Sept. 22, 1925. 1,554,565

J. W. EBERT

SMOKE AND GAS COLLECTOR FOR FURNACE DOORS

Filed March 9, 1925

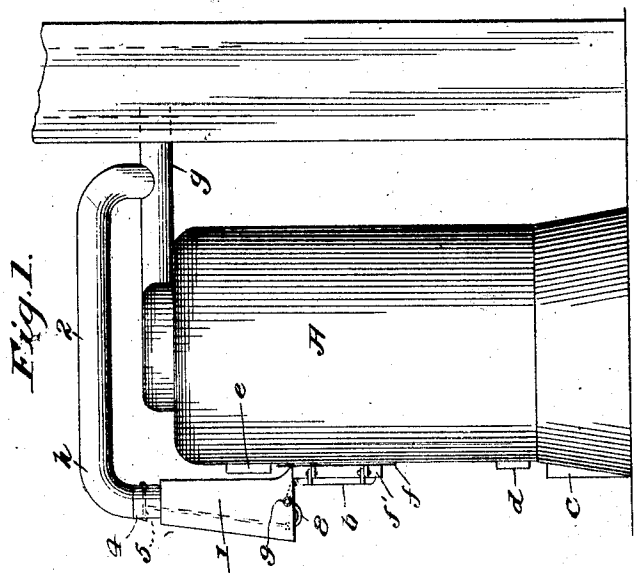


Fig. 1.

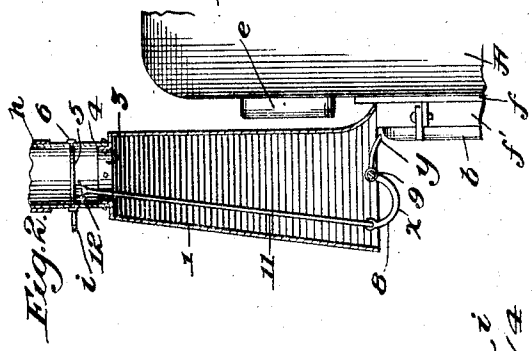


Fig. 2.

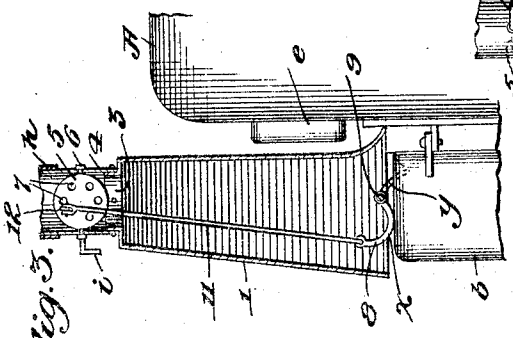


Fig. 3.

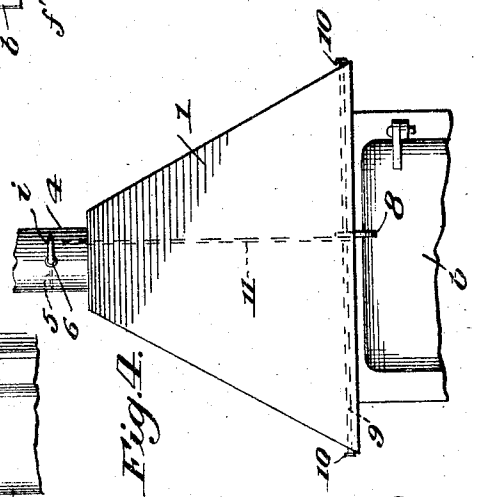


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN WILLIAM EBERT, OF FREDERICK, MARYLAND.

SMOKE AND GAS COLLECTOR FOR FURNACE DOORS.

Application filed March 9, 1925. Serial No. 14,171.

To all whom it may concern:

Be it known that I, JOHN WILLIAM EBERT, a citizen of the United States, residing at Frederick, in the county of Frederick and State of Maryland, have invented a new and useful Smoke and Gas Collector for Furnace Doors, of which the following is a specification.

The present invention is an attachment for furnaces and has for its object the elimination of smoke, gases, fumes and the like which emanate therefrom when the stoking door of the furnace is open.

The present application is an improvement in the construction of such smoke and gas collecting devices as shown and described in my copending application Serial No. 6,748.

The principal object of the invention is the provision of means for automatically opening and closing a draft damper or other means for controlling the draft through the collector when the stoking door of the furnace is opened and closed, whereby no attention or operation is necessary in the use of the invention.

Among the objects of the invention, it is primarily the purpose thereof to provide an extremely inexpensive and simple device of the above stated character which can be installed on the furnace by a layman and which is practically adapted for general use on all types of furnaces, namely, hot-air furnaces, hot water furnaces, steam furnaces, and the like.

The invention further resides in sundry details of construction, combination and arrangement of parts which will appear from this specification and be particularly pointed out in the appended claims.

In the specification and the annexed drawings, the invention is disclosed in the form in which it is considered to be the best, but the invention is not limited to such form because it is capable of being embodied in other forms; and it is to be understood that in and by the claims following the description herein it is intended to cover the invention in whatever form it may embody within the scope thereof.

In the drawings which illustrate the preferred embodiment of the invention as at present devised:—

Figure 1 is a side elevation of a furnace equipped with the invention.

Fig. 2 is an enlarged vertical sectional view through the collector attachment to illustrate the construction of the draft controlling means and its relation with respect to the stoking door of the furnace when the door is normally closed,

Fig. 3 is a similar view to Fig. 2 showing the operation of the draft control means when the door is open, and

Fig. 4 is an enlarged front view of the collector attachment showing its relation with respect to the stoking door of the furnace.

Like characters refer to similar and like parts throughout the specification and drawings.

Referring particularly to the drawings, *a* represents a furnace, here shown as a hot water or steam pipe boiler furnace, having the usual stoking door *b*, ash door *c*, clinker door *d* and soot door *e*, which latter is arranged over the stoker door for the purpose of cleaning out soot, dust and ashes from the heating coils. There may be one or more soot doors *e* according to the size and design of the furnace. All of the above is conventional structure found in furnaces, (even in hot air furnaces with the possible exception of the soot doors *e*), and it is the general construction for the stoking door *b* to be hinged in a frame *f* which is suitably secured to the front wall of the furnace and has a projection or flange *f'* extending therefrom.

The present invention resides in a hood 1 of the general type or design adapted to be disposed immediately above the stoking door and adapted to have one edge thereof, or other suitable portion, engage or rest upon a portion of the furnace, the upper portion of the hood being in communication through a suitable conduit or other means for conveying the gases or the like from the hood by natural drafts therethrough. In the present showing the connection between the hood and the conduit 2 is such as permits the hood to be shifted or disconnected from its normal position shown in the drawings, to enable access to the soot doors *e* for the purpose of cleaning.

The specific construction now contemplated and used consists of the hood 1, made of suitable sheet metal material opened at its bottom or underside and having a width approximately the same or slightly greater than the width of the opening at the stoker door *b*, the side walls of the hood

being tapered from this point upwardly so as to eliminate corners or pockets in which dust, gases or the like, may accumulate while passing upwardly in the hood, thus directing the gases and dust upwardly to a suitable opening 3 in the top of the hood. Rising from the opening 3 is a neck portion 4 which is preferably secured to the hood. The upper end of the neck portion has a sliding fit with the end *h* of the conduit 2. Within the neck 4 is disposed a damper 5 of any desirable construction, preferably as here shown, of the butterfly type, journaled in the side walls of the neck 4 at points 6. The damper 5 is either perforated as at 7 or otherwise suitably constructed to permit a slight draft pass the same, but this is entirely optional with the manufacturer or user. The conduit 2 is connected with the draft flue or other suitable exit opening for the smoke and gases.

The lower edge of the back wall of the hood is slightly extended outwardly and laterally or otherwise provided with a suitable projection, indicated at 5, which is adapted to rest upon the frame flange *f'* of the stoker door *b*, or any other projection or abutment on the furnace at a point above the door *b*. It will thus be seen that the hood 1 is normally held in position by reason of its connection with the end *h* of the conduit 2 and by reason of the lower end of the hood resting upon a permanent portion of the furnace immediately above the door *b*.

It is common knowledge that when the stoking door *b* is opened for any purpose, particularly when refueling, the fire, smoke, gas, and other fumes emanate from the door, which fill the furnace room and in domestic houses frequently find their way into the living rooms, thus tarnishing silver, killing plant life and having other detrimental effects, and when wood and soft coal is used, flame flares spring from the door. This gas, smoke, fumes and flares are by the present invention drawn into the hood and conveyed by reason of the draft therethrough into the chimney flue *g*, when the damper 5 is opened.

Means are here provided for automatically operating the damper 5 from the opening and closing movements of the door *b*. For this purpose there is provided a cam lever 8 bent on a compound curve or ogee formation and mounted intermediate its ends for pivotal movement on a rod or shaft 9. The rod 9 extends across the mouth or underside of the hood 1 and is supported at its ends in the side walls of the hood as at 10, but any other form of support for the pivot of the lever 8 may be provided. The lever 8 is connected to the damper by means of a link rod 11, connected at one end to the lever 8 and having its other end suitably pivotally connected to the damper as at 12.

One curved end portion *x* of the lever 8 is arranged, when the door *b* is in normally closed position, to lie in the path of the swinging movement of the door and to be engaged preferably by the upper edge of the door, as indicated in Fig. 3. The other end portion *y* of the lever lies, in the normal position of the door *b*, shown in Fig. 2, out of its path of movement, but is moved downwardly into the path of the closing movement of the door, when the end *x* is engaged by the opening movement of the door and swung upwardly to open the damper 5, as indicated in Fig. 3. Therefore, it will be clear that by this construction the door *b*, when swung open, will engage the cam surface *x* of the lever 8 and swing it upwardly on its pivot, which movement is transmitted through the rigid rod 11 to the damper 5 which is opened thereby; and, when the door *b* is closed the cam end *y* is engaged thereby swinging the lever 8 oppositely, and through the rod 11 closing the damper 5 to the position shown in Fig. 2.

When it is desired to clean the heating coils, access to the soot door *e* is readily permitted by simply lifting the hood 1 to disengage the portion 5 thereof from the flange *f* and then draw the hood downwardly to disengage the neck 4 from the end wire of the conduit 3. Obviously the hood can be replaced with the same facility.

From the foregoing it will be observed that a very simple, economical and practical device has been provided for use in connection with furnaces of all types, for the purpose of eliminating smoke, gas, dust and the like which emanates from the stoking door when the latter is opened, and that the use of the present invention will encourage a more universal use of soft coal for domestic purposes.

It is also manifest that the present invention may be used as a "check draft" device when installed on furnaces not otherwise equipped with the same, by a manual manipulation of the damper by means of the handle *i* or by the lever 8.

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

1. A collector device of the kind described comprising a hood adapted to be positioned adjacent a door of a furnace and to be connected to the flue thereof, means for controlling the draft through said hood, and means connected with said draft control means and positioned to be operated by the opening and closing movements of the furnace door for actuating said draft control means.

2. A collector device of the kind described comprising a hood adapted to be positioned

above the stoking door of a furnace, means connecting said hood with the draft flue of the furnace, and draft control means for regulating the draft through the hood, and a movable member on the hood having a part normally in the path of movement of the stoking door, whereby said part is engaged by the door and shifted when the latter is opened, a connection between said part and said draft control means, whereby the latter is opened upon said movement of said part, and another part movable between the door and the furnace by said movement of said first part to be engaged and shifted by the door upon the closing movement of the latter, whereby said draft control means is closed.

3. A collector device of the kind described comprising a hood-like member adapted to be positioned adjacent the stoking door of a furnace and to be connected to a suitable exit, draft control means for regulating draft through said hood, a movable member on the hood having parts thereof to lie on opposite sides of the furnace door and in the path of movement thereof according to the position of the door, said parts being engageable by the door and shiftable alternately to said positions thereby, and a connection between said member and said draft control means whereby the latter is operated.

4. A collector device of the kind described comprising a hood to be positioned above the stoking door of a furnace, said hood having a relatively small upper end, a damper pivoted in said end of the hood, a trip lever extending in a substantially compound curve pivotally mounted intermediate its ends on the hood, one end portion of the lever being extended to lie in the path of opening movement of the furnace door when the hood is in position, whereby said lever is engaged and moved by said furnace door, the other end of said lever being extended to be moved in the path of the closing movement of the furnace door by said shifting movement of said lever, and vice versa, and a link connection between said lever and said damper whereby the latter is opened and closed by the movements of the furnace door.

5. A collecting device of the kind described comprising a hood to be positioned above a door opening, said hood having a relatively small upper end, a damper pivotally mounted in said end of the hood, a rod extending across the lower end of the hood, a trip lever pivotally mounted intermediate its ends on said rod, a link connection between said lever and said damper, one end portion of said lever being extended to lie in the path of the opening movement of the door, the other end portion of said lever being adapted to be shifted in the path of closing movement of said door when the other end portion of the lever is engaged and moved by the opening movement of the door, and conversely.

In testimony whereof I have hereunto set my hand.

JOHN WILLIAM EBERT.