(No Model.)

# J. S. MAKIN.

## DRAFT REGULATOR FOR FURNACES.

No. 421,591. Patented Feb. 18, 1890.

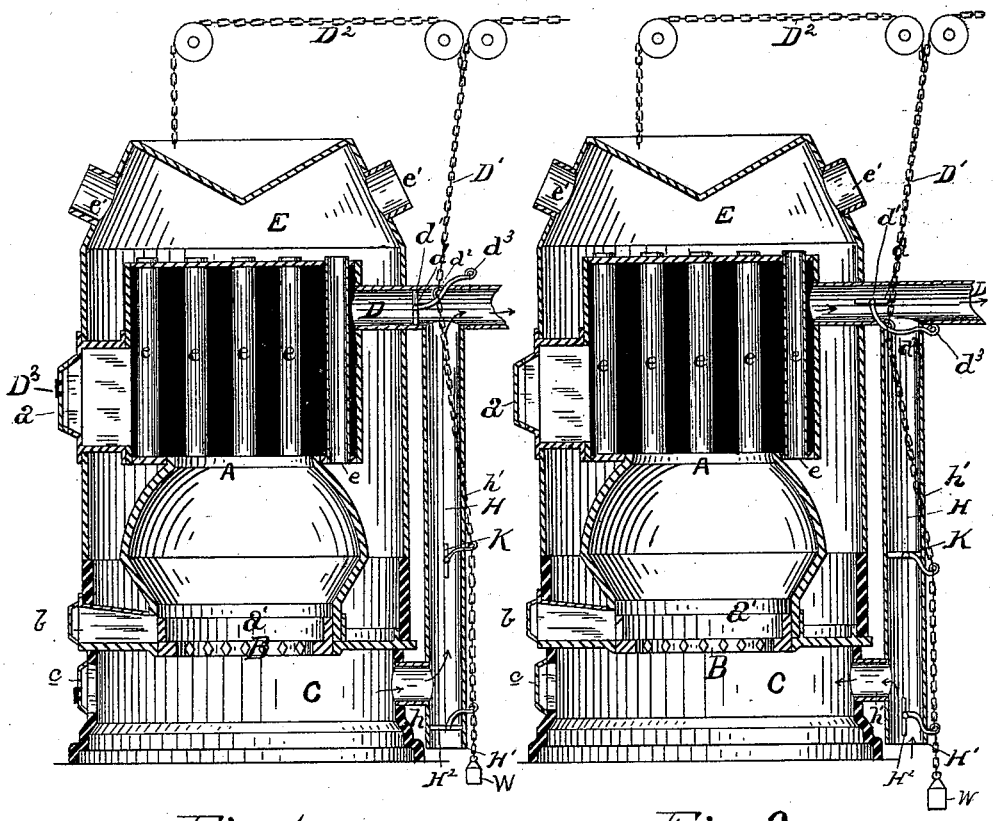


Fig. 1




Fig. 2.

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# UNITED STATES PATENT OFFICE.

JOHN S. MAKIN, OF PHILADELPHIA, PENNSYLVANIA.

## DRAFT-REGULATOR FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 421,591, dated February 18, 1890.

Application filed November 28, 1888. Serial No. 292,095. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN S. MAKIN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Draft-Regulators for Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same, which will enable others skilled in the art to which my invention belongs to construct and operate it.

In general, my invention may be used in connection with any furnace or stove having a substantially tight body encompassing a grate or fire-pot located between a combustion-chamber and an ash-box; but as it is especially adapted for use in conjunction with ordinary "portable heaters" or domestic hot-air furnaces it is hereinafter illustrated and described in that particular connection.

The object of my present invention is to establish a positive diversion and change of direction in the draft-current, grading into all intermediate stages of "up," "down," or "neutral," as may be desired; and this I accomplish by a combination of a by-path or flue connecting the space below the grate-surface (ash-box) with the combustion-chamber or smoke-pipe beyond its damper, acting in conjunction with an intermediate or "switch" damper and a valvular orifice in said flue.

Reference being now had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures, they will be found to illustrate my improvements in the form in which I preferably embody them in actual practice.

Figure 1 is a vertical median section through an ordinary portable heater or hot-air furnace provided with my improved draft-regulator. It shows the position of the moving parts when the draft is closed or full-checked. Fig. 2 is a view substantially similar to that shown in Fig. 1, save only that the draft is here wide open.

A represents the combustion-chamber; *a*, the fuel-supply door, preferably provided with a sliding port; *a'*, the space in which the fuel lies; B, the grate-bars; C, the ash-box; D, the smoke-pipe; *d*, the damper, which I prefer should have no hole in or clip taken out of it, such as dampers often have to prevent total closure, said damper being trunnioned in the walls of the pipe D and operated by means of a rock-shaft *d'* and lever $d^2$; *b*, the stoking-door; *c*, the ash-pit door, preferably provided with movable draft-port; E, the hot-air chamber and its heating and conduit flues *e e* and *e' e'*; D, the damper-pull, preferably a chain passed over pulleys in the ordinary way to any desired point of control, and there, as customary with damper-pulls, operated either by hand or automatic adjustment; W, a weight or counterpoise attached to a continuation of said chain should the general weight and disposition of the moving parts, hereinafter designated, prove insufficient to gravitate the system in directions opposite to the pull; $D^2$, an auxiliary chain, which may be employed to set the regulator from a different or distant locality, &c.

The aforesaid parts being substantially those of the ordinary heater and well understood, I pass now to those which are novel in their organization and arrangement. They are the flue H, (formed in this illustrative example of the elbow-pipe *h h'*,) connecting the upper combustion-chamber or exhaust-pipe D, at a point beyond or farther from the fire than the aforesaid damper *d*, with the ash-box C; an extension H' of said flue, preferably directed toward the ground on which the heater stands and provided at or near its end with a valvular orifice formed in this case by the damper $H^2$, and the adjustable damper K, located about centrally of the length of said connecting-flue and forming what I designate the "switch damper." The damper K and $H^2$, being substantially counterparts of the ordinary damper *d* in form, equipment, and adjustability, are preferably connected together by linking their levers or operating-handles to the lower part of the chain D', and are also connected by the same means to the ordinary damper *d*, thus forming a draft system whose several parts move in unison. However, as a modification the chain or its equivalent may be attached to the damper *d* by a greater length of lever, as by the terminal hook $d^3$, than it is to damper $H^2$, in which case *d* will never be concurrently

closed with $H^2$, and thereby back-drafts and leakage may be prevented and the device be still within the purview of my invention.

In operation all the ordinary doors and drafts of the heater being closed, if a full draft is desired through my regulator device the damper *d*, switch-damper K, and draft check or damper $H^2$ are to be set simultaneously, as by movement of the connecting-chain D into the position shown in Fig. 2, while the setting shown in Fig. 1, a reverse of the former, is effected by the contrary operation and is that of complete closure. Intermediate to these two positions the dampers can be changed and set concurrently and positively by moving a connecting-chain D′, or its equivalent linkage, as, say, to a position midway to those shown in Figs. 1 and 2—to wit, to that indicated in dots in Fig. 1 a half-dampered, half-checked, half-open draft then following as the result of a single act of the operator; and should the ash-box door (or ordinary draft) and the fuel-supply door (or its port) be opened in conjunction with my draft-regulating device, its preferred operating-chain being hooked to the longer damper-lever $d^3$, as indicated in dotted lines, and its three dampers be placed as indicated by the dotted positions at K, *d*, and $H^2$ in Fig. 2, a neutral effect or "no draft" follows, all currents separating and being drawn mutually above and below the fuel.

Juxtaposition of the orifice controlled by $H^2$ with the ground-line above alluded to as a preferred construction renders my device a scavenger of foul and heavy air as well as a draft-regulator; but while I appreciate its usefulness in the form described I am also aware that it may be very differently located in respect to altitude without departing from my present invention.

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

1. In a furnace, the combination of the ash-box, the combustion-chamber, a dampered exit-pipe leading from the latter for the products of combustion, an air-pipe communicating at its upper end with the exit-pipe beyond its damper and near its lower end with the ash-box, the air-pipe being provided with two dampers—one at its lower end and the other located between its communications with the ash-box and the exit-pipe—and a connection between the three dampers, causing them to move in unison, substantially as described.

2. In a furnace, the combination of the ash-box, the combustion-chamber, a dampered exit-pipe leading from the latter for the products of combustion, an air-pipe communicating at its upper end with the exit-pipe beyond its damper and near its lower end with the ash-box, said air-pipe being provided with two dampers—one at its lower end and the other located between its communications with the ash-box and the exit-pipe—a connection between the three dampers, causing them to move in unison, an operating-chain whereby the dampers may be actuated from a distant point, and a counter-balance for holding them in any position to which they may be set, substantially as described.

3. In a furnace, the combination of the ash-box, the combustion-chamber, a dampered exit-pipe leading from the latter for the products of combustion, an air-pipe communicating at its upper end with the exit-pipe beyond its damper and near its lower end with the ash-box, the air-pipe being provided with two dampers—one at its lower end and the other located between its communications with the ash-box and the exit-pipe—and a connection between the three dampers holding the one in the exit-pipe and the one in the lower end of the air-pipe closed while the intermediate one is open, or vice versa, and causing them to move in unison, substantially as described.

JNO. S. MAKIN.

Witnesses:
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