Smith & Wood.

Draft Regulator.

No. 96,494. Patented Nov. 2, 1869.

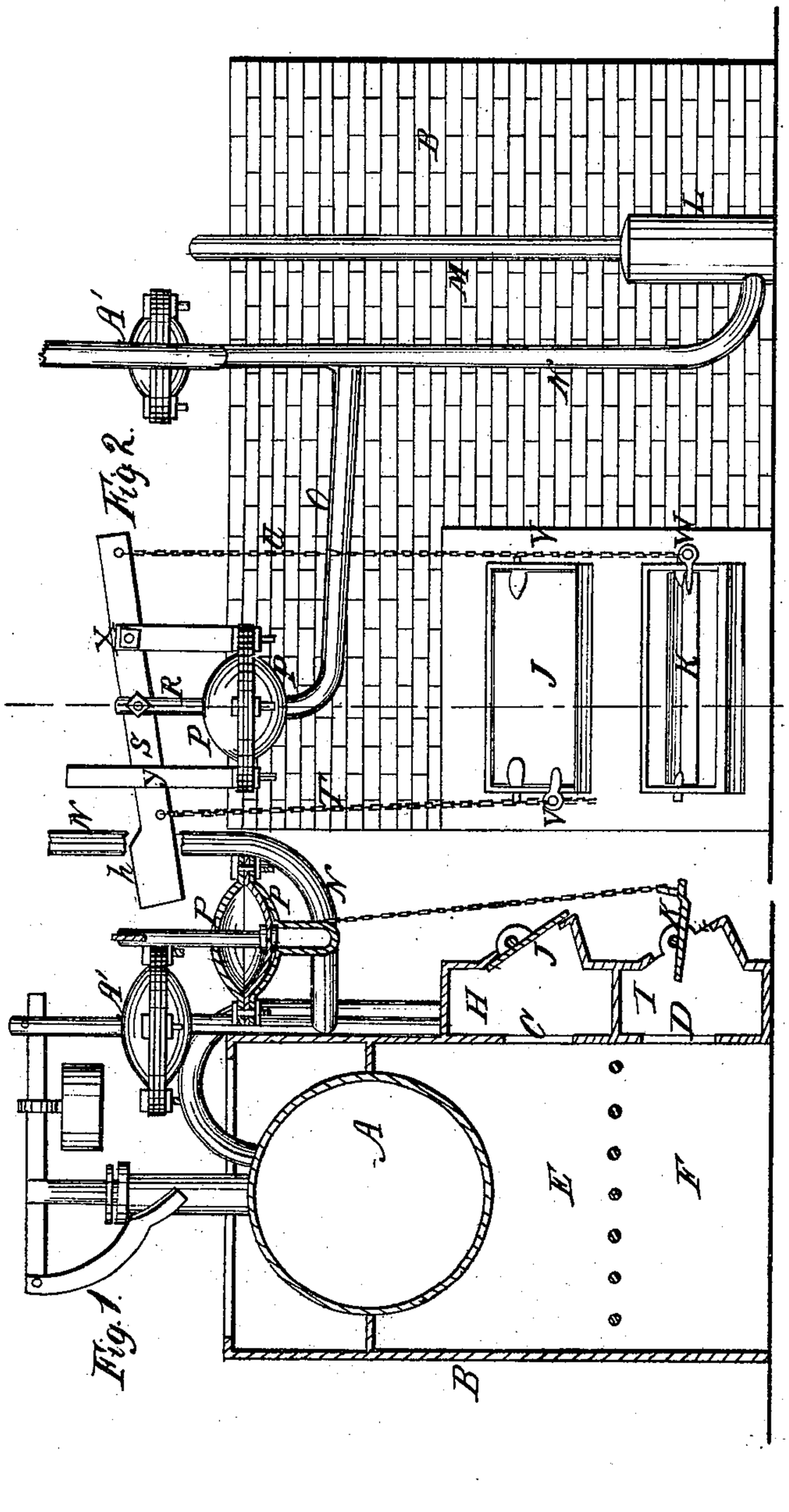

Fig. 1.

Witnesses.
Jno. C. Brooks
Alex F. Roberts

Inventor.
J. J. Smith
S. Wood
per Munn & Co
Attys.

United States Patent Office.

JAMES J. SMITH AND SAMUEL WOOD, OF CLEVELAND, OHIO.

Letters Patent No. 96,494, *dated November* 2, 1869.

IMPROVEMENT IN DRAUGHT-REGULATORS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, JAMES J. SMITH and SAMUEL WOOD, of Cleveland, in the county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Draught-Regulators; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to a new and useful improvement in regulating the draught of steam-boiler chimneys, and the pressure of the steam; and consists in the arrangement of an open tube, with a column of mercury, which is subject to steam and atmospheric pressure, in combination with suitable mechanism for operating upon draught-dampers, and also for acting upon the safety-valve, the whole arranged as hereinafter more fully described.

In the accompanying plate of drawings—

Figure 1 is a vertical section of a steam-boiler and arch, with the regulating-apparatus attached according to my invention, the section being through the line *x x* of fig. 2.

Figure 2 is a side elevation of the same.

Similar letters of reference indicate corresponding parts.

A represents a steam-boiler.

B represents the arch or mason-work, in which the boiler is placed.

C is a draught-aperture in the side of the fire-box, and

D is a draught-aperture in the side of the ash-pit.

E is the fire-box or furnace.

F is the ash-pit.

G represents the fire-grate.

The draught-apertures C and D are enclosed by boxes or chests H and I, and each is provided with a damper, J and K, suspended on pivots in an inclined position, as seen in fig. 1, so that they are self-closing, by reason of the preponderating weight of their lower sides.

It is to open and close these dampers that we provide a body of mercury in the chamber L, which is in communication with the boiler, by means of the pipe M.

As the steam presses upon the mercury in L, the mercury is forced up into the pipe N and branch-pipe O, and operates upon an elastic diaphragm, which is confined between the two conical flanges P P.

R is a rod, which is confined to the elastic diaphragm, and plays freely up and down through the upper flange P, its motion being governed by the action of the mercury on the diaphragm, while the action of the mercury is governed by the pressure of the steam from the boiler.

The chamber L is placed at such a distance below the diaphragm, that the weight of a column of mercury of the height between the two, will be equal to the pressure required to be maintained in the boiler.

The rise and fall of the rod R is made to operate the dampers J K, by means of the lever S and the chains T U, the chain T being attached to the upper damper J, as seen at V, and the chain U being attached to the damper K, as seen at W, and the chains are so connected, that when the elastic diaphragm is down, the lower damper is open.

The fulcrum of the lever S is at X.

Y is a forked stand, to guide the lever.

The lever S is weighted, as seen at Z, so as to counterbalance the weight of the damper K.

It will be readily seen that when the lower damper is open, and the upper one closed, they are arranged in the best possible manner to increase the combustion of the fuel in the furnace and get up steam.

When the pressure of steam has increased to such an extent as to raise the diaphragm by its pressure on the mercury, the lower damper will be closed, as well as the upper one, as there will be sufficient "slack" in the chain T, (which is attached to the upper damper,) to prevent the lever S from acting upon that damper at once.

Should the closing of the lower damper, under these circumstances, not be sufficient to slacken the fire, the pressure will raise the lever S to its full height, which will lift the upper damper, and allow a current of cold air to pass through the fire-box and up the stack.

It is presumed that these two dampers will be sufficient to control and regulate the generation of steam, but as an extra precaution against accident from over-pressure of steam, and also to insure the better working of the safety-valve, we provide another elastic diaphragm, at A', (similar in its operation to the one already described,) and place it at a considerable elevation above the other, so that it will not be affected by the pressure, except when the lever S is raised to its fullest extent, and when the other means provided have not been sufficient to reduce the pressure.

The pipe N is attached at near the bottom of the chamber L, and sustains an open column of mercury when the pressure of steam forces the mercury from the chamber, and when, by a reduction of the pressure, the mercury sinks back into the chamber, the air enters and occupies the tube.

By this arrangement, the control of the draught and the generation of steam and pressure in the boiler are believed to be complete.

Where the steam is allowed to act directly upon the diaphragm, (or in contact therewith,) the diaphragm is soon destroyed by the heat thus imparted.

The use of the mercury prevents all injury from this cause.

Having thus described our invention,

We claim as new, and desire to secure by Letters Patent—

1. The use of mercury in an open column, substantially as and for the purposes described.

2. The construction and arrangement of the mercury-chamber L, at the base of an open column, substantially as described, and for the purposes specified.

3. The arrangement of the mercurial tube and the devices co-operative therewith, in the manner described, and for the purposes set forth.

JAMES J. SMITH.
SAMUEL WOOD.

Witnesses:
GEO. HESTER,
L. B. EAGER.