No. 649,763. Patented May 15, 1900.

G. H. SCHARF.

DRAFT REGULATOR.

(Application filed May 22, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

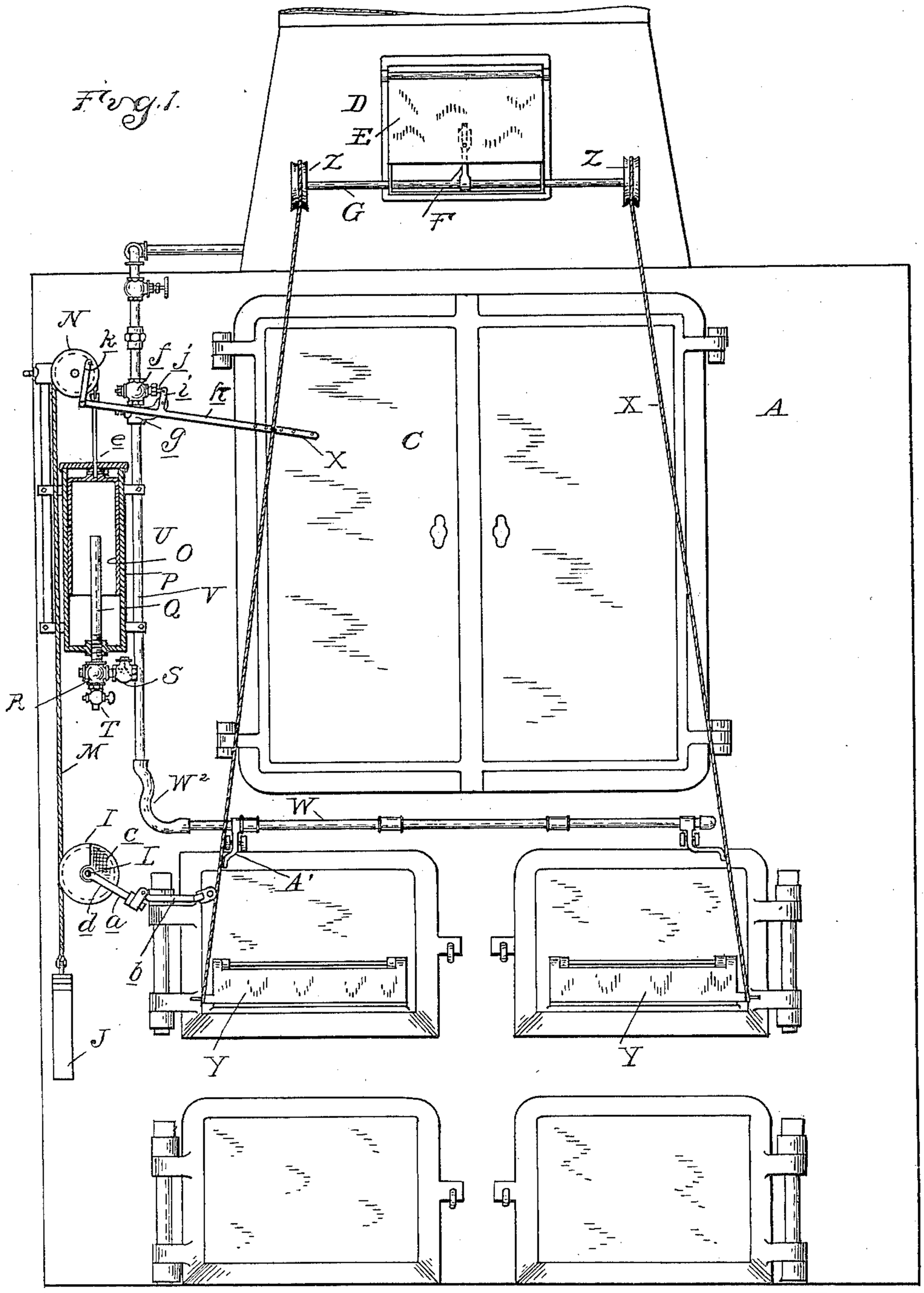

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Fig. 2.

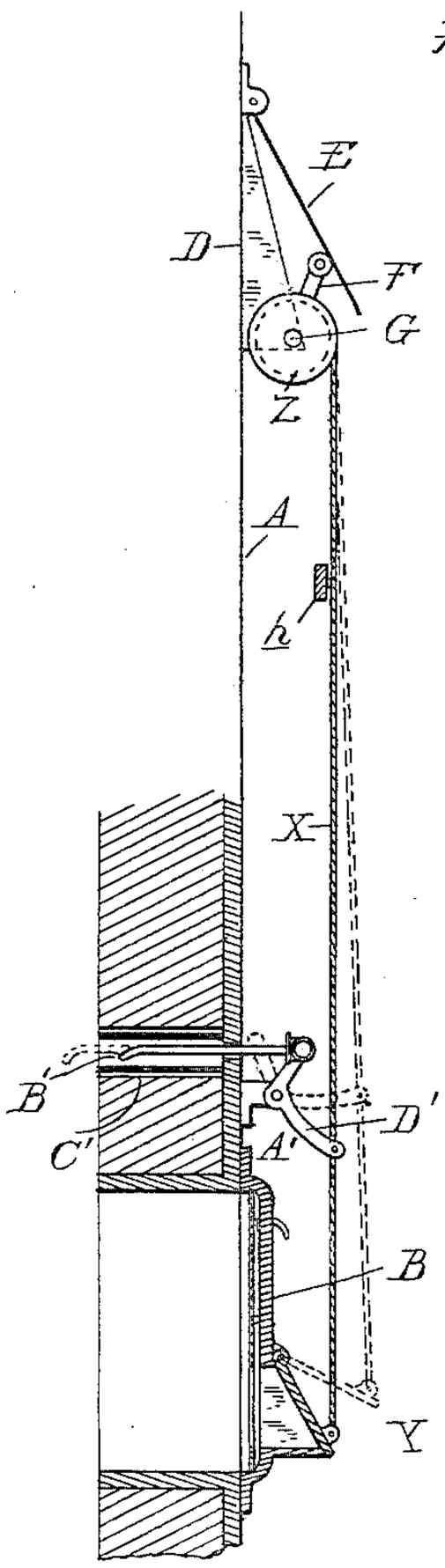


Fig. 3.

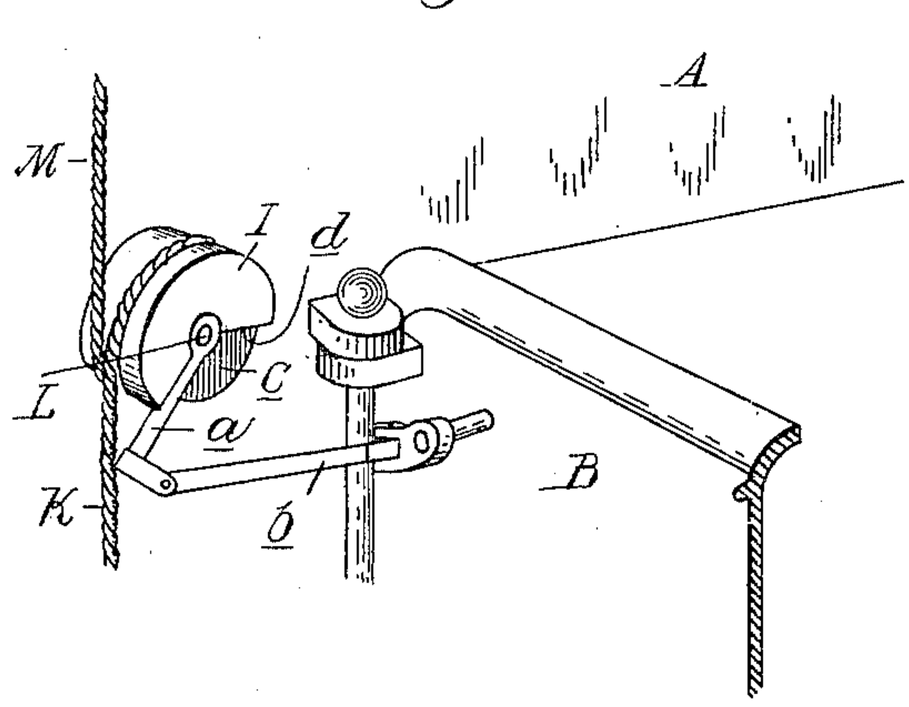
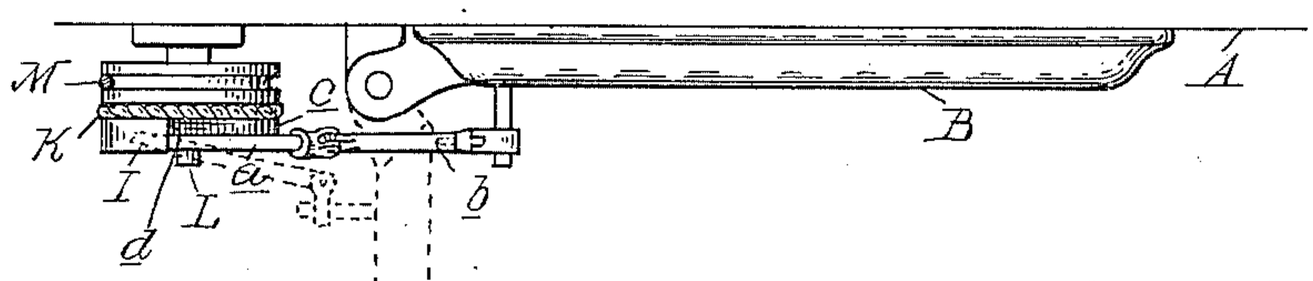


Fig. 4.



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UNITED STATES PATENT OFFICE.

GREGORY H. SCHARF, OF YPSILANTI, MICHIGAN, ASSIGNOR TO THE G. H. SCHARF COMPANY, OF SAME PLACE.

DRAFT-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 649,763, dated May 15, 1900.

Application filed May 22, 1899. Serial No. 717,805. (No model.)

To all whom it may concern:

Be it known that I, GREGORY H. SCHARF, a citizen of the United States, residing at Ypsilanti, in the county of Washtenaw and State of Michigan, have invented certain new and useful Improvements in Draft-Regulators, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists in the construction of a draft-regulator for furnaces, and particularly in the construction, arrangement, and combination of the various parts of the mechanism, as more fully hereinafter described, and set forth in the claims.

In the drawings, Figure 1 is an elevation of a furnace-front, showing my invention applied thereto and showing the tank of the timing mechanism in vertical section. Fig. 2 is a vertical section through the front. Fig. 3 is a perspective view of the connection between the fuel-door and the timing mechanism; and Fig. 4 is a plan view thereof, showing different positions of the parts in full and dotted lines.

The reference-letter A designates the boiler-front, having the usual fuel-feed doors B and flue-doors C, and D is the stack, having a damper E therein of any desired form. I have shown it as a hinged damper for controlling the draft-opening in the stack, the said damper being adapted to close by gravity and to be opened by a rock-arm F on the rock-shaft G.

The damper referred to is operated by the opening of the fuel-door B and is controlled by a timing mechanism, these parts being preferably as follows:

I designates a sheave or wheel carrying the weight J, which latter is suspended from it by a rope or chain K, and L is a shaft mounted near the furnace-door, on which the sheave referred to is loosely sleeved.

An operating connection is formed between the fuel-door B and the sheave, said connection comprising, essentially, two members *a b*, which connect the door with the shaft. The member *b* of the connection has a universal-joint connection with the fuel-door at one end and at the opposite end a similar connection with one end of the member *a*. The opposite end of the latter member is loosely sleeved upon the shaft L.

c designates a segmental recess formed in the sheave I, and the member *a* is so arranged as to lie within said recess and at certain predetermined intervals to abut against the shoulder *d* upon said sheave.

M is a cable extending over the sheave last referred to and upwardly over a similar sheave N, to which it is connected, and at its end the cable is secured to an inverted-bell-shaped weight O, which is located and sealed in oil within the tank P, preferably supported on the furnace-front. The bell-shaped weight is provided at its top with a rod *e*, which extends upwardly and out of the tank, the free end of said rod being attached to the cable M, as described.

Q designates an air inlet and exhaust pipe extending through the lower end of the tank into the weight, the lower end of which is provided with a valve-controlled air-inlet R and a check-valve S.

T designates a stop-cock through which air may be admitted to the bell-shaped weight when desired.

The reference-letter U designates a steam-pipe formed, preferably, in two sections—a steam-supply section V and a discharge-section W. The section V is provided with a globe-valve *f* and a bracket *g*, and *h* is a lever pivotally connected to the bracket by an arm *i*, the upper end of the latter being pivotally connected to the valve-rod *j*.

k designates a link pivoted to the sheave N, and the free end of said link is pivoted to the lever *h*.

X designates cables which connect the draft-dampers Y in the fuel-doors B with the sheaves Z upon the end of the rock-shaft G. The cable X in proximity to the lever *h* is secured to the free end of said lever, as shown in Fig. 1.

The discharge-section W of the steam-supply pipe is supported by means of bell-crank levers A′ upon the front of the furnace and is provided with a series of jets B′, which extend within slots or openings C′, formed in the front wall of said furnace. The flexible connection W^2, in the form of a hose, connects the two pipe-sections to permit of a rocking movement of the crank-levers just referred to.

The arms D′ of the bell-crank levers are each secured to the cables X, as shown in Fig. 2, the parts being so arranged that when

the dampers Y are opened the jets B′ will be extended within the combustion-chamber of the furnace.

The parts having been thus described, the operation of the mechanism is as follows: Upon opening the fuel-door B, the parts being arranged as shown in Fig. 1, the section *a* of the operating connection between the sheave I and the fuel-door is caused to strike against the shoulder *d*, formed upon said sheave, causing the latter to rotate and thereby raise the weight J. The bell-shaped weight O falls within the tank P, the air within said tank being expelled through the check-valve S, and the sheave N is rotated a certain amount. Through the lever connection between the latter sheave and the cables X the rotary movement of the sheave N raises the dampers Y within the fuel-doors, and likewise through the connection between the sheave and the valve *f* the rotary movement of said sheave opens the valve, permitting the steam to enter the furnace. Also the upward movement of the cables X operates the bell-crank levers A′, thereby causing the jets B′ to be projected through the slots in the furnace-wall within the furnace. The damper E in the stack upon the upward movement of the cables X is free to close through the action of gravity. Upon the closing of the fuel-doors B the section *a* of the connection before referred to moves freely within the segmental recess until the said door is entirely closed. The weight J being heavier than the bell-shaped weight O causes the latter weight to rise within the tank P, and the speed at which the bell-weight rises is controlled by the amount of air allowed to enter the bell within the valve-controlled inlet R.

It will be obvious from the description of the invention that as the weight O reaches its initial position the steam will be shut off and the damper E in the stack opened and the draft-dampers Y in the fuel-doors closed. Also the jets B′, which were caused to extend within the furnace during the passage of the steam therethrough, will be withdrawn.

It is to be noticed that the stack-damper employed in my improved mechanism instead of being of the usual type, known as the "butterfly-damper" or one of similar construction, consists of a door controlling an opening formed in the wall of the stack. When it is desired to decrease the draft, the damper, which is in the form of a door, as stated, is opened, which allows a current of cold air to pass into and upwardly through the stack. This air-current cools the stack to a certain extent, and the decreasing of its temperature retards the draft. Thus I have provided means for effectively regulating the stack-draft, which in no way interferes with the passage of the gases and products of combustion through the stack.

What I claim as my invention is—

1. The combination of a stack having a draft-opening formed in the outer wall thereof, a damper controlling the draft-opening in the stack, said damper being normally open, a draft-damper normally closed, an actuating device for simultaneously operating the dampers, a fuel-door controlling the setting of the actuating device, and a retarding mechanism for timing the period of operation of said actuating device.

2. In a furnace, the combination of a steam-supply device arranged adjacent to the combustion-chamber and mounted for insertion within and withdrawal from said chamber, a fuel-door controlling the inserting of the steam-supply device within the combustion-chamber, and a timed actuating mechanism for withdrawing said steam-supply device from said chamber.

3. In a furnace, the combination of a valved steam-supply device arranged adjacent to the combustion-chamber and capable of insertion within and withdrawal from said chamber, an actuating device for alternately projecting and withdrawing said steam-supply device, a fuel-door controlling the setting of the actuating device and a retarding mechanism for timing the period of operation of said actuating device.

4. In a furnace, the combination of a draft-damper, a stack-damper, a valved steam-supply nozzle for delivering steam into the combustion-chamber, said nozzle being mounted adjacent to and adapted to be projected within and withdrawn from said chamber, a single actuating device for operating the dampers and projecting and withdrawing the nozzle, means for setting the actuating device, and a retarding mechanism for timing the period of operation of the actuating device.

5. In a furnace the combination of a draft-damper, a stack-damper, a valved steam-supply nozzle for delivering steam into the combustion-chamber, said nozzle being mounted adjacent to and adapted to be projected within and withdrawn from said chamber, a single actuating device for operating the dampers and projecting and withdrawing the nozzle, a fuel-door controlling the setting of the actuating device, and a retarding mechanism for timing the period of operation of the actuating device.

6. In a furnace, the combination with the combustion-chamber having an opening formed therein, a rocking support adjacent to and arranged transversely of said chamber, a multiple of nozzles mounted upon said support and adapted, upon the actuation of the latter in one direction, to be inserted through the opening into the chamber, and upon the actuation of said support in the opposite direction to be withdrawn from said chamber, a steam-supply pipe connected to the nozzle, and means for rocking the support.

7. In a furnace, the combination with the combustion-chamber having an opening formed therein, a rocking support adjacent to said chamber, a nozzle mounted upon said support and adapted, upon the actuation of

the latter in one direction, to be inserted through the opening into the chamber, and upon the actuation of said support in the opposite direction to be withdrawn from said chamber, a valved steam-supply pipe connected to the nozzle, an actuating device for rocking the support, a fuel-door controlling the setting of the actuating device, and a retarding mechanism for timing the period of operation of the actuating device.

8. In a furnace, the combination with the combustion-chamber having an opening formed therein, a rocking support adjacent to said chamber, a nozzle mounted upon the support and adapted upon the actuation of the latter in one direction to be inserted through the opening into the chamber, and upon the actuation of said support in the opposite direction to be withdrawn from the chamber, a valved steam-supply for the nozzle, a stack and a draft damper, a cable connecting the dampers and the rocking support, a fuel-door, a weight, controlled by the door, for operating the cable in one direction, a counter pulling-weight for moving the cable in the opposite direction, and a retarding mechanism for timing the period of operation of the counterweight.

9. In a draft-regulating apparatus, the combination of a tank partially filled with a sealing fluid and having openings formed in the top and bottom thereof, a bell-shaped weight within the tank, a rod connected to the weight and extending through and closing the upper opening in the tank, an air-inlet pipe located within the lower opening in the tank, said pipe extending upwardly within the weight in proximity to the top of the latter, and below the tank, a valve in said pipe controlling the admission of air, and a check-valve for said pipe.

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

GREGORY H. SCHARF.

Witnesses:
JAMES WHITTEMORE,
M. B. O'DOGHERTY.