(No Model.)

T. H. SYMINGTON.

RELIEF VALVE.

No. 581,789. Patented May 4, 1897.

Fig 1.

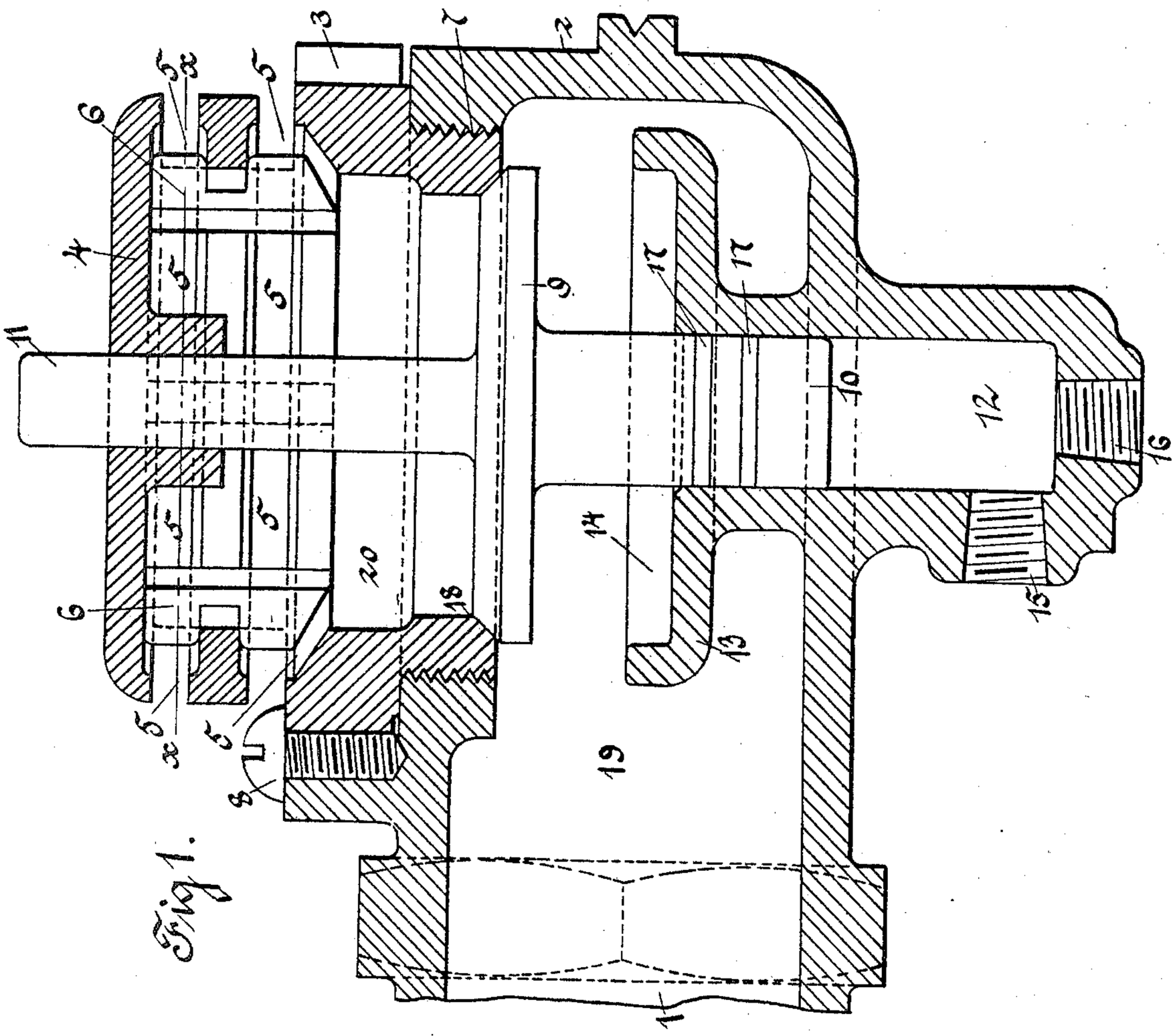
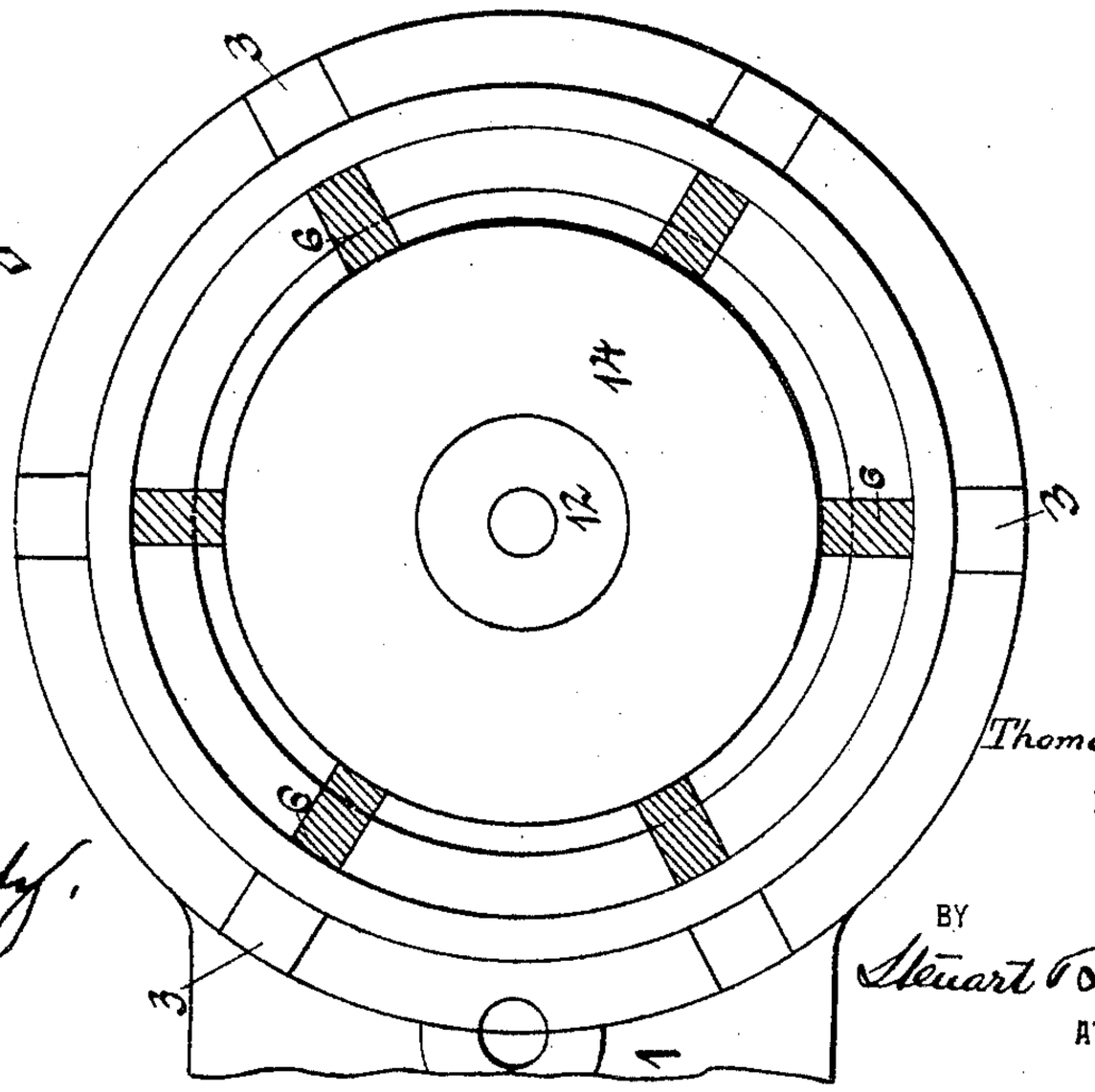


Fig 2.



WITNESSES:

Wm. W. Handy.
M. G. Stewart.

Thomas H. Symington
INVENTOR

BY
Stewart & Stewart
ATTORNEY. S

UNITED STATES PATENT OFFICE.

THOMAS HARRISON SYMINGTON, OF RICHMOND, VIRGINIA.

RELIEF-VALVE.

SPECIFICATION forming part of Letters Patent No. 581,789, dated May 4, 1897.

Application filed September 2, 1896. Serial No. 604,628. (No model.)

To all whom it may concern:

Be it known that I, THOMAS HARRISON SYMINGTON, a citizen of the United States, and a resident of Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Relief-Valves, of which the following is a specification.

The object of my invention is to provide means for preventing compression in a locomotive-cylinder when running without steam. This compression, as is well known, acts as a brake to the locomotive, and also causes excessive pounding in the machinery.

My invention consists in a valve which automatically opens to the atmosphere the cylinder of a locomotive when the throttle is closed, the valve keeping the cylinder open while the engine is running without steam and closing it instantly and keeping it closed when the throttle is opened.

The construction and operation of this valve are fully explained in the following specification, reference being had to the accompanying drawings.

Figure 1 is a vertical section of the valve, and Fig. 2 a plan view taken on line *x x* of Fig. 1.

Referring to Fig. 1, 2 is the valve-casing, having a portion 1 threaded on the outside for screwing the valve into the end of the cylinder. The threaded portion is not shown in the drawings.

3 is a cap which is screwed into the casing 2 at 7 and locked in place by means of the screw 8.

9 is the valve, which is provided with rods 10 and 11, projecting from the centers of its upper and lower surfaces. The lower rod 10 slides in the recess 12 in the casing 2 and the upper one 11 through the center of the cap 3. The casing is provided inside with a projecting cup-shaped part 13.

14 is the cavity of the cap and is of a proper size to allow the valve 9 to fall into it.

Into the lower part of the recess 12 are tapped two holes 15 and 16. 15 is connected by means of a pipe direct to the steam-chest, and 16 plugged. The cap 3 is hollow on the interior and is provided with radial openings 5 5, separated by the ribs 6 6. The area of the lower side of the valve in chambers 19 and 12 is greater than the area of the upper surface.

One of these valves is connected to each end of the cylinder, and in operation they work as follows: The throttle having been closed and pressure removed from the under surface of the valve it will fall by gravity into the cavity 14, and the cylinder will be connected with the atmosphere through the chambers 19 and 20 and the openings 5 5 in the valve-cap. The valve is prevented from being forced up to its seat 18 by the out-rush of steam or air through chamber 19 by the upwardly-projecting sides of the cup 13. Now as each end of the cylinder is provided with a valve and both valves open as soon as the throttle is closed both ends of the cylinder will be at once connected to the atmosphere and the engine will run freely downhill without pounding. The main object, however, attained by the invention is the relief of the compression of air in the cylinders, and particularly in the large low-pressure cylinders of compound engines which produces pounding. As soon as the throttle is opened steam is admitted into the recess 12 through opening 15 and the valve 9 is forced back to its seat 18 and communication with the atmosphere shut off.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a relief-valve, the combination of a pressure-chamber and a valve closing the same with a cup-shaped recess below the valve in the pressure-chamber into which the valve falls when pressure is relieved from below it, and an auxiliary pressure-supply delivering pressure upon the lower end of the valve-stem to lift the valve out of the recess.

2. In a relief-valve the combination of a pressure-chamber and an exhaust-chamber, a valve closing the opening between them, the pressure-chamber having a cup-shaped recess below the valve and into which it falls when pressure is relieved in the pressure-chamber, and an auxiliary pressure-supply, delivering pressure upon the lower end of the valve-stem to lift the valve out of the recess.

Signed at Baltimore, in the State of Maryland, this 20th day of May, A. D. 1896.

THOMAS HARRISON SYMINGTON.

Witnesses:

J. HENRY STROHMEYER,

M. G. STEUART.