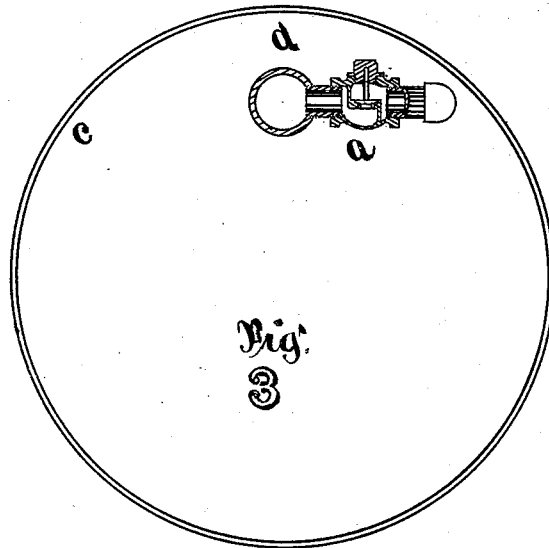
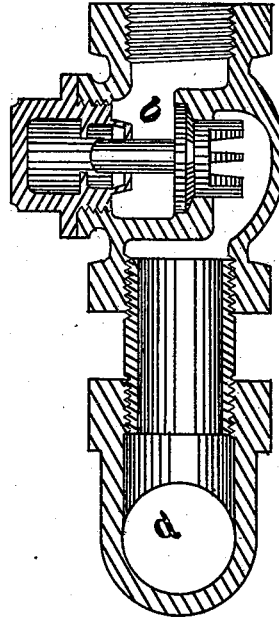
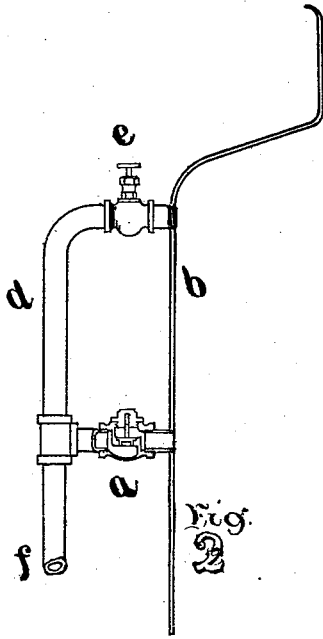


T. SHAW.

MODE OF RELIEVING HIGH-PRESSURE ENGINES.

No. 190,378.

Patented May 1, 1877.



Witnesses

Elias J. Shaw
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UNITED STATES PATENT OFFICE.

THOMAS SHAW, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN MODES OF RELIEVING HIGH-PRESSURE ENGINES.

Specification forming part of Letters Patent No. **190,378**, dated May 1, 1877; application filed March 3, 1877.

To all whom it may concern :

Be it known that I, THOMAS SHAW, of the city and county of Philadelphia, Pennsylvania, have invented a new and Improved Mode of Relieving High-Pressure Engines of Excessive Pressure when Suddenly Reversed; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in the application of a relief check-valve to the steam-pipe leading from the boiler to the engine, said valve to be applied in said pipe anywhere between the boiler and the engine.

The object of the invention is to permit the escape of high-pressure steam pumped into the steam-pipe by sudden reversing of the engine.

In order to enable others to use and practice my invention, I will proceed to describe its construction and operation.

On reference to the accompanying drawings, which form part of this specification, Figure 1 is a longitudinal section through an ordinary check-valve, *a*, secured by common nipple to steam-pipe *d*.

Fig. 2 represents one side of an ordinary vertical boiler, *b*, with a steam-pipe, *d*, connected with said boiler at its upper end, where it is provided with a common throttle-valve, *e*, from which steam is led to the engine, which can be located at its lower end *f*, in which case the relief check-valve *a* can be located at any point between *e* and *f*, and is connected with the steam-pipe *d* and the boiler *b*, with the valve opening in the direction of the boiler, so that any excess of pressure in pipe *d* will lift the check-valve *a*, and permit the excess of steam to flow into the boiler. When desired, the check-valve may be located and combined with throttle-valve *e* without any alteration in the result.

Fig. 3 is a cross-section of shell of loco-

motive-boiler, for the purpose of exposing the steam-pipe *d*, which leads the steam from the throttle-valve to the engine. In this case the check-valve *a* may be applied within the boiler at any point between the throttle-valve of pipe *d* and the engine; or it may be combined with the throttle-valve, if desired, to produce the desired effect of relieving the steam-pipe *d* and the engine of excessive pressure, occasioned by the sudden reversing of the engine, in which case the excess of pressure flows into the boiler through the check-valve *a*.

The importance of this invention can be fully understood when it is explained that in locomotives and other self-propelling steam-engines, after the desired speed is obtained, the first effort at reduction of speed when approaching a station, or for any other reason, is to shut off the steam by closing the throttle-valve; and when the engine is in this condition, and it then becomes necessary to reverse the engine, the valves of engine are so operated as to cause large volumes of steam to be pumped into the steam-chest and the steam-pipe leading therefrom, which creates pressure far beyond the boiler-pressure, which strains and weakens parts of the engine, and frequently causes the breaking of crank-pins, piston-rods, pitman-rods, cylinder-heads, and other parts of the engine, which damages the engine, and prevents its employment in a direction where it is superior to all other brakes for overcoming its acquired momentum.

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

As an improvement in steam-engines, a check-valve in communication with the steam-pipe and the boiler, and located between the throttle-valve and the engine, in the manner described, for the purpose set forth.

THOMAS SHAW.

Witnesses:

ELIAS J. SHAW,
M. T. J. ROCHOLL.