

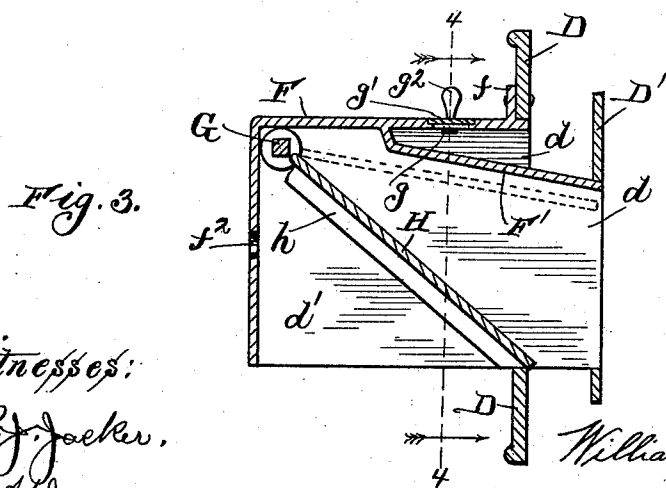
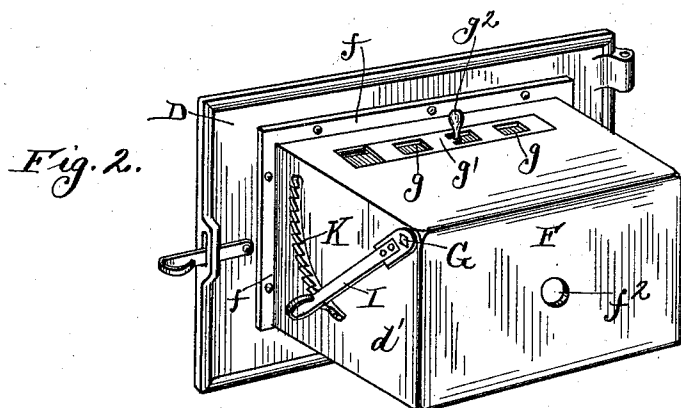
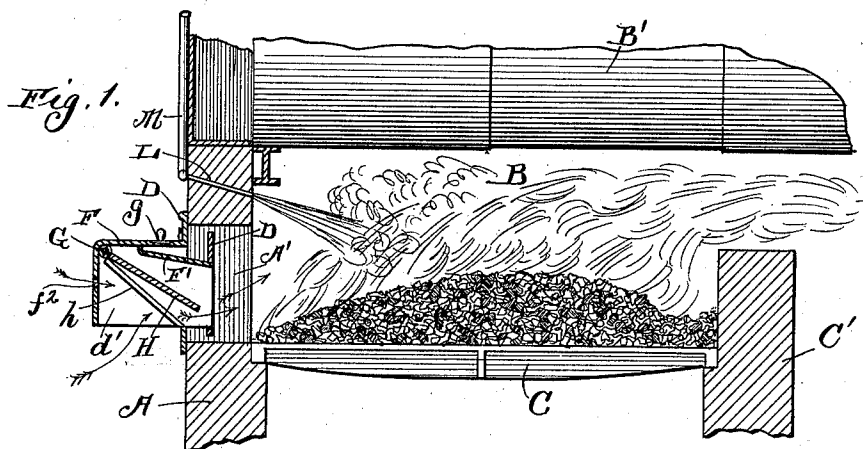
(No Model.)

2 Sheets—Sheet 1.

W. R. MILLS.
SMOKE PREVENTER.

No. 545,967.

Patented Sept. 10, 1895.



Witnesses:

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Fig. 4.

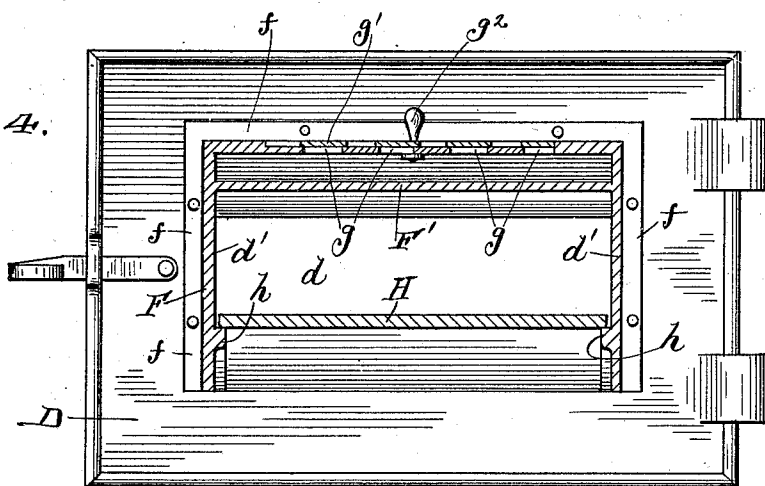


Fig. 5.

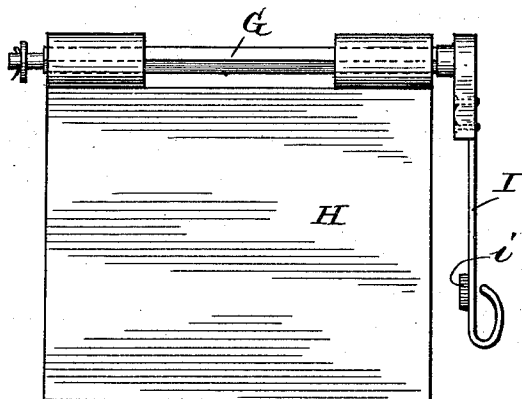
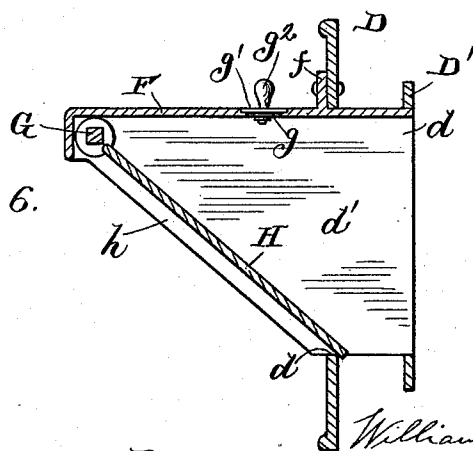


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM R. MILLS, OF CHICAGO, ILLINOIS.

SMOKE-PREVENTER.

SPECIFICATION forming part of Letters Patent No. 545,967, dated September 10, 1895.

Application filed June 12, 1895. Serial No. 552,523. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. MILLS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Smoke-Preventers, of which the following is a specification.

This invention relates to devices to be used on or applied to furnaces to prevent the generation and emission of smoke, and while it is more especially adapted to boiler-furnaces, yet it is applicable to other furnaces; and it consists in certain peculiarities of the construction, novel arrangement, and operation of the various parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The objects of my invention are, first, to provide a smoke-preventer which shall be simple and inexpensive in construction, strong, and durable, yet effective in operation, and, second, such a device by means of which a draft of atmospheric air may be admitted to the furnace and so regulated, treated, and disposed at or over the necessary point of the fire as to continuously and automatically supply a fresh quantity of oxygen at the required point and time, thus preventing the escape of any material quantity of unconsumed particles of carbon or smoke gases, which when once generated cannot be consumed, as is well known.

Still another object of my invention is to provide a device for the prevention of smoke, which may be applied on the outside of the furnace and in such a manner that no changes in the furnace-walls will be required.

Figure 1 is a longitudinal vertical sectional view of a portion of a boiler-furnace, showing my smoke-preventer applied to the door thereof and illustrating its operation and the action of the air on and over the fuel in the grate. Fig. 2 is a perspective view of the smoke-preventer, showing it connected to the furnace-door, the same being detached from the furnace. Fig. 3 is a central cross-sectional view through the door with my attachment thereon. Fig. 4 is a view in front elevation, partly in section, taken on line 4 4 of Fig. 3. Fig. 5 is a view in elevation of the deflecting and adjustable plate used in my smoke-preventer, showing the same detached therefrom

and the lever for adjusting the same; and Fig. 6 is a central cross-sectional view of the furnace-door and preventer attached thereto, showing a modification in its construction.

Similar letters refer to like parts throughout the different views of the drawings.

A represents the front wall of the furnace, which is provided, as usual, with an opening A', through which is passed the coal or other fuel for the fire on the grate-bars. The construction of the furnace may be of the ordinary or any preferred kind, but is usually provided with grate-bars C and a bridge-wall C', which, together with the front and side walls of the furnace form the fire-box B under the boiler B' when the same is used. To the outer surface of the wall A is hinged a door D, which may be made of any desired form and of suitable size to fit the opening A' in the front wall of the furnace. The door D is provided, as usual, with a guard-lining D', which protects the door proper from the effects of the intense heat of the furnace. The door D, as well as its lining D', is formed through its central portion with an opening d of any desired size, but usually rectangular in shape, as is clearly shown in Fig. 4 of the drawings. Around the perimeter of the opening d and to the outer surface of the door is secured a box F, the lower portion of which is open, as shown in Figs. 1, 3, and 6 of the drawings. This box is formed or provided around its sides and upper edge adjacent to the furnace-door with a flange f, through which are passed suitable rivets or bolts for securing the same to the door. The inner surface of the top of the box F is provided with an inclined horizontal floor or partition F', which extends from near the longitudinal center of the box and from side to side thereof inwardly till flush with the inner surface of the lining D', thus leaving a space between the top of the box and said floor or partition to which cold air may be admitted through the openings g in the top of the box, from whence it may pass into the space between the lining and door, as will be readily understood by reference to Fig. 3 of the drawings. The openings g in the top of the box are provided with a sliding door or piece g', having a handle g², by means of which the said openings are opened or closed. Within the box

and near its outer or upper corner is located a rod or bar G, which is preferably square in cross-section in its central part, but is formed cylindrical near its ends, in order to allow it to turn within its bearings, which are in the sides d' of the box. On this bar or rod is secured an adjustable deflecting-plate H, which is of sufficient size to fit snugly within the box and normally to rest its lower portion on the bottom edge of the opening d in the furnace-door. The side edges of the plate H when the same is in its normal position will rest on the cleats h , which are cast or otherwise provided on the inner surface of the sides d' of the box. To one end of the bar or rod G, which extends through one side of the box, is secured a spring-lever or hand-piece I, which is provided on its surface adjacent to the box with a catch or projection to engage the teeth on the ratchet-piece K, which is secured to the outer surface of one of the sides of the box. The rear portion of the box F may be provided with an opening f^2 , through which the fire may be seen when the plate H is raised.

In Fig. 6 of the drawings I have shown a modification in the construction of my smoke-preventer, which consists in forming the box F^2 by omitting therefrom the horizontal and inclined floor F' , which is shown in Fig. 3 of the drawings. When I use this modification, the upper portion of the box is extended on a horizontal line through the opening in the furnace-door till flush with the inner surface of the lining, as shown, and in order to economize in the use of material I sometimes omit the rear or outer portion of the box, so as to give it substantially the form shown in Fig. 6 of the drawings.

Just above the opening A' in the front wall of the furnace is placed one or more steam-pipes L, which terminate at the inner surface of the said wall, and are so deflected as to cause the steam which is passed therefrom to meet and combine with the volume of air admitted through the opening A' and regulated by means of the deflecting-plate H. The steam-pipe M may be provided with a jet, so that a quantity of steam admitted through the pipe may be discharged with considerable force into the fire-box, and may also be regulated as to quantity. By raising the lever or handpiece I the plate H may be raised to any suitable extent and there held by the spring-lever I engaging with the ratchet-teeth on the piece K, thus admitting the draft of air under the lower portion of said

plate, which air will pass directly over the fire, and can be so directed by the deflection of the plate H that it will supply a sufficient quantity of oxygen to the point of the fire at which the same is required as to cause perfect combustion, thereby preventing the escape of unconsumed particles of carbon and smoke gases. By using a jet or jets of steam discharged over the opening A' into the fire-box the same will mingle with the atmospheric air and will so distribute, dispose, and otherwise treat the same as to create complete combustion, which is the main object to be attained in order to prevent the formation of smoke. While I have shown a spring-lever I engaging with the teeth of the ratchet-piece K to adjust the plate H, yet I do not wish to be limited to said means to adjust the same, as I may employ other means therefor without departing from the spirit of my invention. It is also apparent that the jet of steam is not always required, but can be used as the nature of the fire and fuel may demand.

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

1. The combination with a furnace door, having an opening therein and through its guard lining, with a box secured to the door around said opening, and having an opening and a door to close the same in its upper portion, a deflecting and adjustable plate within the box, said plate being secured to a rod or bar located at the outer upper portion of said box, the said rod or bar having its bearings in the sides of the box, and a spring-lever secured to one end thereof and adapted to engage suitable ratchet-teeth and to regulate the angle of the deflection and to lock the plate at said angle, substantially as described.

2. The combination with the door D, having the guard lining D' , and central opening d , through both, the box F, secured to the door around said opening, the partition or floor F' , within the box, the openings g , and the sliding-door g' , in the top of the box, the bar or rod G, having its bearings in the sides of the box and provided with means to turn the same, and the plate H, fixed on the bar or rod G, and normally resting on the lower edge of the bottom of the opening in the door, substantially as described.

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Witnesses:

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