

(No Model.)

T. D. SMITH.
DRAINING VALVE FOR STEAM CYLINDERS.

No. 546,907.

Patented Sept. 24, 1895.

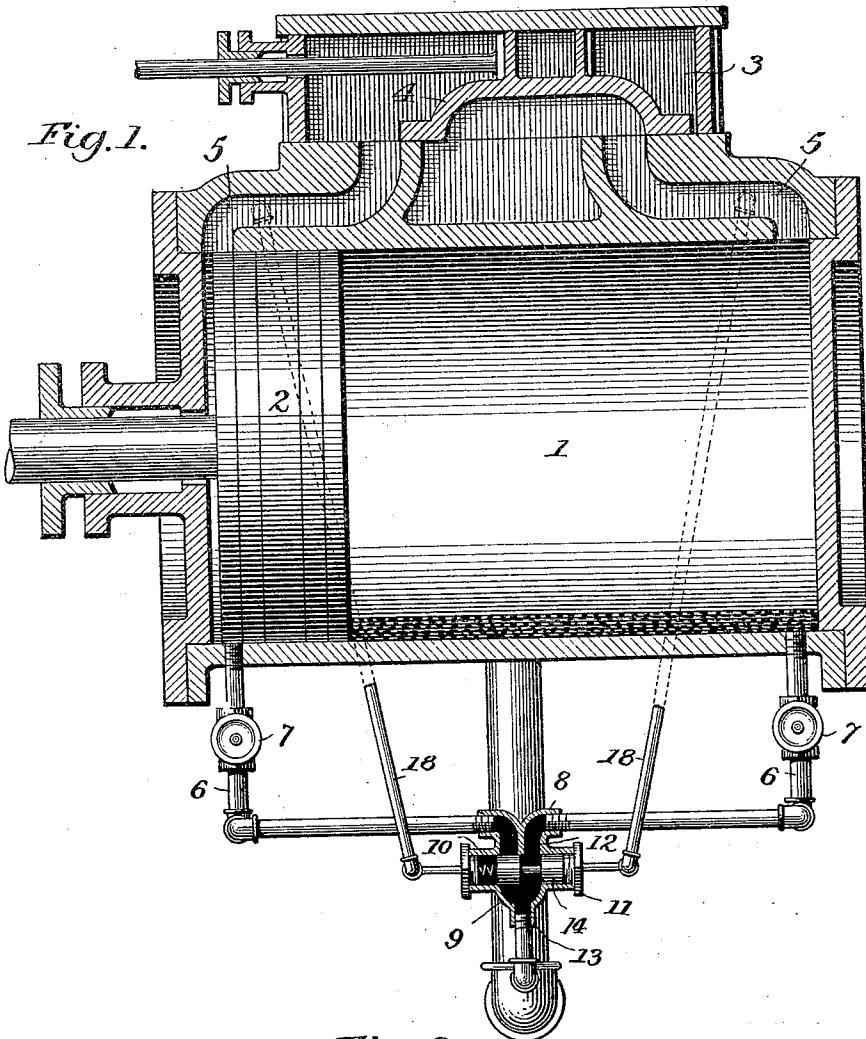
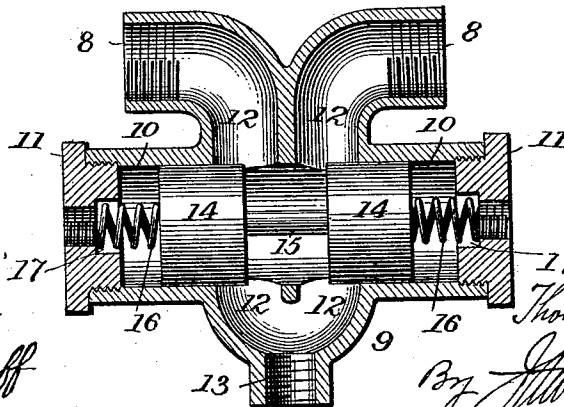


Fig. 2



Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS D. SMITH, OF WILKES-BARRÉ, PENNSYLVANIA.

DRAINING-VALVE FOR STEAM-CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 546,907, dated September 24, 1895.

Application filed April 29, 1895. Serial No. 547,521. (No model.)

To all whom it may concern:

Be it known that I, THOMAS D. SMITH, a citizen of the United States, residing at Wilkes-Barré, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Draining-Valves for Steam-Cylinders, of which the following is a specification.

My invention is an automatic-valve device for draining the water of condensation from the cylinders of steam-engines. It is so arranged that when the engine is not in use the passages between the waste-pipe and both ends of the cylinder are open, so that any water formed by leakage of steam into the cylinder will be free to run immediately into the waste-pipe. When the engine is in operation, the valves are moved so that the passage from the exhaust end of the cylinder is positively and immediately opened, while the passage between the opposite end of the cylinder and the waste-pipe is simultaneously closed.

The invention further consists in details of construction and arrangement of parts, which will be specifically described hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional view of a cylinder provided with my improved relief-valve, and Fig. 2 is an enlarged sectional view of the valve device.

Referring to the drawings, 1 indicates the cylinder of a steam-engine provided, as usual, with a piston 2, steam-chest 3, and slide-valve 4. From the steam-chest there are ports 5 leading to the ends of the cylinder, and from the bottom of the cylinder at opposite ends there are drain-pipes 6, provided, if desired, with hand-valves 7. The waste-pipes 6 connect with branches of a valve-casing 9. Transversely through the valve-casing there is a cylindrical opening 10, provided with detachable heads 11 at its ends. The branches 8 communicate with passages 12, which enter at one side of the cylinder 10, near its middle point, and leave the cylinder at the opposite side, from whence they both enter the waste-pipe 13. Within the cylinder 10 there are a pair of piston-valves 14, connected by a rod 15. These piston-valves are adapted to close alternately the passages 12 as they are moved in different directions in the cylinder. They

are held normally central in the cylinder by means of springs 16, which bear upon the pistons 14 and have their opposite ends seated in sockets 17 in the heads 11. The power to move the pistons 14 is supplied by steam preferably taken from the passages 5 through pipes 18, which communicate with opposite ends of the cylinder 10. As shown, the pipes 18 are tapped into the cylinder-heads 11.

The operation of my improved relief-valve device is as follows: When the engine is not in operation and there is no pressure upon either of the pistons 14, they are held in the position shown in Fig. 2, each passage 12 being open through the cylinder 10 to the waste-pipe, so that water of condensation can escape from both ends of the engine-cylinder. When the engine is started and live steam is admitted to the passage 5 at the left end of the cylinder, it immediately passes through the pipe 18 to the left end of the valve-cylinder 10. The pressure in the latter cylinder then shifts the pistons 14 to the right, closing the passage 12 from the left or live-steam end of the engine-cylinder and opening the passage between the right or exhaust end of the engine-cylinder and the waste-pipe. When the valve 4 is shifted so as to admit steam to the right-hand end of the engine-cylinder, the valve-pistons are immediately forced to the left, the pipe 18 on the right being in communication with the live steam and the pipe 18 on the left being in communication with the exhaust. It will thus be seen that, as illustrated in the drawings, the piston-valves will reciprocate as the engine-piston reciprocates, and that the drain-pipe on the exhaust side will always be open, so that the water may pass out freely.

The construction of my improved valve device is very simple and cheap, and repairs may be easily made. The valves are cushioned by the springs 16, so that the operation of the valve is nearly noiseless and there is no jar or other tendency to wear it out rapidly.

The mechanical construction of the valve device may be modified to a considerable extent without departing from the spirit of the invention, and therefore I do not limit myself to the precise construction and arrangement of parts illustrated and described.

What I claim is—

1. In a draining valve for steam cylinders,

a casing having two passages connected with drain pipes at opposite ends of the steam cylinder, a pair of pistons connected together and movable transversely across said passages and adapted to close them alternately, and pipes or passages 18 independent of the drain pipes, arranged to connect the spaces at the outer ends of the valve pistons alternately with the live steam and exhaust whereby the valve pistons are shifted each time the engine piston reciprocates, substantially as described.

2. In a draining valve for steam cylinders, the combination with the engine cylinder having drain pipes at opposite ends, of a relief valve casing having a cylindrical opening and a pair of connected piston valves therein, two inlet passages 12 at one side of said valve cylinder connected with the said drain pipes and adapted to be alternately opened and closed by the piston valves, a waste pipe connected with the cylinder and alternately communicating with the drain passages 12, and pipes 18 connecting the opposite ends of the valve

cylinder alternately with the live steam and exhaust, substantially as described.

3. In a draining valve for steam cylinders, the combination with the engine cylinder having drain pipes at opposite ends, of a relief valve consisting of a casing having a valve cylinder closed at its ends, two connected piston valves movable in said cylinder, springs for holding said valves normally in a central position, pipes or passages connecting the ends of the valve cylinder with the live steam and exhaust of the engine alternately, and ports connecting the valve cylinder with the drain pipes and the waste pipe, said drain pipes and waste pipes being normally in communication when the engine is not using steam, substantially as described.

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

THOMAS D. SMITH.

Witnesses:

MORGAN R. MORGANS,
DAVID COTTLE.