

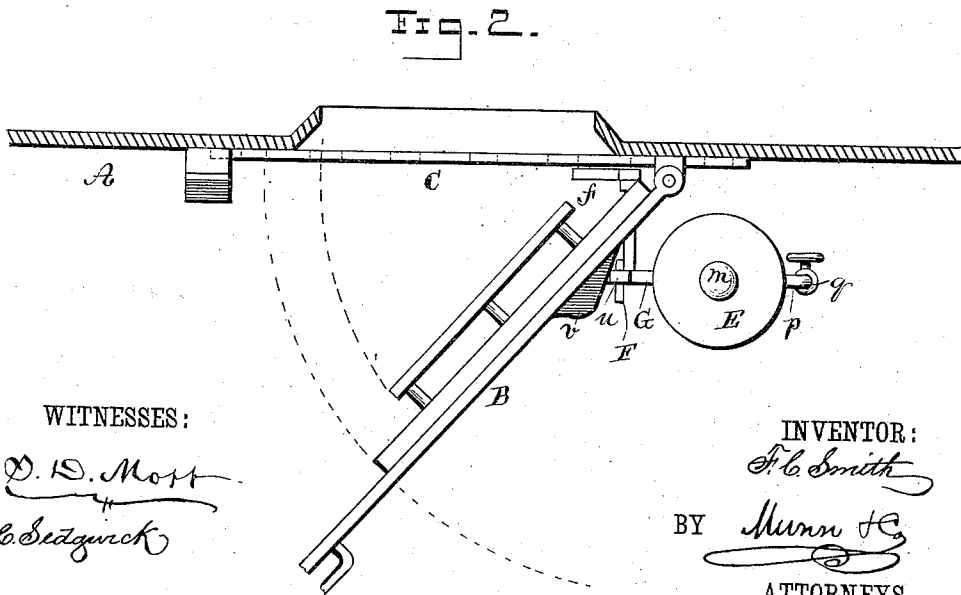
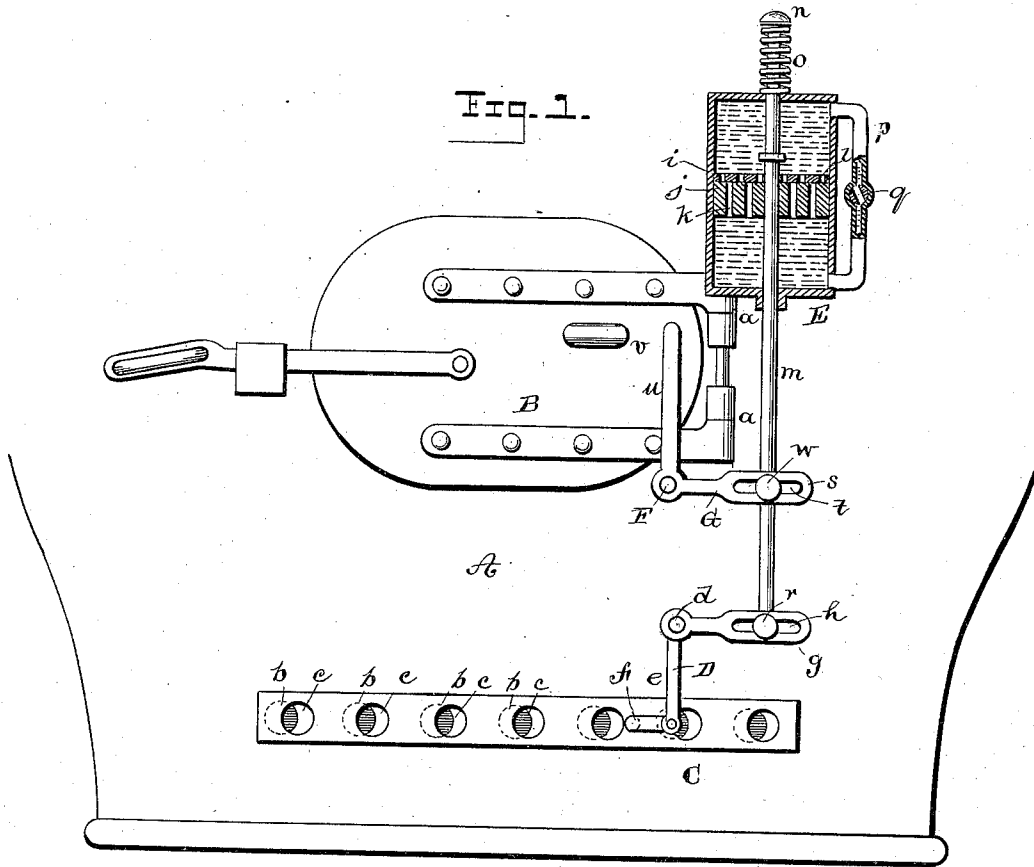
(No Model.)

F. C. SMITH.

AIR REGULATOR FOR FURNACES.

No. 366,038.

Patented July 5, 1887.



WITNESSES:

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FRANK C. SMITH, OF DELAWARE, OHIO.

AIR-REGULATOR FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 366,038, dated July 5, 1887.

Application filed February 25, 1887. Serial No. 228,875. (No model.)

To all whom it may concern:

Be it known that I, FRANK C. SMITH, of Delaware, in the county of Delaware and State of Ohio, have invented a new and Improved
5 Air-Regulator for Furnaces, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a front elevation of a portion of
10 a locomotive-boiler, showing the fire-door and the cold-air damper; and Fig. 2 is a plan view, partly in section, of the same.

Similar letters of reference indicate corresponding parts in both views.

15 It is a common practice in firing locomotive and other boilers to admit air to the furnace above the fire, to supply to the gases the oxygen necessary to insure their combustion, and when the heavy gases and smoke are consumed
20 the cold-air dampers are commonly left open, and the admission of air after the combustion of the gases, resulting from the contact of the fresh coals with the ignited coals, is detrimental, as it tends not only to deaden the fire, but to
25 cool down the boiler.

The object of my invention is to obviate these difficulties by providing an automatic cold-air-damper regulator, which will be operated whenever the fire-door of the boiler is
30 opened, and which will effect the closing of the cold-air damper within a prescribed time from the opening of the damper.

My invention consists in the combination, with the cold-air damper and fire-door of a furnace, of a spring arranged to close the air-damper and a cataract or dash-pot adapted to retard the closing of the air damper.

To the front of the boiler A is hinged the fire-door B, by means of the hinges a, in the
40 usual way, and in the front of the boiler are formed the cold-air apertures b. A damper, C, arranged to slide along the boiler-front over the holes b, is provided with a series of holes c, corresponding in size and position to the
45 holes b.

On a stud, d, projecting from the front of the boiler, is pivoted a right-angled lever, D, having the arm e connected to the cold-air damper C by the link f. The arm g of the said lever
50 is provided with a slot, h.

In a convenient position at the front of the boiler is supported a cataract, E, consisting

of the cylinder i, containing the piston j, provided with series of apertures k, and having on its upper surface an apertured valve, l, 55 which is adapted to close the openings k of the piston. The piston j is secured to a piston-rod, m, which passes through apertures at opposite ends of the cylinder. The upper end of the piston-rod m is provided with a head, n, 60 between which and the top of the cylinder is placed a spiral spring, o. A pipe, p, communicates with opposite ends of the cylinder, and is provided with a plug-valve, q, by which it may be closed more or less. The lower end 65 of the rod m is provided with a stud, r, which passes through the slot h of the lever D.

Upon a stud, F, projecting from the front of the boiler, is pivoted a right-angled lever, G, provided with an arm, s, having a slot, t, 70 and a straight upwardly-projecting arm, u, which is held in the path of a lug, v, projecting from the face of the door. A stud, w, extends from the rod m through the slot t of the right-angled lever G. When the fire-door B 75 is opened, the lug v is brought into engagement with the arm u of the lever G, and turns the said lever on its pivot, imparting a downward motion to the rod m, carrying the piston j downward in the cylinder, forcing the oil or 80 other liquid contained by the cylinder from the space below the piston to the space above the piston through the apertures k of the piston and through the apertured valve l, at the same time compressing the spring o at the top 85 of the cylinder. The engagement of the stud r, projecting from the lower end of the rod m, with the lever D slides the damper C so as to cause the apertures c to coincide with the apertures b, and thus admit air to the boiler- 90 furnace above the fire. When the door B is closed, the lever G being released, the spring o tends to raise the piston j; but the upward movement of the piston is retarded by the oil, which can escape from the space above the 95 piston to the space below the piston only through the pipe p and valve q. The valve q is adjusted so as to insure the slow transfer of the liquid from the upper to the lower end of the cylinder, the movement of the piston being 100 regulated by the valve q, so that the piston will return to the point of starting in about the time required to consume the smoke resulting from the newly-added coal.

In lieu of the spring *o* at the top of the cataract, I may employ a steam or air cylinder to secure the desired action.

I have described one form of my apparatus; but I do not limit or confine my improvement to this particular form, as it may be varied to adapt it to boilers and furnaces of various kinds.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In an air-regulator for furnaces, the combination, with the fire-door and cold-air damper, of a damper opener and closer, and a retarding device arranged to cause the damper to close slowly, substantially as described.

2. In an air-regulator for furnaces, the combination, with the cold-air damper, of a valve-closing spring, a cataract for retarding the action of the spring, and means, substantially as described, for opening the damper.

3. The combination, with the cold-air damper C and fire-door B, of the cataract E, formed of the cylinder *i*, provided with the pipe *p* and the valve *g*, the rod *m*, apertured piston *j*, valve *l*, adapted thereto, the damper-closing spring *o*, and connections intermediate between the rod *m*, fire-door B, and damper C, substantially as described.

4. In an air-regulator for boiler-furnaces, the combination, with the fire-door B and damper C, of the lever G, adapted to receive motion from the fire-door, the rod *m*, connected with the said lever G, the liquid-filled cylinder *i*, provided with the pipe *p* and valve *g*, the spring *o*, and the lever D, connected with the damper C and rod *m*, substantially as described.

FRANK C. SMITH.

Witnesses:

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