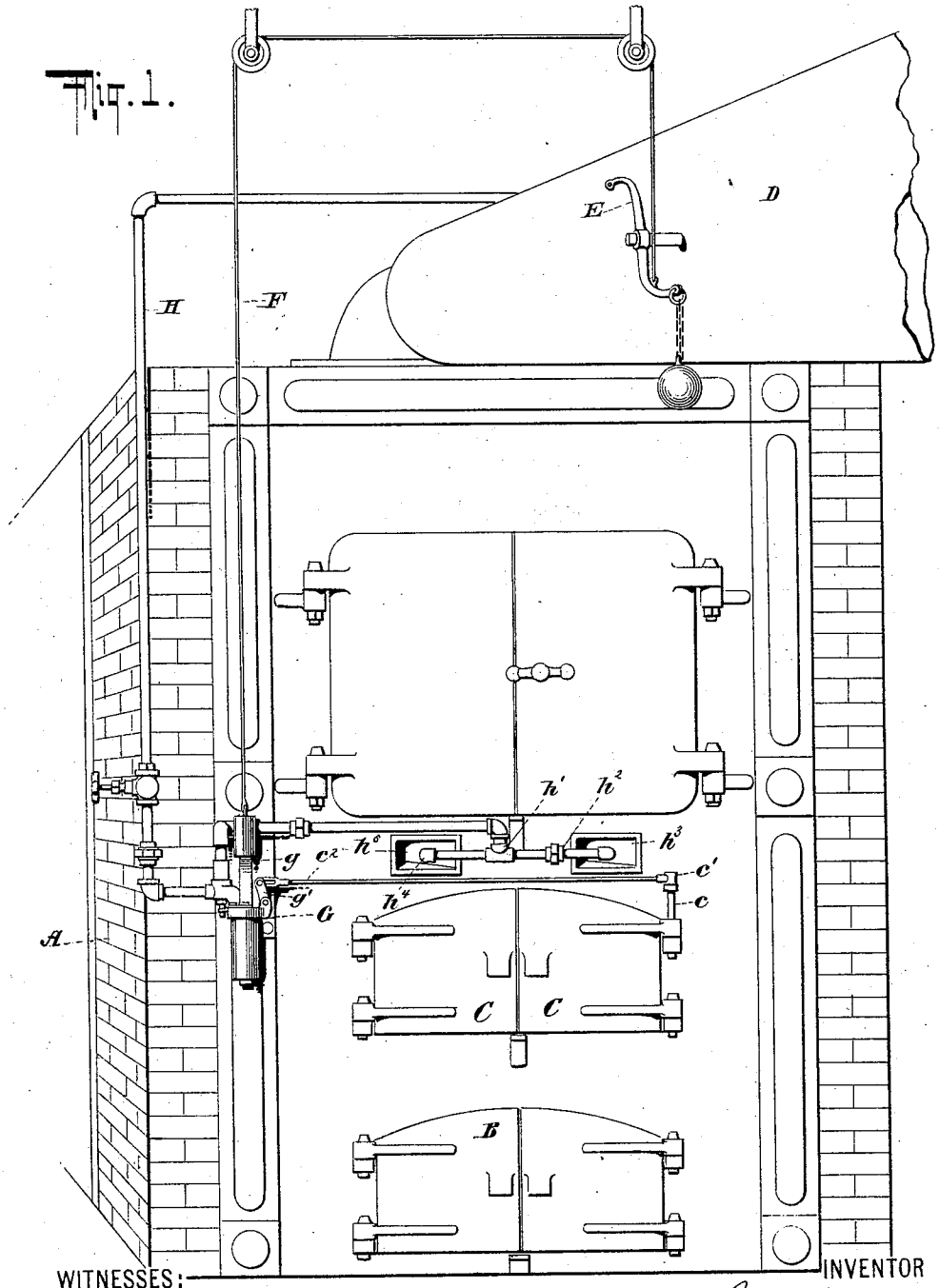
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A. A. FREELAND.

SMOKE CONSUMING APPARATUS.

No. 589,169. Patented Aug. 31, 1897.

Fig. 1.



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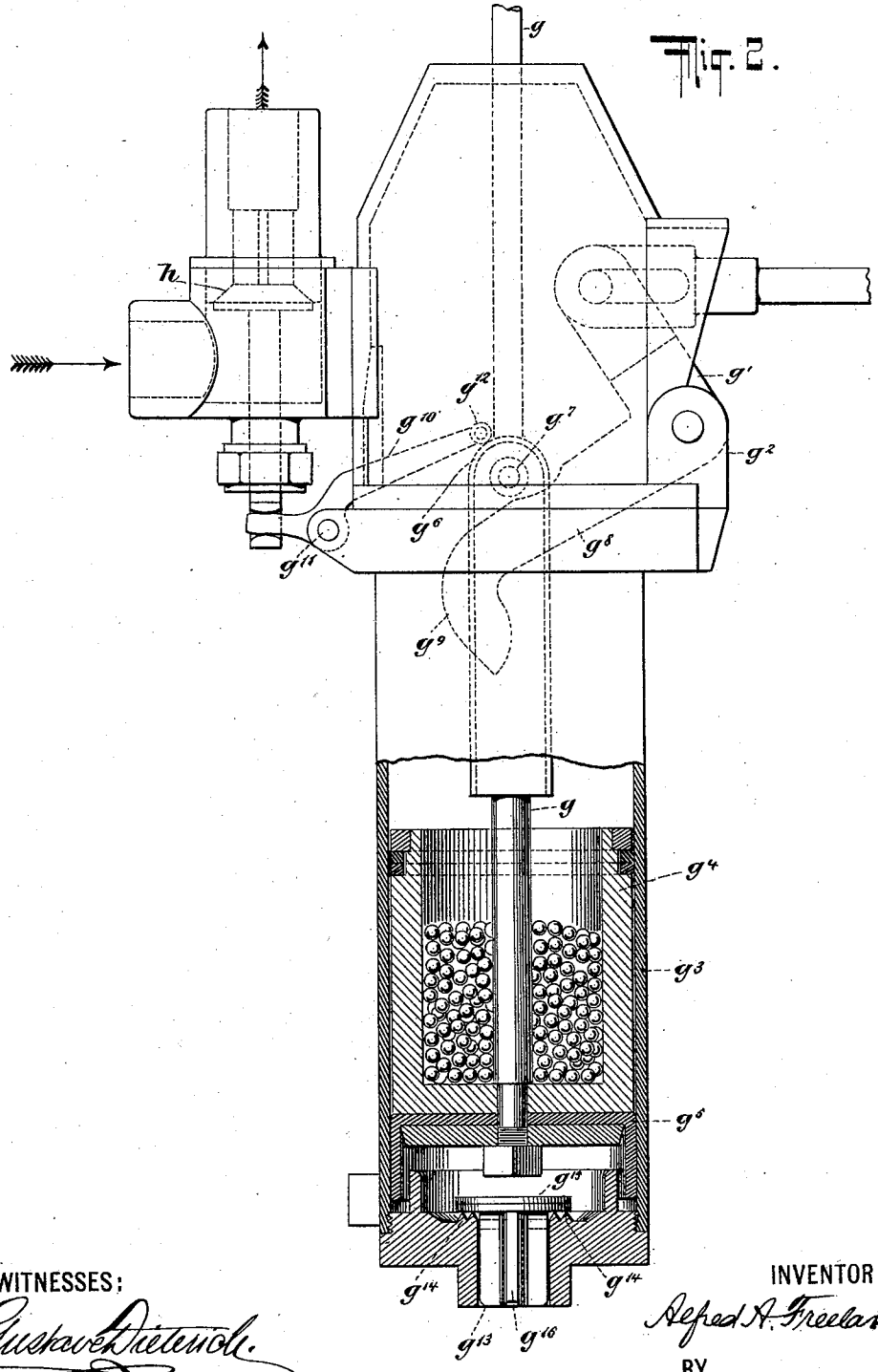
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SMOKE CONSUMING APPARATUS.

No. 589,169. Patented Aug. 31, 1897.

Fig. 2.



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SMOKE CONSUMING APPARATUS.

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Fig. 3.

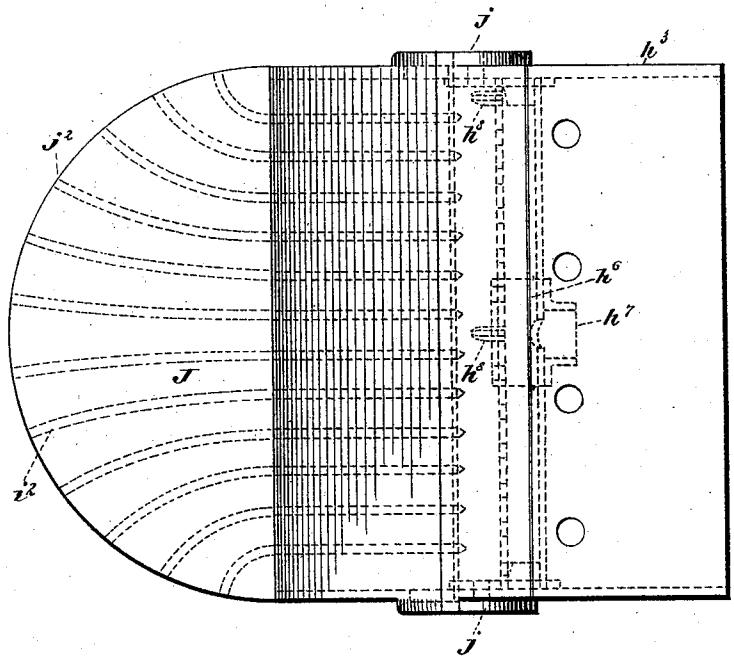
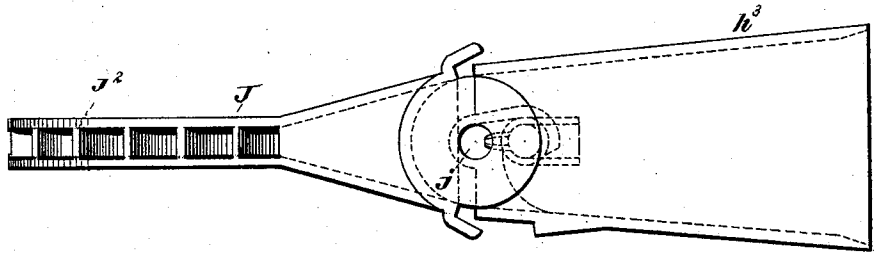


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALFRED A. FREELAND, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO FRANCIS DEIMEL, OF SAME PLACE.

SMOKE-CONSUMING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 589,169, dated August 31, 1897.

Application filed April 6, 1897. Serial No. 630,955. (No model.)

To all whom it may concern:

Be it known that I, ALFRED A. FREELAND, a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Smoke-Consuming Apparatus, of which the following is a specification.

My invention relates to smoke-consuming apparatus, and has for its object to produce a simple efficiently-operating device for consuming smoke.

My invention will be understood by referring to the accompanying drawings, showing an embodiment of my invention.

In the drawings, Figure 1 is a front elevation of my smoke-consuming apparatus. Fig. 2 is an enlarged detail sectional view of the cataract for operating the steam-inlet and the damper. Fig. 3 is a broken-away plan view of the steam and air distributer; and Fig. 4 is a section on line 4 4 thereof, showing the means for adjusting the disburser of the said steam and air distributer to different degrees of inclination corresponding with the requirements of practice.

In the drawings, A is a furnace or boiler provided with any usual ash and furnace doors B C and exit-pipe D. A weighted damper E controls the exit-pipe and is itself controlled by a cord or band or chain, &c., F, connected to the said damper E and operated by the cataract G, to which it is secured by the stem g. Leading from the boiler-dome or other source of dry-steam supply is a pipe H, provided with a check-valve h, (see Fig. 2,) under control of the cataract, as will be described. This pipe H continues to the front of the furnace to the point h', where it may branch, one branch h^2 entering the funnel h^3 in the face of the furnace and the other branch h^4 entering the funnel h^5 in the face of the furnace.

The furnace-door C is provided with a spindle c, turning therewith and carrying an arm c' at its upper end, which is suitably connected, as by means of a link c^2, with an elbow-lever g', (see Figs. 1 and 2,) pivoted upon a bracket g^2 of the cataract, so that when the door is opened it will radiate its spindle c and cause the arm c' to pull upon the link c^2 and swing the elbow-lever g' so as to operate the cataract. The pipes or branches h' enter a header h^6 by the nipple h^7, which header is provided with a number of outlets or nozzles h^8, which discharge into a chambered funnel or disburser J. This funnel or disburser is mounted upon plates j, which are pivotally secured to the funnel-casing h^3, as will clearly appear by an inspection of Figs. 3 and 4.

The disburser J is provided with a series of radiating passages j^2, which serve to disburse or distribute the steam-and-air mixture to the fire, for it will be obvious that as the rear ends of the funnel-casings h^3 h^5 are open to the air the influx of steam from the header will cause an inrush of air through the said funnel-casings, which air will be mixed with the steam and the mixture projected into the fire-box of the furnace. The form of cataract shown in the drawings comprises a cylinder g^3, in which a chambered piston g^4 works, which chambered piston is shown as provided with packing g^5 and a stem g. The chamber of the piston may be suitably loaded, as with lead, shot, or mercury. The stem of the piston g is provided with a cam g^6 and a stud g^7. The stud g^7 is in such position as to be struck by the arm g^8 of the elbow-lever g'. This arm g^8 is provided at its end with a cam g^9, upon which the stud g^7 rides. The stem of the valve h is connected at its lower end to a valve-operating lever g^{10}, which is pivoted on the cataract-casing at g^{11}, and is provided at its free end with a bowl g^{12}, adapted to ride on the cam g^6, so that the said cam will when the stem is moved rock the said valve-operating lever g^{10} so as to pull the valve downward to allow steam to flow through the pipe H into the furnace.

The lower end of the cylinder g^3 is apertured, as with an aperture g^{13}, which aperture within the casing is surrounded by a series of valve-supporting points or studs g^{14}. Resting upon these points or studs is a loose valve g^{15}, having a guide g^{16} projecting into the aperture g^{13}. This valve is freely movable up and down, as will be explained.

Having described the construction and operations of the component parts of the structure, I will now proceed to give the operations of the structure in detail.

It will be understood that my apparatus is

intended to operate to distribute steam and air to the fire in the furnace A when a fresh supply of coal is thrown upon the said fire, so as to cause the fire to fully consume the smoke incident to such piling on of coal, which supply, however, need only be kept up for a short time. When the fire-door C is opened to allow coal to be thrown upon the fire, it thereby swings its pintle c, pulling upon the rod c^2 and swinging the elbow-lever g' on its pivot, thereby bringing the arm g^8 thereof against the stud g^7 on the stem of the piston and raising the said piston, and as the piston is raised suddenly the influx of air through the aperture g^{13} in the cataract-casing will cause the valve g^{15} to rise, thereby allowing the air to rapidly flow into the cylinder. The rise of the piston also brings the cam g^6 against the bowl g^{12}, rocking the lever g^{10} and opening the valve h, which valve is kept open by the bowl g^{12}, resting against the plane face of the cam g^6, while the piston is raised. This opening of the valve allows steam to pass to the distributers, where it is mixed with air and disbursed over the fire, as explained. The rising of the stem g also permits the weighted damper to close. As soon as the furnace-door is shut the rod c^2 is thereby forced to the left and swings the elbow-lever g' to its original position, thereby leaving the piston free to descend, which descent will be slow by reason of the fact that the valve g^{15} drops upon the points or studs g^{14}, so that air can only escape between the said valve and the spaces between the points. As the piston slowly descends the valve will be held open and will not be closed until the bowl g^{12} rides up on the curved portion of the cam g^6, when the steam-pressure will close the said valve h as the piston g^4 reaches its normal position, when the damper will be opened through the medium of its connection F.

It will thus be obvious that for a short time after the closing of the furnace-door the furnace will be supplied with steam and air, which, by the action of the cataract, will be automatically shut off after it has flowed for a predetermined length of time, which is readily arranged by weighting the cataract-piston and limiting the size of the air-exits of the valve.

It will further be obvious that since the joints j of the disburser are friction-joints the said disburser may be adjusted to throw the steam and air in a curtain at various inclinations by inserting a bar into the disburser and prying the said disburser to turn it on its pivot.

What I claim, and desire to secure by Letters Patent, is—

1. In a smoke-consuming apparatus, the combination of air and steam supply devices, of a cataract and an operating device therefor, comprising an elbow-lever g' provided with an arm g^8 in operative relation to the piston of said cataract but disconnected therefrom.

2. In a smoke-consuming apparatus, the combination of a valved steam-supply device, a controlling mechanism therefor comprising a cataract, and valve-operating mechanism for operating the steam-valve, and a cam-lever operating on the cataract but disconnected therefrom, so that the said cataract may be operated and the cam-lever returned to its original position, allowing the cataract to perform its function.

3. In a smoke-consuming apparatus, the combination of a valved steam-supply, a valve-operating lever, a piston, a cam-lever for operating said piston, and a cam moved by the said piston and operating the valve-operating lever, substantially as described.

4. In a smoke-consuming apparatus, the combination of a steam-controlling valve, and means for operating the same, comprising a piston, a cam g^6 moved by the said piston, a valve-operating lever g^{10}, and a cam-lever for moving the piston, all of the said parts being disconnected from each other so as to be movable independently of each other at predetermined times.

5. In a smoke-consuming apparatus, the combination of a steam-regulating valve H, an operating-lever g^{10} therefor, a piston, a cam g^6 moved by the said piston and operating to swing the lever g^{10}, and a cam-lever g^8 for operating the piston combined with a connection with the furnace-door, substantially as described.

6. In a smoke-consuming apparatus, the combination of an air-inlet chamber or funnel h^3, a header therein provided with nozzles, a steam-supply pipe for bringing steam to the header, and a steam-disbursing apparatus having radiating passages located beyond the header and adapted to spread the mixed steam and air in a curtain over the fire.

7. In a smoke-consuming apparatus, the combination of an air-inlet chamber or funnel h^3, a steam-inlet device located in the funnel and adapted to draw air into the funnel, and a disbursing apparatus located beyond the funnel and adapted to distribute the mixed steam and air over the fire, the said disbursing apparatus being pivotally mounted so as to be adjustable, substantially as described.

ALFRED A. FREELAND.

Witnesses:
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MAURICE BLOCK.