

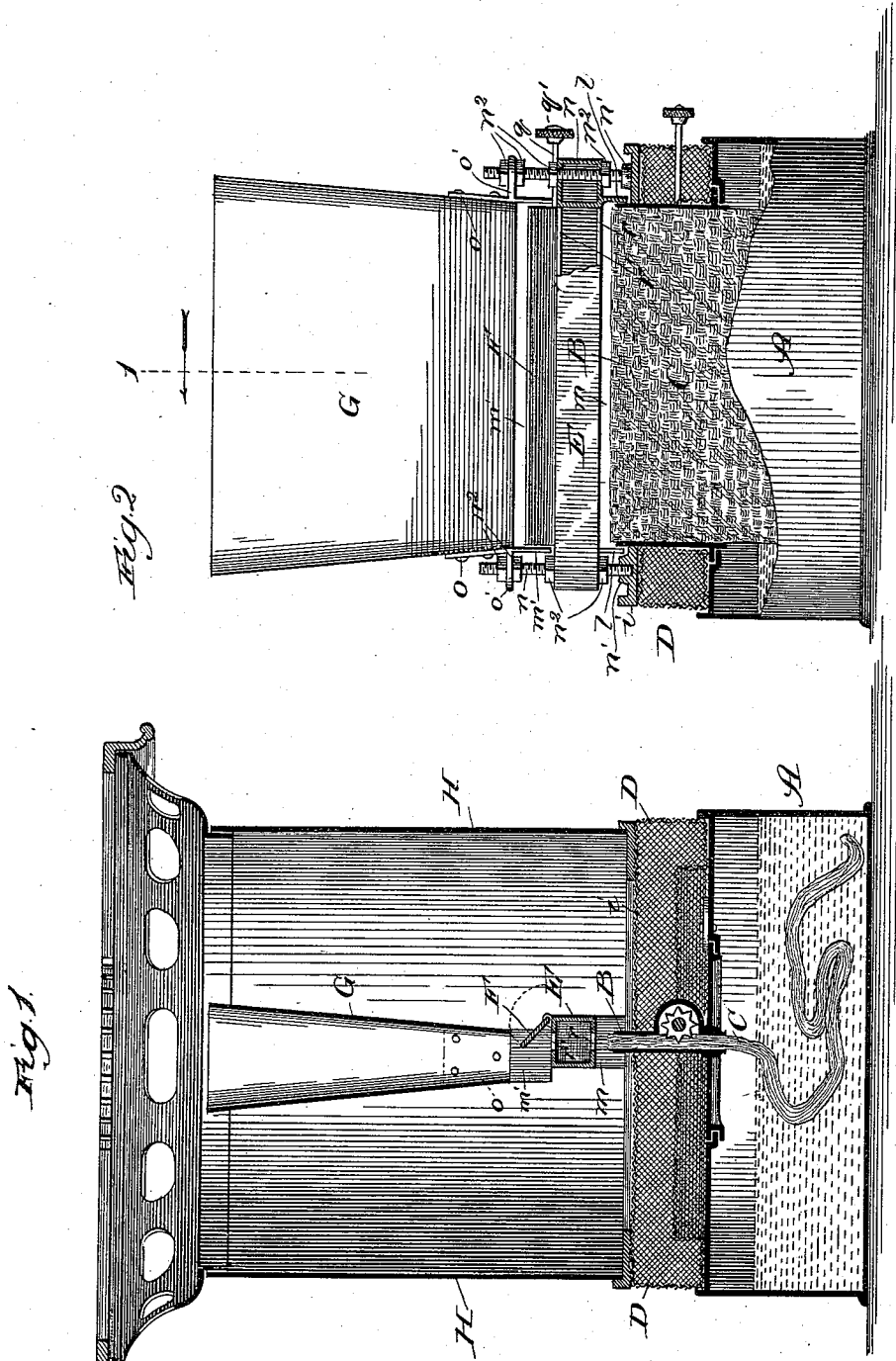
(No Model.)

2 Sheets—Sheet 1.

J. J. BUSENBENZ.
OIL BURNER.

No. 429,302.

Patented June 3, 1890.



Witnesses:
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Att'ys.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

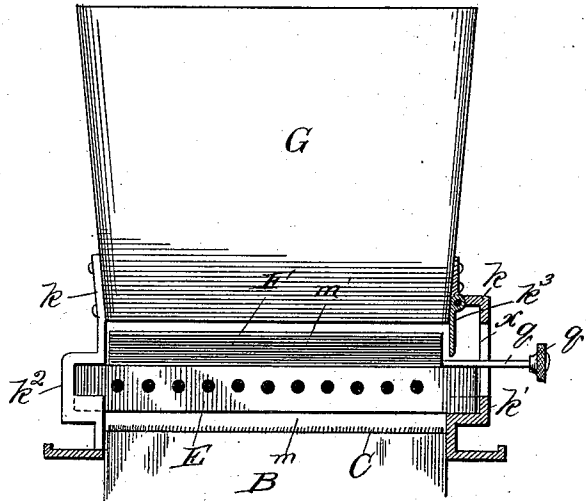


Fig. 4.

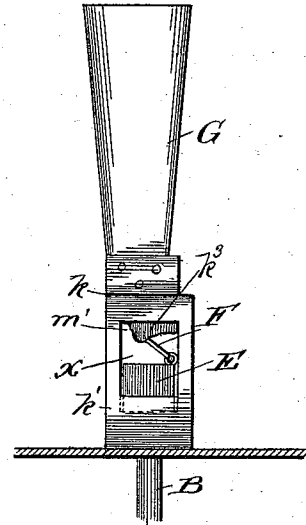


Fig. 5.

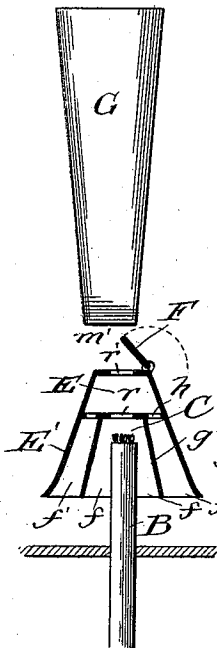


Fig. 6.

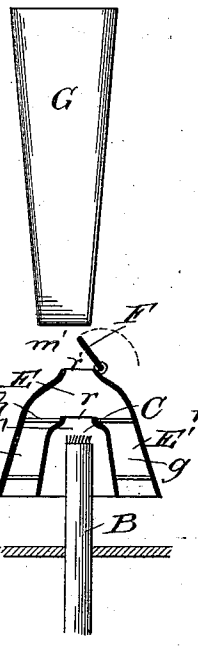


Fig. 7.

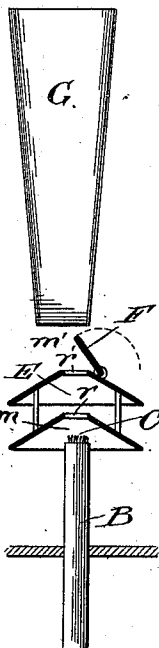


Fig. 8.

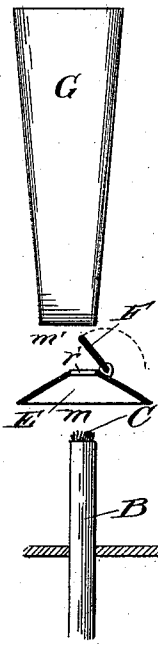
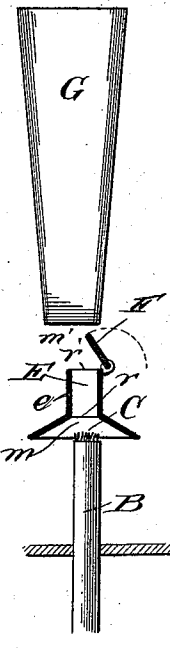


Fig. 9.



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UNITED STATES PATENT OFFICE.

JACOB J. BUSENBENZ, OF CHICAGO, ILLINOIS.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 429,302, dated June 3, 1890.

Application filed December 24, 1889. Serial No. 334,821. (No model.)

To all whom it may concern:

Be it known that I, JACOB J. BUSENBENZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Oil-Burners, of which the following is a specification.

My invention relates to an improvement in the class of devices for burning oil (hydrocarbon as well as other oils) for heating purposes; and the object of my invention is to secure improved combustion of the oil.

In the accompanying drawings, Figure 1 is a view in sectional elevation, showing an oil-burner in the form of an oil-stove provided with my improvement in its preferred form, the section being taken at the line 1 of Fig. 2 and viewed in the direction of the arrow; Fig. 2, a view in broken sectional elevation of the burner and oil-reservoir; Fig. 3, a view like that presented in Fig. 2 of the burner, showing a modification in details of the construction; Fig. 4, a view in end elevation of the device as represented in Fig. 3; and Figs. 5, 6, 7, 8, and 9 are views in broken sectional end elevation, each showing a differently-modified construction of the burner.

The construction affording my improvement, whereby I have been enabled to attain the best results, is that presented in Figs. 1 to 4, inclusive, and following is the description thereof.

A is the oil-reservoir; B, the wick-tube provided with means for raising and lowering the wick C, and surrounded on the top of the reservoir by wire-gauze D, these parts being of any suitable or usual construction for oil-burning stoves and not necessarily involving any features of novelty. Directly over the wick-tube is supported a chamber E, preferably of tubular shape and of the rectangular tubular shape illustrated, and having longitudinally in its base and top the openings r and r' , the latter being the narrower and shielded by a deflector F, which should be hinged along a side of the said opening, and preferably to the chamber E, as shown, the rod q , forming the pin of the hinge-connection, being extended beyond one end of the chamber E, and provided at its extremity with a button q' , by which to manipulate it for adjusting the deflector.

Above the chamber E and somewhat out of line with it, as shown, is supported the chimney G, formed of any suitable material, as mica or metal, and which is preferably, but not essentially, of the angular flaring shape illustrated.

Of the various manners of supporting the chamber E and chimney G that may be employed the two represented, respectively, in Figs. 2 and 3 afford peculiar advantages. That shown in Fig. 2 involves T-plate brackets o , secured to the narrower sides of the chimney and extending beyond its lower tapered end, the horizontally-projecting portions o' thereof being perforated to admit screws n , extended also vertically through the chamber E near its opposite ends into stationary nuts n' , provided on the upper side of the gauze D, nuts n^2 being provided on the screws n for supporting thereon the chimney G at the parts o' of the brackets o and the chamber E, as shown. It will be noticed that the manner of supporting the parts affords a space m between the wick-tube B and chamber E and a space m' between the said chamber and the base of the chimney, which spaces are indispensable features of the construction, and that the lower portions of the T-plate brackets o close the ends of the space m' , while those of the space m are similarly closed by flanges l , extending from the base of the chamber E, to prevent the access to the flame of air-currents in the direction of the width of the wick.

The supporting means shown in Figs. 3 and 4 afford the particular advantage of permitting the chamber E (which may be perforated along its lateral sides, as illustrated in Fig. 3) to be readily removed, as for cleaning, and as readily replaced. The means comprise brackets k , secured, like the brackets o , to the narrower sides of the chimney and formed below the latter into laterally-flanged rests k' and k^2 for the ends of the chamber E, the bracket k having its rest k' open laterally, as shown at x , and being provided with a hinged flange k^3 to close the space m' at one end of the chamber, the bracket k itself affording the closure at the opposite end, and both brackets closing the ends of the space m . With this construction, to permit removal of the chamber E, the hinged flange k^3 is

turned outward and the chamber slightly raised at the rod *q* and pulled out through the opening *x*.

The stove portion proper or cover H envelops the chimney G in the usual manner and fits at its lower end on the cover or plate *i*, surmounting the gauze D.

In order to permit igniting of the wick B, direct draft is provided for through the openings *r* and *r'* in the chamber E by turning the deflector F away from the opening in the upper side of the chamber to remove it from extending over such opening. Then the wick may be ignited from below in the usual manner. If desired, the wick may, for igniting purposes, be turned up far enough to protrude through both openings *r* and *r'* in the chamber E, and thereupon be turned back or withdrawn into the wick-tube, allowing the flame to burn through the said chamber until a bright steady flame appears. The deflector is then turned into its normal position at an angle to extend over the opening *r'* in the chamber E, and which angle is preferably about forty-five degrees, as shown, whereby a comparatively narrow vertical space is left uncovered by the deflector between the horizontal plane of its upper edge and the opening *r'*. After the deflector F has been adjusted to its normal position, as described, the wick may be turned either up or down, as required, the limit to which it may be adjusted being judged by the condition of the flame, which will contain small bright darts if the wick be imperfectly adjusted as to its height.

I have obtained the best results by observing the following named relative proportions of parts: With a wick of a thickness of about three-sixteenths of an inch the height of the chamber E above the top of the wick-tube should be about three-eighths of an inch, the lower opening *r* being then about five-sixteenths and the upper opening *r'* about one-fourth of an inch wide, and the width of the deflector F should be just sufficient when down to cover the opening *r'*. The chimney G should then be supported above the chamber E at an elevation of about five-eighths of an inch, and the width of the opening in its base should be about one-half of an inch, the chimney being so placed as to bring its base about one-fourth of an inch to one side, as shown, of the vertical plane of the wick, the offset being toward the free edge of the deflector.

Of course it will be understood that I do not limit myself to the observance of the foregoing exact relative proportions, since they may be departed from without seriously affecting the result; but the proportions named are those which I have found to afford the best results.

By the foregoing construction all the gases generated by the ignited wick pass through the narrow openings, affording the upward passage through the chamber E and through the intervening space *m*, wherein the oxygen

of the air, which has ready access to the flame from the open sides of such space, mingles with the carbon and gases of the flame inside the chamber E, in which a thorough mixture thereof takes place, and as a consequence an intense heat is generated. The effect is further intensified by the deflector F, which contracts the passage of the gases from the chamber E without materially reducing the extent of the direct draft, and by the access to them in passing from the deflector to the chimney through the space *m'* of more oxygen with the air at the unprotected sides of the said space, and the contraction of the resulting current through the narrow opening in the base of the chimney, the heat becomes sufficiently intense to consume all the carbon held suspended with the gases, thereby rendering the combustion practically complete.

If the opening in the base of the chimney G be too wide, the quantity of air it will admit will be excessive in the sense of being greater than is required to sustain the flame, and its effect will be a tendency to chill the flame, thus diminishing its heat and impairing the completeness of combustion of the carbon.

It should be stated that the deflector F, after the initial ignition of the wick, is left in its thrown-back position only until the chamber E has become thoroughly heated by the flame. When it is adjusted to its normal operative position illustrated with reference to the chamber, (wherein no flame appears,) it operates to deflect the gases to form of them a single solid current, but which gases would otherwise tend by their pressure to emerge from both lateral edges of the opening *r'* and unite centrally above the latter at a point, leaving a space between the two currents. After so emerging the gases immediately ignite by the influence upon them of the oxygen of the air, which finds access to them in the space *m'*, and burn with a blue flame of intense heat in the chimney, and practically without smoke or odor.

The various modifications illustrated in Figs. 5 to 9, inclusive, all involve in their construction the same principle as that involved in the preceding figures, but are less effective than the latter, though operating substantially in the same manner. Thus in Fig. 5 the chamber E is of tapering form and extends downward as a flaring inclosure E', separated from the chamber proper by a perforated base or diaphragm *h*, and containing a partition *g*, dividing the extension E' into concentric passages *f* and *f'*, the latter affording an air-duct and the former a shield for the wick, which extends into it to a height sufficient to afford the space *m*. The construction shown in Fig. 6 is substantially the same as and operates like that illustrated in Fig. 5, and the only material difference between the two constructions last referred to and that presented in Fig. 7 is, that the chamber E in the latter has open sides, which, how-

ever, are not so desirable as when closed or nearly closed, as they permit lateral drafts of air, which exert some chilling effect on the heated gases passing through the chamber.

5 In Fig. 8 the chamber E is afforded merely by a shield, like the upper one in the preceding figure, (but which need not involve the exact shape illustrated,) and which is supported sufficiently high above the wick B
10 to afford the space m , and in Fig. 9 the shield of the preceding figure is surmounted around its outlet-opening by a tubular extension e .

The particular advantage in using the rectangular tube E (shown in Figs. 1 to 4, inclusive) as the mixing chamber for the gases, with the openings r and r' in its lower and upper sides, over that of using any of the other constructions referred to is, that the flame in passing through does not come into contact
20 with the side walls of the chamber, as it does in the others, and wherein such contact chills it. However, all the various constructions permit the same principle of operation—namely, of passing the flame from the wick
25 through a narrow space, wherein it takes up oxygen, into the chamber E by way of a contracted opening, and wherein the gases are mixed and condensed; then passing them out of the chamber through a contracted orifice and through a narrow space, where more
30 air gains access to and effects their ignition, into the contracted inlet in the base of the chimney, wherein complete combustion takes place.

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

1. In an oil-burner, the combination, with the oil-reservoir and wick-tube, of a chamber supported above the wick-tube and having a
40 passage extending upward through it and affording an intervening space m , a deflector F, and a chimney G, supported above the said chamber and affording an intervening space m' , substantially as described.

45 2. In an oil-burner, the combination, with the oil-reservoir and wick-tube, of a chamber supported above the wick-tube and having a passage extending upward through it and affording an intervening space m , a deflector
50 F, hinged adjacent to the outlet of the said passage, and a chimney G, supported above the chamber, with its base out of vertical line with the said outlet away from the side thereof at which the deflector is hinged and afford-
55 ing an intervening space m' , substantially as described.

3. In an oil-burner, the combination, with the oil-reservoir and wick-tube, of a chamber E, removably supported above the wick-tube,
60 and having a passage extending upward through it and affording an intervening space m , an adjustable deflector F, and a chimney G, supported above the chamber and affording an intervening space m' , substantially as
65 described.

4. In an oil-burner, the combination, with the oil-reservoir and wick-tube, of a chamber

E, supported above the wick-tube and having a passage extending upward through it, a space m between the wick-tube and cham-
70 ber and closed at opposite ends, an adjustable deflector F, a chimney G, supported above the chamber, and a space m' between the chamber and chimney and closed at opposite
75 ends, substantially as described.

5. In an oil-burner, the combination, with the oil-reservoir and wick-tube, of a chamber E, supported above the wick-tube and pro-
vided with openings r and r' in its lower and upper sides and affording the intervening
80 space m , a deflector F at one side of the opening r' , and a chimney G, supported above the chamber with the center of the opening in its base out of coincidence with that of
85 the opening r' , substantially as described.

6. In an oil-burner, the combination, with the oil-reservoir and wick-tube, of a tubular
chamber E, having the longitudinal open-
90 ings r and r' in its lower and upper sides and supported above the wick-tube with its open-
ing r coincident therewith, a space m between the wick-tube and chamber and closed
95 at opposite ends, a deflector F, hinged adjacent to the opening r' , a chimney G, supported above the chamber with the center of
the opening in its base out of coincidence
100 with that of the opening r' , and a space m' between the chimney and chamber and closed at its opposite ends, substantially as described.

7. In an oil-burner, the combination, with the oil-reservoir and wick-tube, of a chimney
G, provided with lateral brackets k , hav-
105 ing rests and at which the chimney is supported, a tubular chamber E, having the
longitudinal openings r and r' in its lower and upper sides and removably supported in
the said rests in the brackets, a space m between the wick-tube and chamber and closed
110 at opposite ends, a deflector F, hinged adjacent to the opening r' , and a space m' between the chamber and base of the chimney and closed at its opposite ends, substantially
as described.

8. In an oil-burner, the combination, with
115 the oil-reservoir and wick-tube, of a chimney G, provided with lateral brackets k , having rests and at which the chimney is supported, a tubular chamber E, having the
longitudinal openings r and r' in its lower
120 and upper side and supported in the said rests in the brackets, an opening x in one of the said brackets provided with a hinged
flange k^3 , a space m between the wick-tube and chamber, a deflector F, hinged adjacent
125 to the opening r' , and a space m' between the chamber and base of the chimney and closed at its opposite ends, substantially as described.

JACOB J. BUSENBENZ.

In presence of—

J. W. DYRENFORTH,
M. J. FROST.