J. N. LAUDER.

AUTOMATIC AIR-VALVE ATTACHMENT FOR STEAM CYLINDERS.

No. 169,452. Patented Nov. 2, 1875.

Fig. 1.

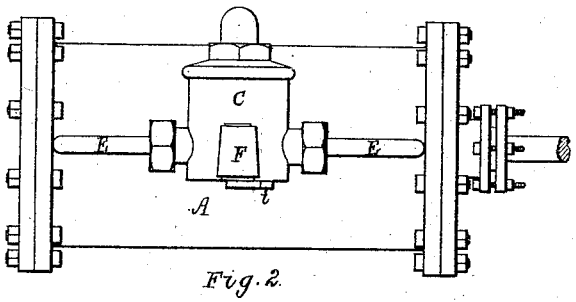


Fig. 2.

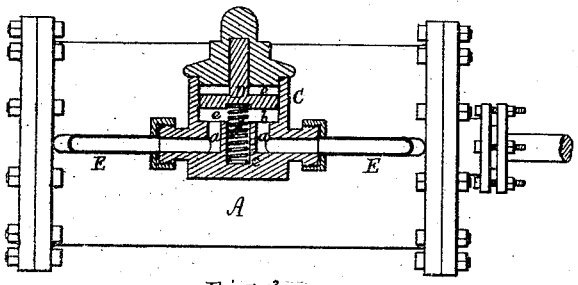


Fig. 3.

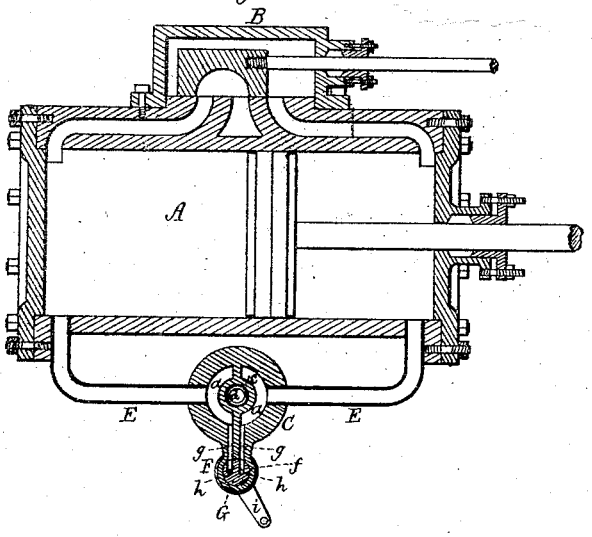
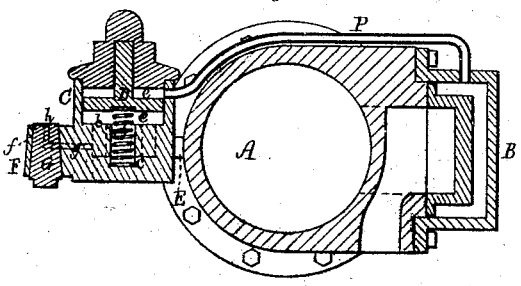


Fig. 4.



Witnesses.
S. U. Pipes
L. W. Müller

James N. Lauder
by his attorney
R. H. Eddy

UNITED STATES PATENT OFFICE.

JAMES N. LAUDER, OF CONCORD, ASSIGNOR TO HIMSELF AND NATHAN P. STEVENS, OF HOPKINTON, NEW HAMPSHIRE.

IMPROVEMENT IN AUTOMATIC AIR-VALVE ATTACHMENTS FOR STEAM-CYLINDERS.

Specification forming part of Letters Patent No. **169,452**, dated November 2, 1875; application filed October 12, 1875.

To all whom it may concern:

Be it known that I, JAMES N. LAUDER, of Concord, of the county of Merrimack and State of New Hampshire, have invented a new and useful Improvement in Steam-Engines; and do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a side view, Fig. 2 a vertical and longitudinal section, Fig. 3 a horizontal and longitudinal section, and Fig. 4 a transverse section, of my improved automatic valve apparatus, as applied to the cylinder of a steam-engine and the steam chest thereof.

My apparatus, like that shown in Letters Patent No. 152,052, dated June 16, 1874, and granted to Nathan P. Stevens, is automatic in its action, and has for its object the prevention of what is termed "vacuum obstruction" of the piston, when in movement in the cylinder, and steam is shut off from entering the same to drive the piston.

On the steam being shut off and the piston continuing to play in the cylinder, as it will in case of a locomotive-engine, while in motion on a railway, the valve of the automatic apparatus will be relieved from downward pressure, and at once, by its spring, will be thrown or forced up or off its seat, so as to open free communication between those parts of the bore of the cylinder which are on opposite ends of the piston-head, in which case the piston will travel freely in the cylinder without such vacuum obstruction.

In carrying out my invention I have dispensed with passages through the valve of the automatic apparatus, and with valves to such passages, as in said Stevens' apparatus, and I have extended from the upper part of the valve-chest of the said apparatus to the steam-chest of the cylinder a tube, to open communication between the two, from which it will be seen that the valve, so long as the steam may not be shut off, will always be left closed upon its seat by the pressure of steam from the steam-chest, and thus close communication between the spaces that, in the cylinder, are against opposite ends of the piston.

In case of the steam being shut off or estopped from entering the steam-chest of the cylinder, the valve of the automatic apparatus will be relieved from pressure, so as to be forced off its seat by its spring, and thereby open communication between the cylinder-spaces at opposite ends of the piston.

Furthermore, there is applied to the automatic valve-chest, two passages leading out of its arcal chambers, situated below its valve-seat, and into the bore of a case of a rotary valve, provided with corresponding inlet-passages, the purpose of which additions being to enable water or steam to be discharged from the cylinder, as circumstances may require.

In the drawings, A denotes the steam-engine cylinder, and B its steam or slide valve chest. The automatic valve-chest is shown at C, its valve at D, its pipes for connecting it with the cylinder at its opposite ends being represented at E E. These latter lead directly from two arcal chambers, *a a*, situated below and opening through the valve-seat *b*. Between these chambers is a cylindrical chamber, *c*, in which is placed a helical spring, *d*, for aiding in forcing the valve D off its seat. The pipe for connecting the space *e* of the chest C with the steam-chest B of the cylinder is shown at P.

The waste-water passages leading from the arcal chambers into the bore *f* of the cock-case F are shown at *g g*, the corresponding discharge-passages of the cock or plug G being exhibited at *h h*. By taking hold of the handle *i* of the plug, and turning the latter, the passages *h* may be brought into or out of connection with the passages *g g*.

With the pipe P there is no absolute necessity of the spring *d* to the automatic valve C, as the apparatus will operate without the spring; but such spring is a useful auxiliary, as it aids to throw the valve off, and it also keeps it still or in place while it is off its seat.

I herein make no claim to the automatic valve apparatus constituting the invention of the said Stevens, as described and claimed in his said patent.

What I claim as my invention is—

1. The combination of the pipe P with the steam-engine cylinder A, valve-chest B, automatic valve-chest C, its valve D, and the pipes E E, all being arranged and applied substantially as and to operate as specified.

2. The combination of the pipe P, steam-engine cylinder A, valve-chests B and C, valve D, spring *d*, and pipes E E, all arranged and applied essentially in manner and to operate as explained.

JAMES N. LAUDER.

Witnesses:
HENRY C. MINOT,
LUTHER W. NICHOLS.