

A. C. NORCROSS.

DAMPER-REGULATOR FOR FURNACES AND STOVES.

No. 178,944.

Patented June 20, 1876.

Fig. 1.

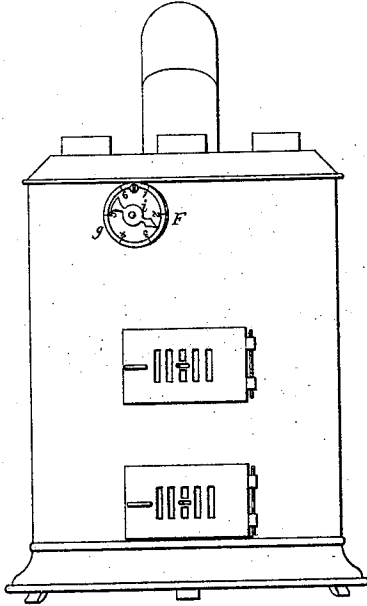


Fig. 2.

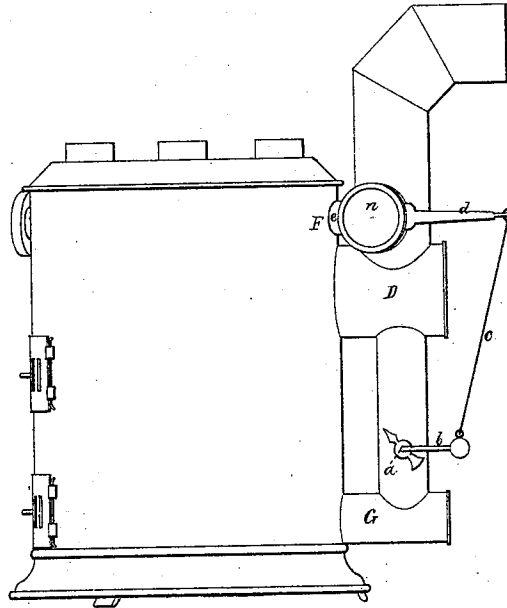


Fig. 3.

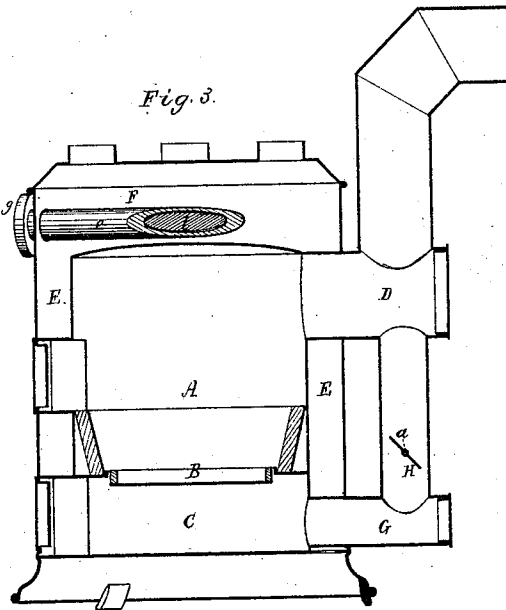
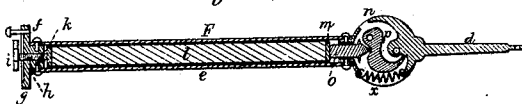


Fig. 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN DAMPER-REGULATORS FOR FURNACES AND STOVES.

Specification forming part of Letters Patent No. **178,944**, dated June 20, 1876; application filed April 13, 1876.

To all whom it may concern:

Be it known that I, ALVIN C. NORCROSS, of Boston, of the county of Suffolk and State of Massachusetts, have made a new and useful Invention having reference to Hot-Air or various other Furnaces; 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 front view, Fig. 2 a side elevation, and Fig. 3 a longitudinal section, of a hot-air or air-heating furnace provided with my invention. Fig. 4 is a longitudinal section of its automatic heat or draft regulator.

Heretofore it has been customary to connect the automatic heat or draft regulator of a furnace either to a damper or valve arranged in the smoke-discharge flue of the fire-place or chamber of combustion, or to one arranged in an air-induct leading into the ash chamber or space beneath the grate of such furnace. Each of such arrangements of the valve or damper is objectionable. The difficulty attending the employment of a damper in the smoke-discharge pipe is that it, by reducing the passage for discharge of the smoke and waste gases, often checks their escape to such a degree as to cause them to be forced out of the doorway or any of the joints of the fire-place. Attempts to regulate, by an automatic heat or draft regulator, the admission of air into the ash-chamber or space beneath the grate of a furnace, generally fails, from the fact that the joints are not air-tight or cannot be maintained sufficiently tight.

In carrying out my invention, I lead out of the ash-chamber or space beneath the grate of the fire-place an educt or pipe, which I open into the smoke-pipe or discharge-flue of the fire-place or chamber of combustion; and I place in such pipe or educt a valve or damper, and so connect it with the automatic heat or draft regulator as to enable the latter to work such valve or damper, the main object of such improvement being to regulate the draft through the fuel, by discharging by the educt, from the chamber below the grate, the surplus air not required for combustion. By so doing I am not obliged to have any door of the furnace fit the doorway with a tight joint, or

to change or vary the heat-regulator so as to open the damper more, preparatory to opening the door of the fire-place or ash-chamber, whether for supplying the furnace with fuel or for removing ashes, or any other purpose, as is generally necessary when the damper is in the smoke discharge pipe or flue.

In the drawings, A denotes the fire-place, B the grate, C the ash-chamber, and D the smoke-discharge flue of the fire-place or chamber of combustion, the air-heating chamber surrounding the fire-pot being shown at E. An automatic heat or draft regulator is represented at F, as arranged in the upper part of the air-heating chamber, and extending in opposite directions out of it.

Furthermore, there is led out of the ash-chamber C, or chamber beneath the grate, a pipe or educt, G, which is extended to and opens into the smoke-discharge flue D, and is provided with a damper, H, from whose shaft or spindle *a* an arm, *b*, is extended, such arm being connected by a rod, *c*, with the lever *d* of the heat or draft regulator. The rod is jointed to the said arm and lever.

This automatic heat or draft regulator F, as shown in the drawings, may be thus described: Its case is composed of a metallic tube *e*, having at its front end a stopper or head, *f*, provided with a dial or index-plate, *g*, through the axis of which and the stopper a screw, *h*, furnished with an index-pointer, *i*, is screwed against a metallic disk, *k*, arranged in the tube. There is also in the tube a cylinder or rod, *l*, of wood, porcelain, or some other proper material, which at one end rests against the said disk *k*, and at the other, against another such disk, *m*. To the rear end of the tube *e* there is fixed a case, *n*, for supporting a slider, *o*, and two levers, *p* *d*, formed and arranged within the case, in manner as shown, the said levers being pivoted to the case.

As the air within the chamber E of the furnace may rise in temperature its heat will be communicated to the tube *e*, which, by such heat, will be expanded in a greater degree than will the cylinder *l*, and, consequently, while the tube may be contracting the slider *o* will force the longer arm of the shorter of

the two levers *p d* against that of the longer of them, and thereby cause this latter arm to rise, so as to aid in effecting the turning of the damper, a spring, *x*, serving to effect a counter-movement.

From the above it will be seen that, as the heat of the furnace may rise above the point required, the damper will be opened, so as to allow a portion or all of the air that may enter the chamber beneath the grate to escape, by the exit-pipe thereof, into the smoke-discharge pipe, without going through the grate and the fuel therein. In this way an indraft is effected at every joint and a consequent escape of gas or smoke otherwise than into the smoke-flue is prevented, whether the door or doors be closed or open more or less.

I would remark that, instead of leading the pipe *G* directly into the smoke-discharge flue or pipe, such pipe *G* may open at its upper end into the fire-place or chamber of combustion over the grate. Also, that my invention is applicable to the furnace of a steam-boiler, provided the heat or draft regulator be extended into the steam-space of the boiler.

Instead of the damper being in the pipe leading from the ash-chamber into the chamber of combustion or its smoke-discharge flue, such damper may be in an induct to lead air into the ash-chamber or space beneath the grate.

I claim—

In combination with a stove or furnace and an automatic heat-regulator, *F*, applied thereto, a pipe or conduit, *G*, leading out of the ash-chamber or space under the grate and communicating with the smoke-discharge-pipe or flue *D* of the said stove or furnace, and provided with a damper, *H*, and mechanism applied thereto, or connecting such and the heat regulator, to cause or enable the valve or damper to be automatically moved or operated by such heat-regulator, under variations of temperature, all being substantially as set forth.

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Witnesses:

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