(No Model.)

2 Sheets—Sheet 1.

W. VOGEL.

OIL BURNING APPARATUS.

No. 416,876. Patented Dec. 10, 1889.

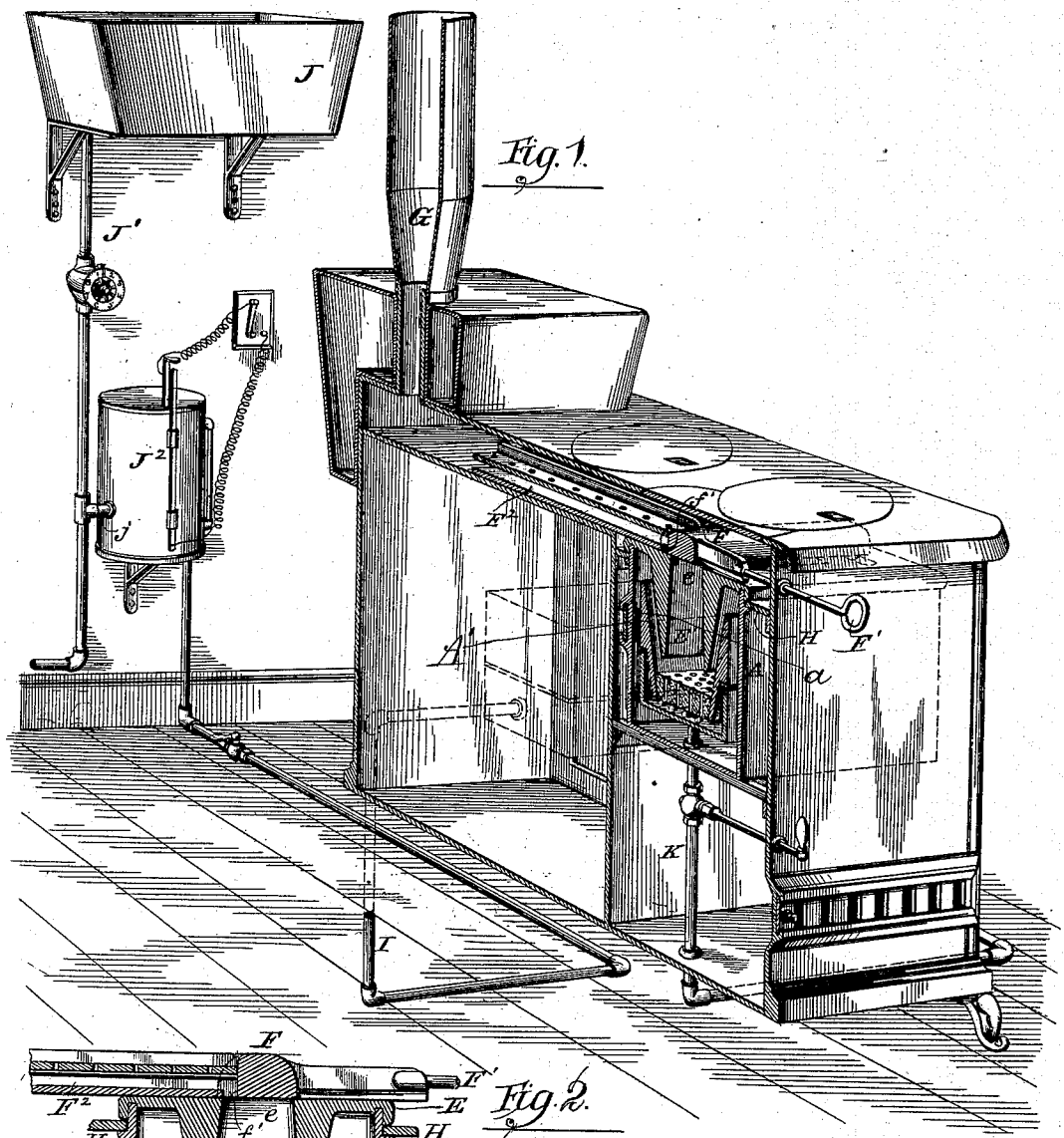
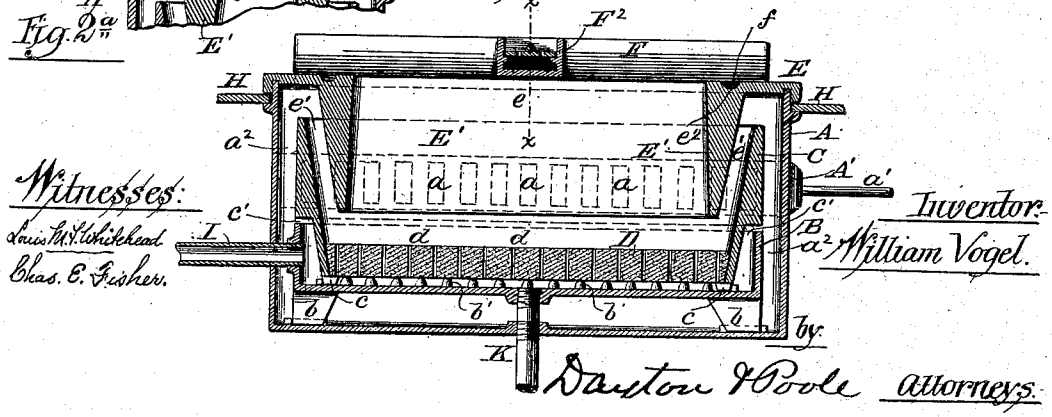


Fig. 1.

Fig. 2.

Fig. 2a.



Witnesses:
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N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

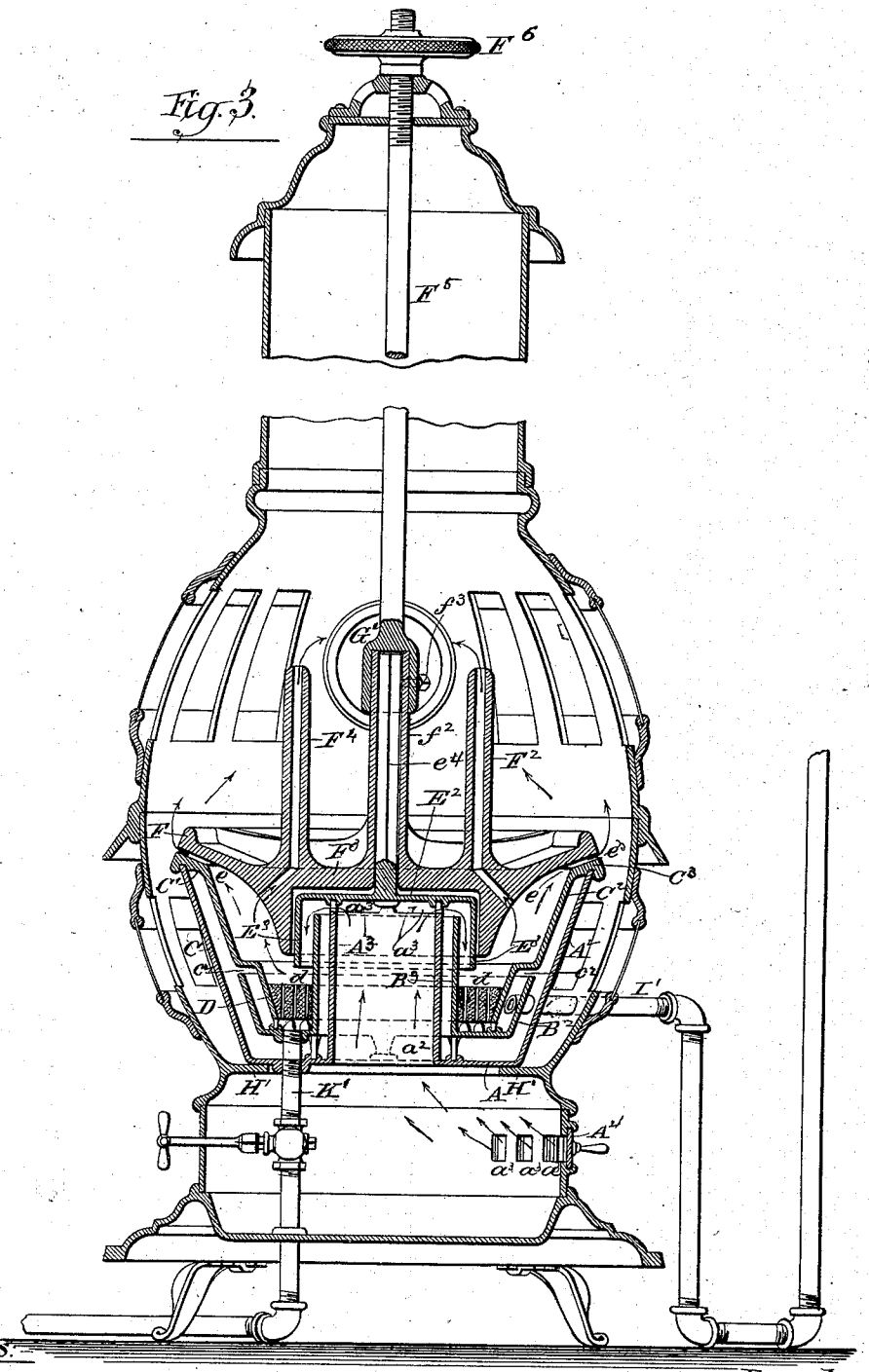
2 Sheets—Sheet 2.

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Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM VOGEL, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE VOGEL PETROLEUM HEATING COMPANY, OF SAME PLACE.

OIL-BURNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 416,876, dated December 10, 1889.

Application filed August 5, 1886. Serial No. 210,046. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM VOGEL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Oil-Burning Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to apparatus for burning oil in stoves, furnaces, and heaters.

Its object is to provide improved construction in such apparatus; and it consists in the matters hereinafter set forth and claimed.

The accompanying drawings illustrate only two of many possible adaptations of the burning devices—namely, one suited to a cooking-stove and the other to a heating-stove; but other modifications of the invention have been made, adapting it to heating air in furnaces, car-heaters, &c., and to other situations.

In said drawings, Figure 1 is a central vertical section running from front to rear of a cooking-stove, shown in perspective, and containing that form of my improvement in oil-burners which is preferred for this particular use, together with a perspective view of one form of automatic oil-feeding devices. Fig. 2 is a vertical section of the oil-burning chamber shown in the stove of Fig. 1, looking from the rear to the front of the stove, said section of Fig. 2 being taken transversely to the stove or lengthwise of the burning-chamber and in a vertical plane at the rear of the slide when the latter is drawn to its extreme forward position. Fig. 2^a is a fragmentary vertical central section taken on the line $x\ x$ of Fig. 2. Fig. 3 is a central vertical section of a heating-stove having the oil-burning devices of my invention applied thereto in a form suited to this particular shape of stove.

First describing the devices shown in Figs. 1, 2, and 2^a of the drawings as the preferred form of embodiment of my invention for its application in a cooking-stove of the description there shown, A is an oblong rectangular box of cast-iron, having its sides and bottom cast in a single piece, or without joint and without a top. On one or more of its sides is a series of openings $a\ a$, Fig. 1, (indicated by dotted lines in Fig. 2,) over which is placed a similarly-apertured slide A′, Fig. 1, serving as a damper or register and provided with a handle a', projecting through the side of the stove, by which it may be operated.

B is a smaller rectangular open-topped and relatively shallow cast-iron box provided with legs b, which support it from the bottom of the box A, and also provided with studs b' upon the upper surface of its bottom.

C is a cast rectangular frame without bottom or top, still smaller than the box B and standing within the latter, being provided with short legs c at the corners to afford a passage beneath it.

At c' a space or passage is shown between the frame C and the upper edge of the box B.

D is a vertically-perforated bed, which may be of cast-iron, but which is preferably of porous material—say of fire-brick or asbestus—filling or nearly filling the opening in the bottom of the frame C and resting upon the studs b'.

E is a centrally-open top plate fitted to the box A and provided with a deep flange E′ around the rectangular opening e which flange depends within the box B, but desirably not so far as the level of the upper edge of said box. There is a space e' provided between the flange E′ and the frame C, and said frame C does not rise to the top plate E. The said frame C and plate E, provided with a flange E′ in the instance illustrated, together form a burner-casing—that is to say, said parts constitute the walls of a combustion-chamber, within which walls is formed a space or passage e' for the influx of air to the combustion-chamber. Air admitted through the register-passages $a\ a$ may therefore rise through the outer passages or space a^2 and pass down the passages e' to the upper surface of the bed D, and may thence rise through the central opening e of the top plate.

F is a slide of suitable size to cover the opening e and fitted to move back and forth

on the top plate E, being guided in its movement by ribs *f*, running in grooves e^2.

F′ is a rod or handle which projects through the front plate of the stove, by which the slide F may be operated.

F^2 is a passage (shown in the form of a tubular appendage of the slide F) extending back between the top plate of the stove and the oven-plate to a point near the outlet-flue G of the stove. Said tube F^2 is provided with a downward extension *f*′ of its passage, leading through the slide F, just within the line of the rear margin of the latter, as shown in Fig. 2^a, whereby when said slide is drawn forward so as to cover the opening *e* said opening *e* will have communication with the space between the upper part of the casing A and the surrounding walls of the stove.

I is an inlet-pipe leading from a source J of oil-supply and delivering into the inner box B, as seen in Fig. 2.

K is a valved outlet-pipe leading downward from the bottom of the outer box A.

Describing next the operation of the burning devices here illustrated and above pointed out, oil is admitted to the box B through the pipe I under control either of the hand or of suitable automatic regulating devices. The oil so admitted is preferably sufficient in quantity to enter the perforations *d* of the bed D, which in the continued operation of the fire becomes highly heated. The oil being ignited, the flame therefrom is supplied with oxygen by the air admitted through the register-openings *a a* and passages *e*′, and said flame ascends in the space *e*. If the slide F be pushed back, so as to give egress to the flame, the latter will rise through the opening thus afforded and pass back beneath the top plate of the stove; but if the slide be drawn forward, so as to close the opening *e*, the flame and products of combustion will rise through the passage *f*′ and pass back through the tube F^2 to the outlet-flue G. The volume of flame will obviously vary with the position of the slide F, as well as with that of the draft-register slide A′, and the volume of the flame is therefore under full control of the operator. When the bed D is sufficiently heated, the oil will be vaporized in the small passages *d*, and if an excess of oil is admitted to the box B it will overflow through the passage *c*′ into the outer box A, where it will be vaporized. Rising in the passage a^2, the vapor will enter the combustion-chamber with the air-supply and will be burned.

The pipe K serves to occasionally draw off the tar-like residuum which will accumulate in the box B from burning heavy oils. The air for supporting combustion in its passage through the space *e*′ moves over the surface of the flange E′, which, being very hot, raises the temperature of the air, so that it makes its exit from the said passage in a heated state, with the effect of facilitating the rapid and complete combustion of the oil. The flange E′ not only serves to heat the air passing through the passage *e*′, but also acts to deflect or carry the air downwardly to a point near the top of the porous or perforate bed, thereby supplying the air at a place most favorable for the perfect combustion of the oil rising through the bed.

Next describing the construction shown in Fig. 3, which is a desirable form of the burning devices of my invention, suited to be inserted in the familiar circular form of heating-stove there shown, it will be first observed that provision is in this case made for directing the flame against the lateral heating-plate of the stove, and that to this end the air is admitted through a central space instead of through a surrounding or lateral space, as in Fig. 1.

As an incident to the form of this stove, the various castings entering into the burner in this adaptation of the device are shown circular instead of rectangular. The box A^2 is provided with a central tube A^3, open at the bottom and top, and a top plate E^2, having an annular form, of the depending flange E^3 sets over this tube to deflect the air which passes through the suitable side openings a^3 at the upper part of the tube A^3 downward to the lower part of the fire-chamber. The box B^2 is also annular in form and has a tubular inner wall B^3 surrounding the tube A^3, desirably at a little distance therefrom, as shown. The frame C^2 is in this case constructed with a flange C^3, which rests on the outer wall of the box A^2, since the air being admitted at the middle of the device, there is no need of the space at the upper edge of this frame C^2 to admit the air, as in Figs. 1 and 2. The perforated bed D is of course annular as an incident to the central air-feed. The circular and vertically-movable plate F^3 answers to the slide F of Fig. 1 and its vertical tubes F^4 to the tube F^2 of Fig. 1, terminating near the outlet-flue G′ of the stove. The plate F^3 of Fig. 3 extends over the flange C^3, and by its vertical movement may be made to open or close the passage e^3, by which the flame escapes from the combustion-chamber into the general interior of the stove.

F^5 is a rod for lifting and lowering the plate F^3, said rod being connected with a central vertical guide-tube f^2 on the plate F^3 by a fastening at f^3, and provided with a screw-threaded hand-nut F^6 above the top plate of the stove. The plate E^2 is provided with a vertical projection e^4, which enters the guide-tube f^2, and thereby keeps the plate F^3 horizontal, and said projection is shown to be square in cross-section and fitted loosely to a correspondingly-shaped interior of the guide-tube f^2 as a means of keeping the plate F^3 from rotating when the hand-nut F^6 is turned. The same passage (in this case lettered c^2) is provided between the edge of the box B^2 and the frame C^2, and a similar feed-pipe I′ and discharge-pipe K′ are employed, as in Figs. 1 and 2. The air-register a^3 A^4 is in this case shown to be located in one of the walls

of what is commonly the ash-box of coal-stoves of this form, and the inwardly-projecting flange H′ serves to cut off this air-entrance chamber from the general interior of the stove, to which the flame passes from the opening a^3.

From the two illustrations of the oil-burning devices of my invention furnished by the figures above described it is evident that formal varieties of said invention may be made without departure from its essential principle. These drawings, in fact, show the burning devices applied to stoves not originally constructed for them. When the stove structure is specially contrived for the burner, certain parts—as the outer box A of Fig. 2 and the tube F^2—may manifestly be made part of the main stove structure.

Certain forms and adaptations of the invention not here illustrated will be shown in other applications for patents and will furnish the subjects of claims in such separate patents.

The particular form of burning device illustrated in Fig. 3 is described and claimed in a separate application for patent, Serial No. 210,047, filed simultaneously herewith.

It is to be particularly noted that the bed D may consist of a body of sand occupying the entire width of the box B and resting on its bottom. The interstices of the sand body will answer to the perforations *d* and the space beneath said bed when of brick, as shown.

Any suitable or preferred means for regulating the supply of oil to the burner or fire-box may be employed in connection with the oil-burning apparatus above described. In Fig. 1, for instance, J is a vessel into which any desired quantity of oil may be poured, and which flows through a pipe J′ to the vessel J^2, and thence through the pipe I to the burner. Said vessel J^2 will in this instance be provided with an electrical controlling device adapted to operate a valve controlling the inflow of oil from the pipe J′ through its branch *j*.

I claim as my invention—

1. An oil-burning apparatus for stoves, heaters, and the like, consisting of an oil-holding box or receptacle, and a burner-casing having walls forming a combustion-chamber over the said box or receptacle and having a passage for the admission of air opening into the bottom of the combustion-chamber adjacent to said oil-holding box or receptacle, said air-passage being extended along or over a wall or walls of the combustion-chamber, whereby the air is thoroughly heated before it reaches the point of combustion, substantially as described.

2. A burner comprising an oil-holding box or receptacle, means for supplying oil to the receptacle, and a burner-casing forming a combustion-space above the receptacle, said casing being provided with an air-inlet passage extending along and over a wall or walls of the combustion-chamber and leading downwardly to the top of the receptacle, substantially as described.

3. A burner comprising an oil-holding box or receptacle, means for supplying oil to the said receptacle, and a burner-casing forming a combustion-chamber above the receptacle and comprising a depending flange or deflector E′, said casing being provided with an air-inlet passage leading to the upper part of said flange and downwardly along the outer surface of the same, whereby the air is heated before it reaches the burning oil and is directed downwardly upon the latter, substantially as described.

4. A burner comprising an oil-holding box or receptacle, means for supplying oil to the said box or receptacle, a burner-casing forming a combustion-chamber above the receptacle and comprising a depending flange or deflector E′, and a movable part covering the opening at the top of said chamber, substantially as described.

5. The combination of an oil-holding box or receptacle, means for supplying oil to the receptacle, and a burner-casing forming a combustion-chamber above the receptacle and comprising a depending flange or deflector E′, and a wall (as shell C) located exterior to the deflector and forming therewith a passage *e′* for the downward passage of air to the place of combustion, substantially as described.

6. The combination, with an inclosure, as a stove, having an escape-flue, of an oil-burning mechanism located within the stove and comprising a combustion-chamber, a flame-outlet from said chamber, a movable part controlling the size of the flame-outlet, and a passage leading from the combustion-chamber to the vicinity of the escape-flue of the stove.

7. The combination of an outer box A, an inner box B, a frame C, descending in the box B, a perforated bed D, located in the lower part of the frame C and having a space beneath it, an oil-inlet passage communicating with this space, an air-inlet passage, a deflector E′, in position to direct the air toward the upper surface of the bed, and a movable part F, arranged to control the outlet *e*, leading from the combustion-space over the bed D.

8. The combination, with the boxes A and B, having a space between them, frame C within and smaller than the box B, giving the passage *c′*, perforated bed D, supported clear of the bottom of the box B, oil-supply pipe delivering into the box B, outlet-pipe leading from the bottom of box B, and air-duct delivering into the space above the bed D.

9. The combination, with an inclosure, as a stove, having a rear escape-flue, of an oil-burning device located at the front of the stove and having an upwardly-opening combustion-chamber, a passage leading from the combustion-chamber to the vicinity of the

stove-flue, a movable cover for closing the upward opening of the combustion-chamber, and means for actuating said cover from the exterior of the inclosure or stove.

10. The combination, with a stove having a rear escape-flue and with an oil-burning device located at the front of the stove and having an upwardly-opening combustion-chamber, of a slide adapted to close the top of the combustion-chamber, and a tubular projection on said slide extending to the vicinity of said flue and provided with a passage at its front end which gives communication with its interior with the combustion-chamber when the slide covers the upward opening of the latter.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

WILLIAM VOGEL.

Witnesses:
M. E. DAYTON,
C. CLARENCE POOLE.