

No. 683,180.

Patented Sept. 24, 1901.

R. G. LATHAM.

DAMPER AND DAMPER CONTROLLING MECHANISM.

(Application filed Apr. 24, 1900.)

(No Model.)

Fig. 1.

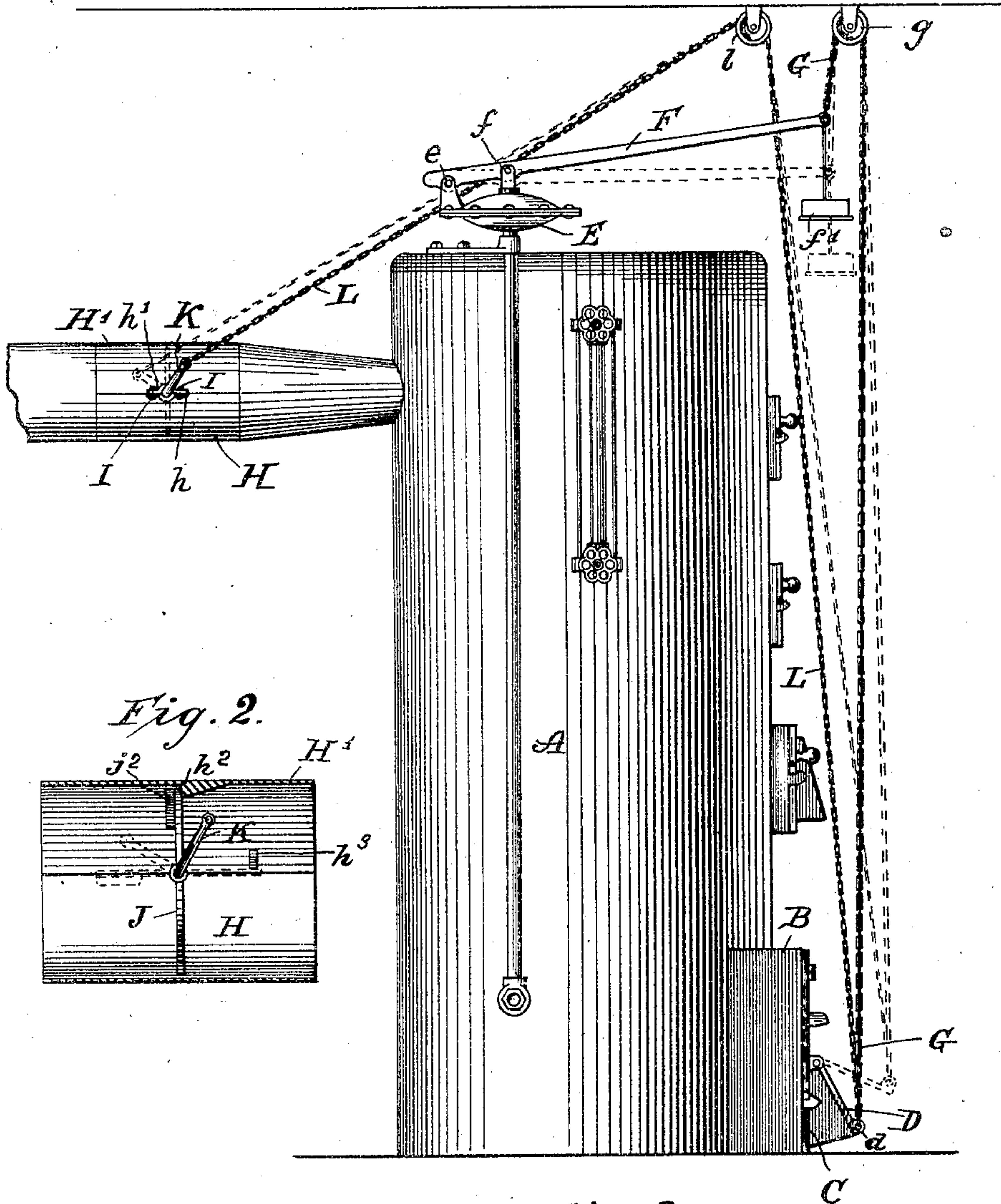


Fig. 2.

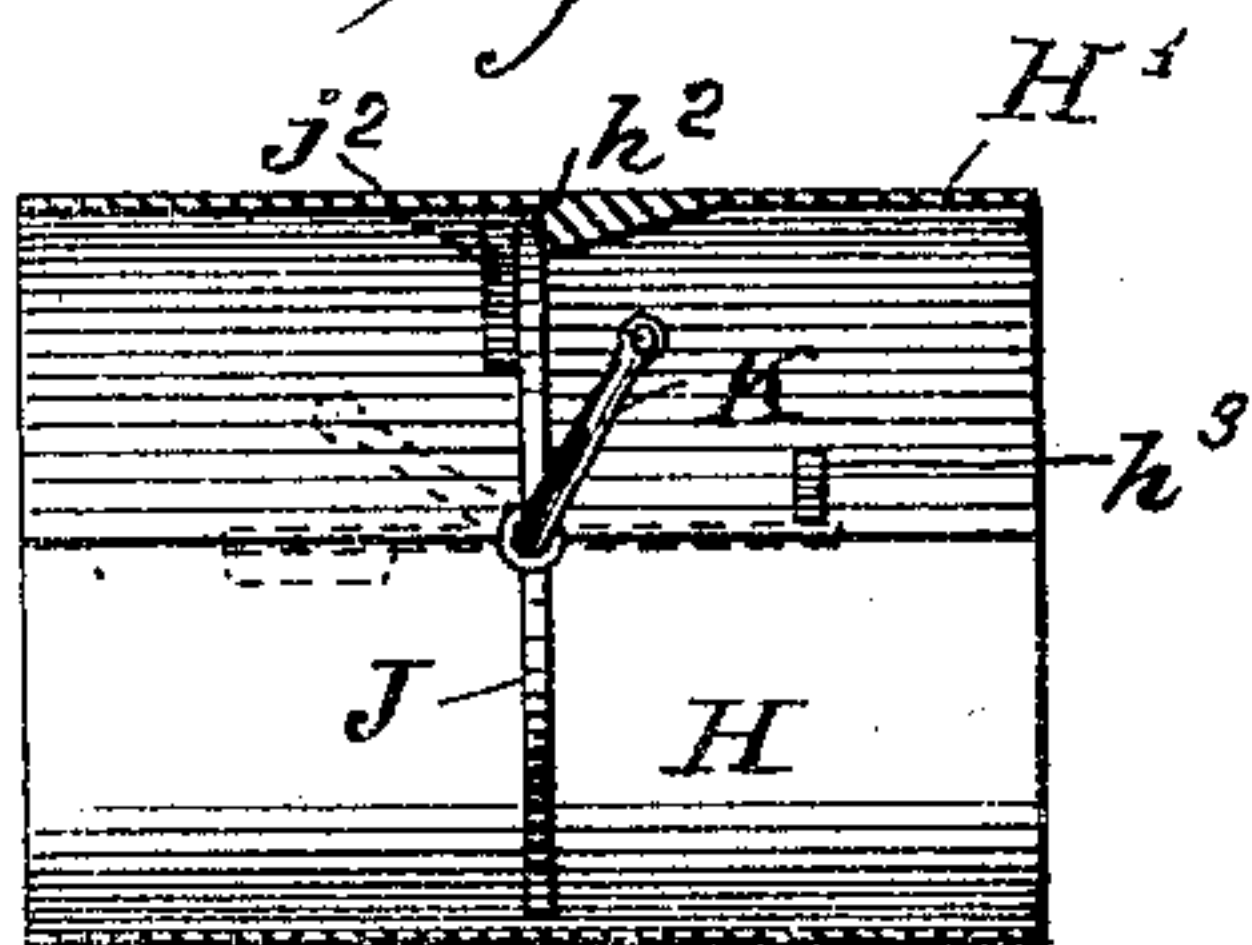
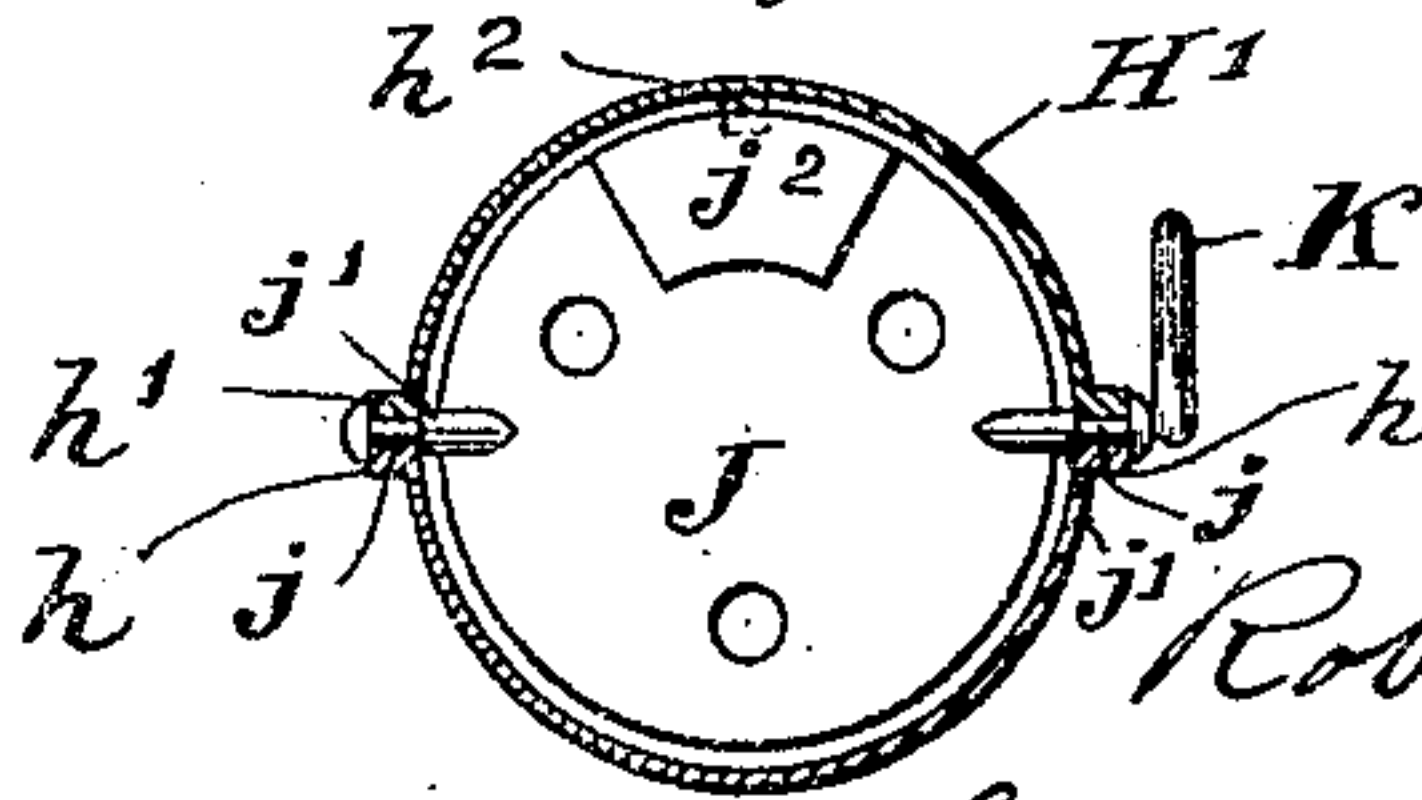


Fig. 3.



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## DAMPER AND DAMPER-CONTROLLING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 683,180, dated September 24, 1901.

Application filed April 24, 1900. Serial No. 14,092. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT G. LATHAM, a citizen of the United States, residing at Manchester, in the county of Hillsboro and State of New Hampshire, have invented certain new and useful Improvements in Dampers and Damper-Controlling Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates, essentially, to the operation of the damper in the smoke-flue of boilers of house-heating apparatus.

The majority of boilers used in heating private dwellings are provided with some sort of device for the automatic regulation of the draft in accordance with the requirements of the fire to maintain an even temperature of water in hot-water heating apparatus or a given pressure of steam in steam heating apparatus. In steam heating apparatus, for example, a diaphragm is commonly used and provided with a weighted arm or lever, the free end of said lever being connected by a chain with a hinged cover for the draft-opening in the ash-pit door, whereby draft is automatically admitted under the fire-grate when the steam-pressure drops below a given point or the draft-opening is automatically closed when the steam-pressure has again risen to or above the required point.

The object of my invention is to provide means whereby the movement of the cover of the draft-opening, whether in opening or closing, shall cause the damper in the smoke-flue of a boiler to likewise open or close in unison with said cover of the draft-opening; and the invention consists in the novel means employed for accomplishing the above object, thereby effecting a great saving of fuel and a more even fire and heat resulting therefrom, as fully set forth in the following specification and claim, and clearly illustrated in the drawings accompanying and forming a part thereof, of which—

Figure 1 is an elevation showing a steam-boiler adapted for house-heating purposes and provided with my improved damper and its connections. Fig. 2 is an enlarged sectional detail showing my improved damper and the pipe-section to which it is fitted. Fig. 3 is a

cross-sectional enlarged view of the pipe-section in which my improved damper appears in elevation.

To insure its successful operation, the damper should be weighted or provided with a suitable spring for maintaining it normally open, then by proper connection with the cover of the draft-opening the influence of the diaphragm upon said cover causing it to open will necessarily open the damper, and vice versa.

A is a boiler, B its ash-pit, and C the ash-pit door, to which is hinged the draft-plate D, which covers a suitable draft-opening.

E is an ordinary diaphragm, to which at *e* is pivotally attached an arm or lever F, said lever being actuated at *f* by the diaphragm, and the free end of said lever F is connected at *d* to the draft-plate D by a suitable chain G, which passes upward from said lever over a pulley *g*, located above the boiler, and thence to said draft-plate. The arm or lever F is weighted at *f'*, and when the pressure in the boiler drops below a given point (determined by the weight *f'*) said weight *f'* causes the lever F to fall, which, by reason of its connection by chain with the draft-plate D, causes the latter to gradually open, thus giving the fire more draft, which restores the steam to its normal or required pressure.

The above-described arrangement for regulating the draft automatically and for keeping the steam at its normal or required pressure is common to the majority of house-heating apparatus, and I do not claim anything in this connection; but it is obvious that the regulation in this manner of draft alone without any provision for checking the free discharge of the air (thus admitted through the draft-opening) through the smoke-flue, with its consequent waste of heat, is objectionable from an economical standpoint, for by holding back as much as practicable of this air, which will have become heated to a high degree, the desired pressure of steam may be maintained with much less consumption of fuel and the fire kept more uniform than when the heated air is allowed to escape as freely as it has entered under the grate. Hence after repeated experiments I conceived the idea of devising some positive means for operating the damper in unison with the draft-



plate of heating-boilers, to accomplish which it is very important that the damper should work freely and with as little friction as possible. Finding this to be quite necessary I  
 5 prefer the construction shown and consisting of a short pipe section or housing for the damper formed in two sections, as seen at  $H H'$  in the drawings, said sections being separable  
 10 longitudinally and each having lateral projections on opposite edges, as at  $h h'$ , located midway from the ends of said sections and secured together by screws or rivets  $I$ , as seen in Fig. 1.

$J$  is the damper, which is provided at opposite sides with journals  $j$ , fitting bearings  
 15 formed part in each projection  $h h'$ , as shown in the drawings, said journals  $j$  being provided with shoulders  $j'$ , adapted to rest against the ends of the bearings in said pipe-sections, and  
 20 thus insure the proper central position and free movement of said damper within said pipe-section and without danger of contact or friction with its sides.

The damper is preferably weighted at  $j^2$   
 25 in a manner to cause it to move away from the stop  $h^2$  and rest normally against a stop  $h^3$ , said stops being formed upon or attached to said pipe-section  $H'$ , and said damper is also provided with an arm  $K$ , which may be  
 30 formed integral with or attached to one of its journals. The chain  $L$  is of proper length when resting upon the pulley  $l$  to connect the draft-plate  $D$  at  $d$  with the arm  $K$  when said draft-plate and the damper  $J$  are in the  
 35 position seen in Fig. 1. The lever  $F$  may of course rise above its position shown in the drawings; but such movement would have no

effect upon either the draft-plate or the damper, as the chain  $L$  is just long enough without slack to connect the two when both are  
 40 closed, and the chain  $G$  is only long enough to permit the proper opening of the draft-plate when the steam-pressure is below normal and the lever  $F$  at its lowest point. It will be found necessary to set the arm  $K$  at a  
 45 proper angle with the damper, (the angle shown being preferable,) so that the operation of the latter may be assured, for if the said arm were placed in alinement with the damper the latter could not be easily started  
 50 when wide open, as the closing of said damper is effected wholly by the weight of the draft-plate and opened by reason of its counterbalance or weight  $j^2$ .

Having described my improvements, what  
 I claim is—

The combination with a house-heater and a thermostat including a pivoted lever, of a draft-plate, a flexible connection between the  
 60 lever and plate, a damper, means for arresting the damper when fully closed, means for automatically swinging the damper into full open position and an independent flexible  
 connection between said damper and draft-plate, said connection being of such a length  
 65 that it will hold said damper in closed position when the plate is fully closed, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBT. G. LATHAM.

Witnesses:

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