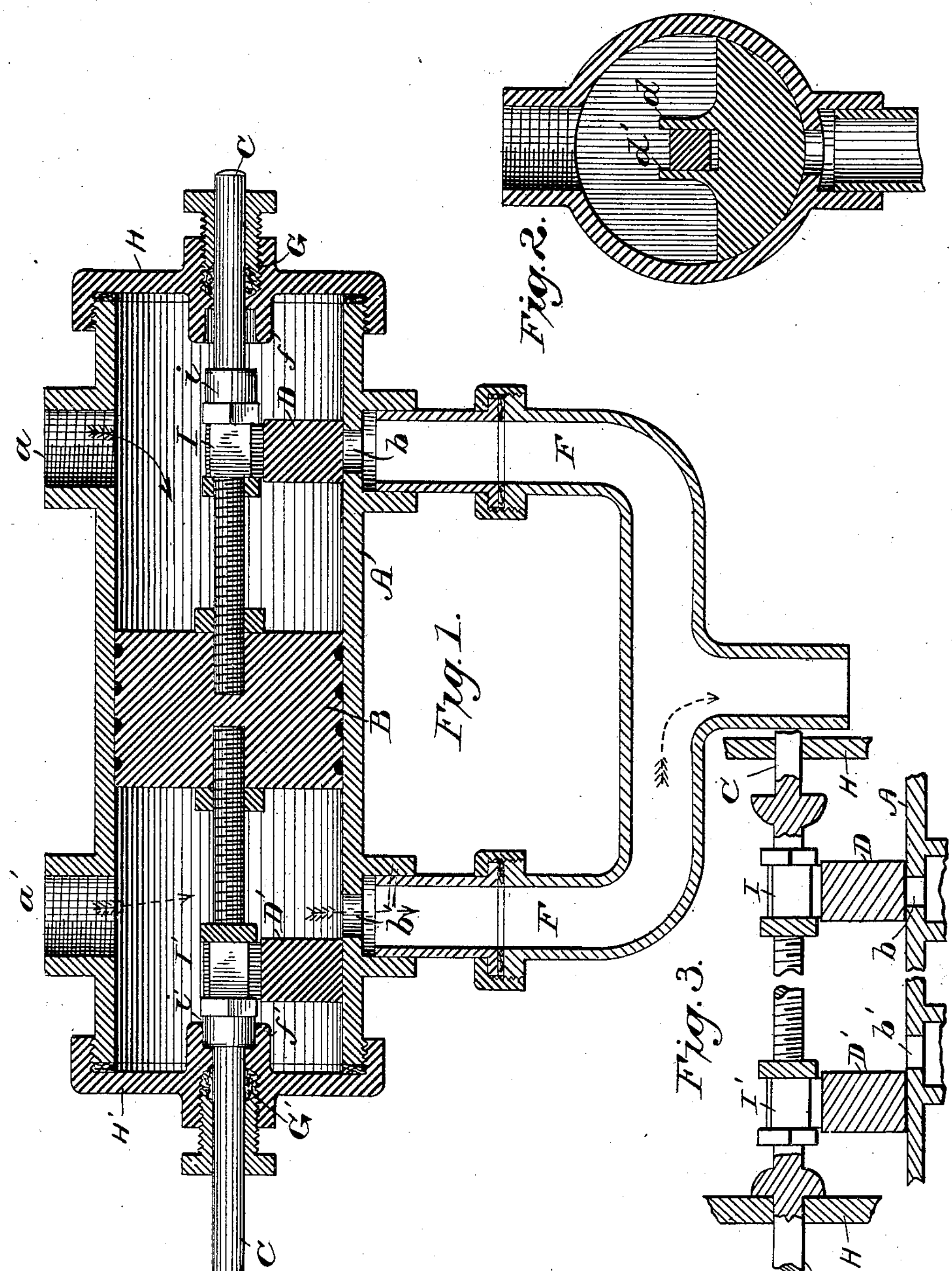
(No Model.)

T. M. FELL.

RELIEF VALVE FOR ENGINE CYLINDERS.

No. 357,191. Patented Feb. 8, 1887.



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THOMAS M. FELL, OF TENAFLY, NEW JERSEY.

RELIEF-VALVE FOR ENGINE-CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 357,191, dated February 8, 1887.

Application filed June 14, 1886. Serial No. 205,118. (No model.)

To all whom it may concern:

Be it known that I, THOMAS MARA FELL, of Tenafly, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Automatic Relief-Valves for Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention has relation to the class of engine attachments known as "cylinder relief-valves."

It has for its object the automatic escape of the water of condensation generally accumulating in the cylinders of the engines, and also the exhaust of any waste steam caused by the leakage of the piston or other cause.

The invention consists in the construction and arrangement of a cylinder with attachments in which is placed a piston to which two rods are adjustably secured. These rods operate the valves that control the exit-ports, the said piston being operated by the initial pressure of the steam from the main cylinder, and also in other details of construction, which will be more fully hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a longitudinal section, and Fig. 2 a cross-section, through one of the valves. Fig. 3 is a sectional view in detail of another means of stopping the valves.

A is the cylinder, provided with two openings, *a a'*, to which pipes may be attached that will lead to each end of the main cylinder, the pipes and cylinder not being shown, as the operation of the device can be understood without them. Opposite the openings *a a'* are the exhaust-ports *b b'*, and leading from these ports are pipes F for conducting to some convenient point the water of condensation and the exhaust steam not regularly carried off.

Within the cylinder is the piston B, it being provided with grooves to form a water-packing for the same.

To each side of the piston is adjustably secured the valve-rods C C, which project out through the heads H H of the cylinders. Stuffing-boxes G G are formed in the heads, so that the valve-rods may be packed to prevent them from leaking. The cylinder-heads H are of peculiar construction. On their outer sides they are provided with the usual stuffing-boxes, and on the inner sides with a cushion-cylinder, or, in other words, with two chambers having a disk between them, only for different purposes. This head can be smoothly bored out without any trouble, and may be cast in a single piece; also within the cylinders are the semi-cylindrical valves D D' to control the exhaust-ports. These valves are provided with lugs *d d* upon their upper sides, between which the square portion of the rods C C is inserted. This square portion I I is screwed upon the rod and held in place by a jam-nut, or it may be made as a part of the rod. Thus the valve is prevented from turning by the square portion. At one end of the square portion is formed by an enlargement pistons *i i*, and upon the inner side of the heads are formed cylinders *f f*, into which the pistons *i* loosely fit. The object of the piston and cylinders is to prevent the solid blows that would otherwise be struck upon the heads of the cylinders, which would injure them, by forming an air or steam cushion for the pistons. The said cylinder confines the air to a certain extent, so that when the pistons are moving rapidly the air or steam checks the momentum of the piston, and after the momentum is overcome the air or steam gradually escapes between the sides of the cylinders and the pistons, allowing the piston to complete its stroke.

The arrow in full line represents the live steam, and those in dotted lines exhaust-steam and water of condensation.

The operation is as follows: Steam has entered the right-hand side of the cylinder and had moved the piston to the left, thereby closing the exhaust-port on the steam side and opening the one on the exhaust side, holding the valves in this position until steam from the main cylinder enters at *a'*, when the valves are shifted and the exhaust takes place from the other port. The projecting valve-rods indicate whether the device is operating or not.

What I desire to claim, and secure by Letters Patent, is—

1. In an automatic cylinder relief-valve, the

combination of the cylinder with the piston and the valves, the valves and piston being wholly contained within the cylinder, substantially as described.

2. In an automatic cylinder relief-valve, the combination of the cylinder with the piston, the adjustable valve-rods attached thereto, and the valves, substantially as shown and described.

3. In an automatic cylinder relief-valve, the combination of the cylinder with the piston, the valves, the rod, and means for cushioning the same, substantially as shown and described.

4. In an automatic cylinder relief-valve, the combination of the cylinder with the piston, the valve, the valve-rod and cushioning-piston, and the cushioning-cylinder in the cylinder-head, as set forth.

5. In an automatic cylinder relief-valve, the combination of the cylinder with the piston, the valve, the valve-rods projecting from the cylinder, and the exhaust and inlet ports, as set forth.

6. In an automatic cylinder relief-valve, the combination of the cylinder having the main piston and adjustable piston-rods, the cushioning-pistons and their cylinders, substantially as set forth.

7. In an automatic cylinder relief-valve, the combination of the cylinder having a piston with rods at each end, of the cylinder-heads provided with stuffing-boxes on their outer sides, and a cylinder on the inner side, as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

THOS. M. FELL.

Witnesses:
O. E. DUFFY,
F. R. HARDING.