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FERDINAND E. CHATARD, Jr.

Hot Air Furnace.

No. 122,105.

Patented Dec. 26, 1871.

Fig. 1.

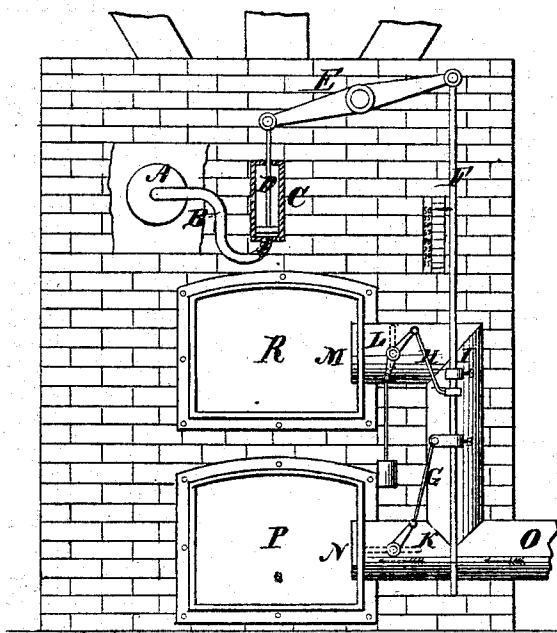
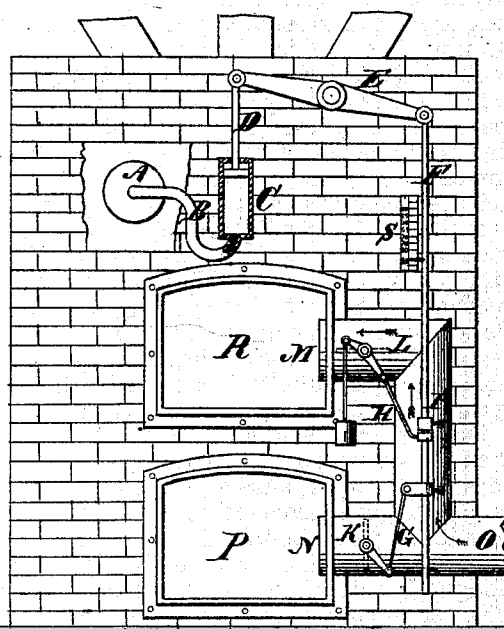


Fig. 2.



WITNESSES.

Wm F Sutherland
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FERDINAND E. CHATARD, JR., OF BALTIMORE, MARYLAND.

IMPROVEMENT IN DRAUGHT-REGULATORS FOR FURNACES AND STOVES.

Specification forming part of Letters Patent No. 122,105, dated December 26, 1871.

I, FERDINAND E. CHATARD, Jr., of Baltimore, in the county of Baltimore and State of Maryland, have invented certain Improvements in Regulating the Draught of Furnaces and Stoves, of which the following is a specification:

My invention relates to an arrangement of two draught-pipes or tubes of any convenient or suitable form, one opening into the ash-box or below the fuel, and the other above the level of the fuel, either directly into the dome of the furnace or stove or into the smoke-pipe. These pipes are branches of one common pipe, which communicates with and receives air from the place in which the furnace or stove is placed, or directly from the outside atmosphere. The upper as well as the lower pipe is provided with a damper or valve of usual form, which dampers are connected by suitable rods or combination of rods and links of chain with the piston of the air-cylinder. The air-cylinder is in direct communication by a tube with a metallic air-vessel of proper size and shape, placed within the hot-air chamber and over the dome of the furnace. When the air within this metallic air-vessel becomes heated it expands according to the ratio of expansion of gaseous bodies. The expansion of the air gives motion to the piston within the air-cylinder, which in turn, by its connecting-rods, gives motion first to the damper within the lower pipe, and then to that of the upper. When the motion has been sufficient to close the lower damper, if the expansion of the air within the metallic vessel still continues, all further motion will result in the opening of the upper damper and sending a current of air over the fuel or into the smoke-pipe. The normal position of the upper damper is shut, and it is kept so by a weight, if necessary. Thus it will be seen that, by properly proportioning the cylinder and metallic air-vessel, and arranging the joints and connections, we will have no perceptible closing motion imparted to the lower damper until the heat within the air-chamber of the furnace is sufficient to expand the air to a certain point; then if the heat continues to increase, the lower damper closes gradually until all the draught is cut off. If the heat should still continue augmenting the expansion will cause the opening of the upper damper. If, therefore we proportion all properly,

and set the dampers so that the lower one will be closed when the heat in the hot-air chamber has reached a certain point, we can keep it at or near that point; for if it increases the upper damper will open; if it diminishes the upper damper remains closed and the lower one opens.

Description of the Accompanying Drawing.

Figure 1 is a front view of draught apparatus, showing pipes, dampers, cylinders, &c., lower damper being open and upper closed. Fig. 2 shows same parts, but with closure of lower damper and opening of upper.

A is an air-tight metallic vessel, placed within the hot-air chamber of the furnace and above the dome and fire-pot. B is a small tube forming communication between A and C, the hot-air cylinder. D is the piston and piston-rod working within C. The piston may be packed in the usual manner of pistons of air-pumps or steam-cylinders, or the extremity of the pipe B, which is within C, may end in a small elastic bag, and thus dispense with the packing. The expansion of the air in the air-vessel will cause the elastic bag to fill more or less the cylinder, and thus give easy motion to the piston without any leakage of air. E is a connecting-rod moving on a pivot, and communicating motion from D to F, which is a vertical rod carrying an index to the scale S, the movable nut I, and the extremities of the damper-rods H and G. K and L are the dampers; M and N, the openings of the draught-pipes above and below the fuel; P, the ash-box; and R, the fuel-opening. O is the exterior opening of the draught-pipe.

I claim as my invention—

The cylinder C, in combination with the air-vessel A, the connecting-rods D, E, and F, the movable nut I, the damper-rods H and G, and the dampers K and L, respectively, within the upper and lower draught-pipes; the whole, when constructed and operating substantially as described, and for the purpose hereinbefore set forth.

FERDINAND E. CHATARD, JR.

Witnesses:

ST. CLAIRE F. SUTHERLAND,
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