

No. 608,290.

Patented Aug. 2, 1898.

J. JOHNSTON.
HYDROCARBON BURNER.

(Application filed Dec. 28, 1896.)

(No Model.)

Fig. 2.

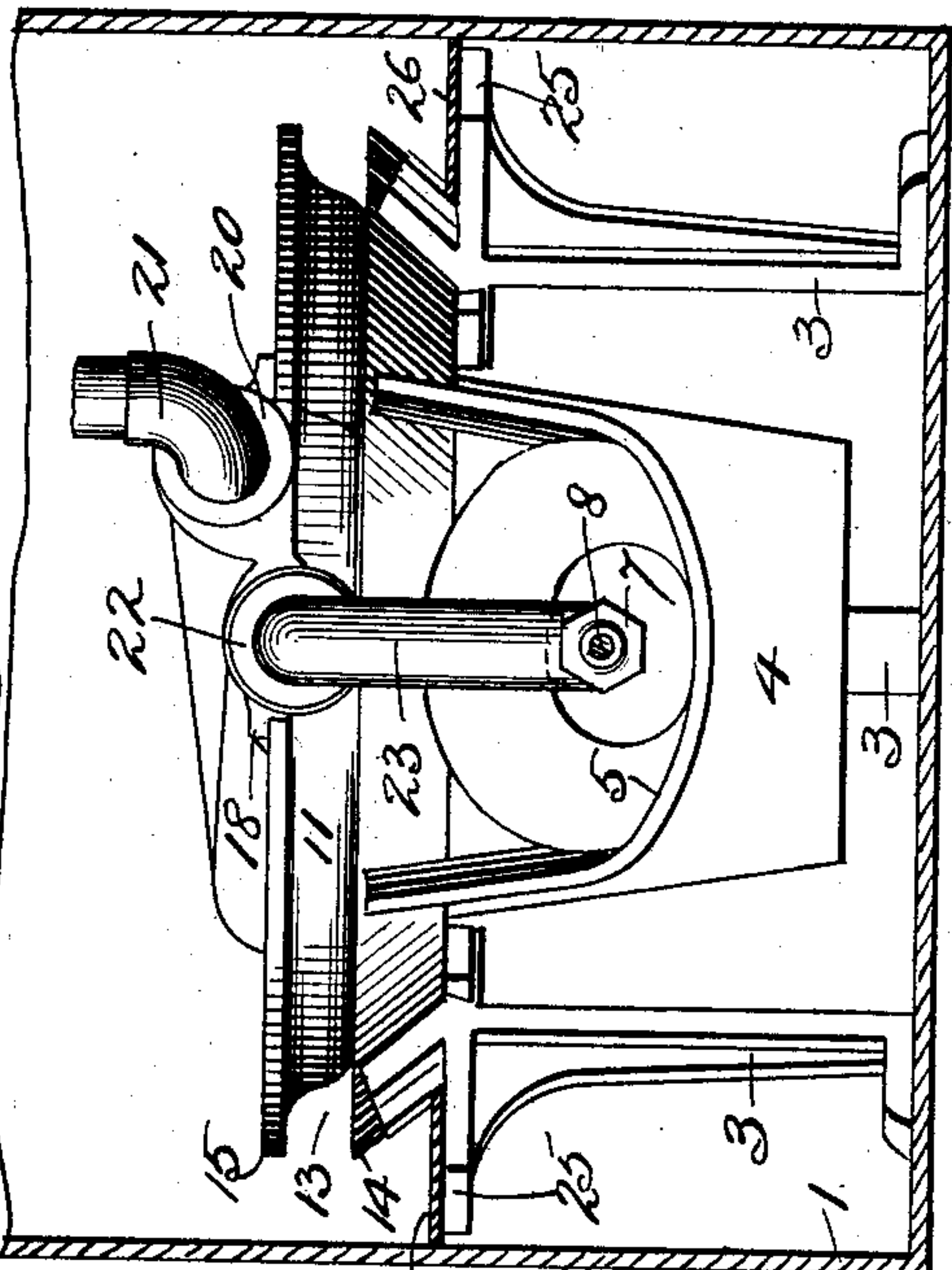
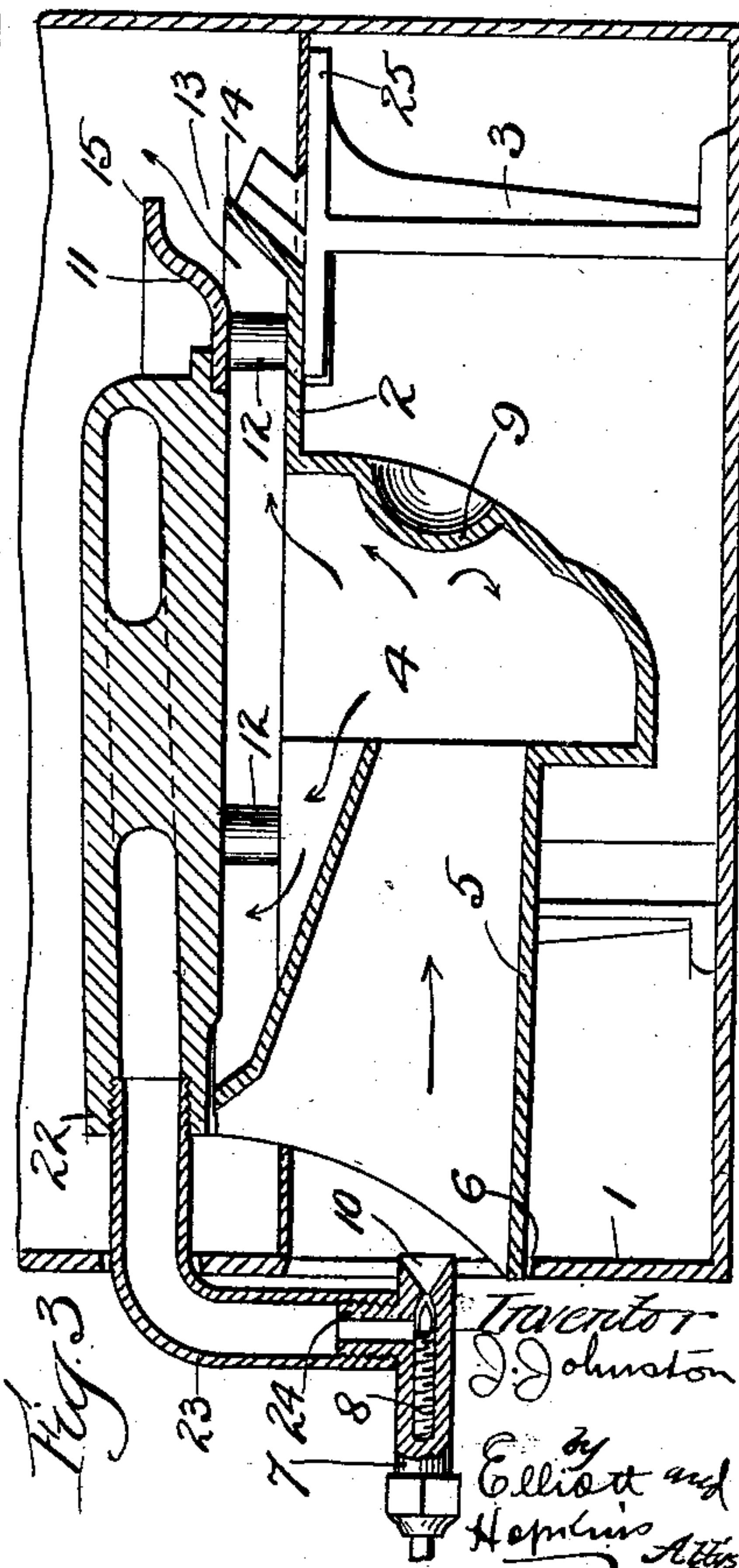
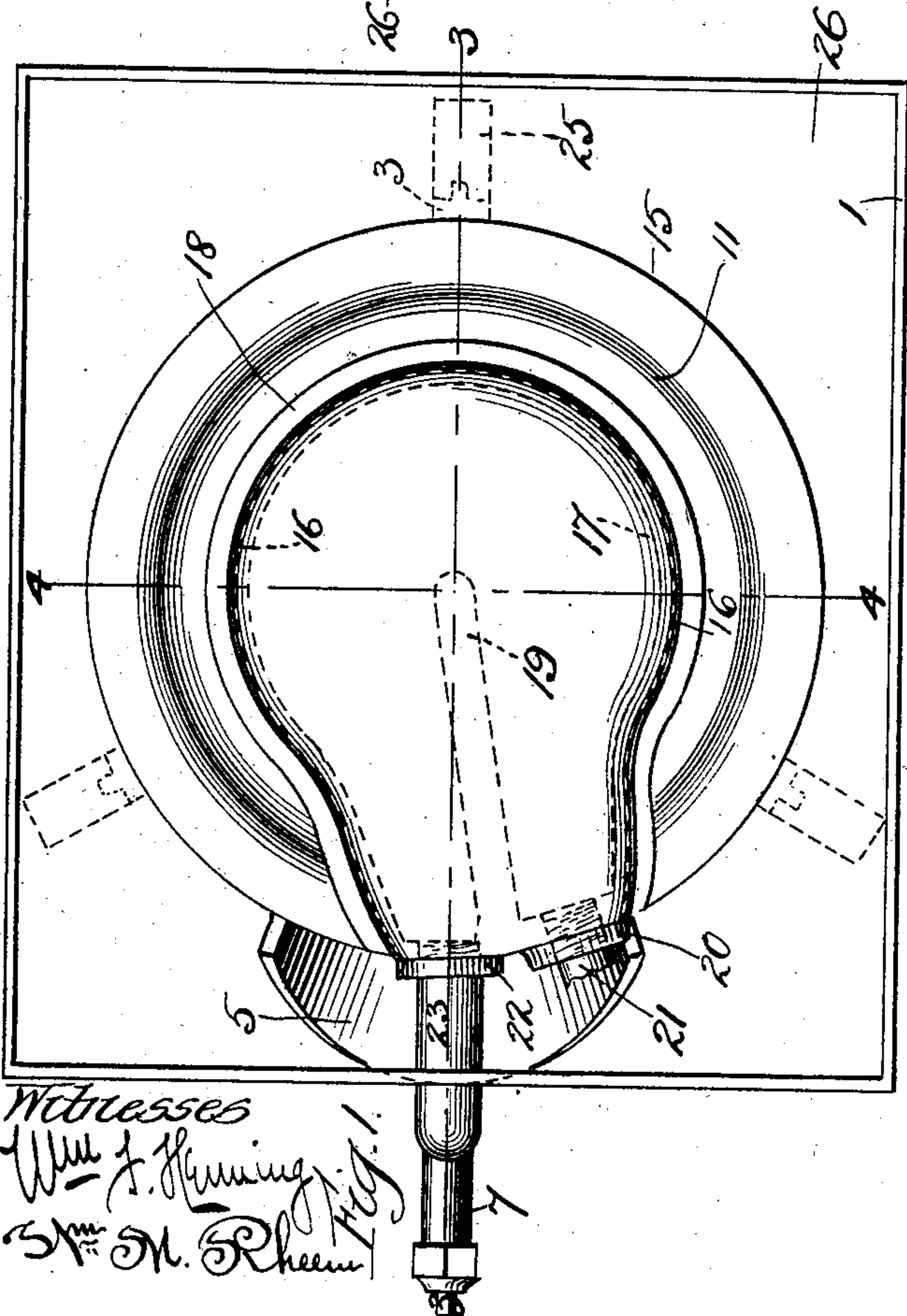
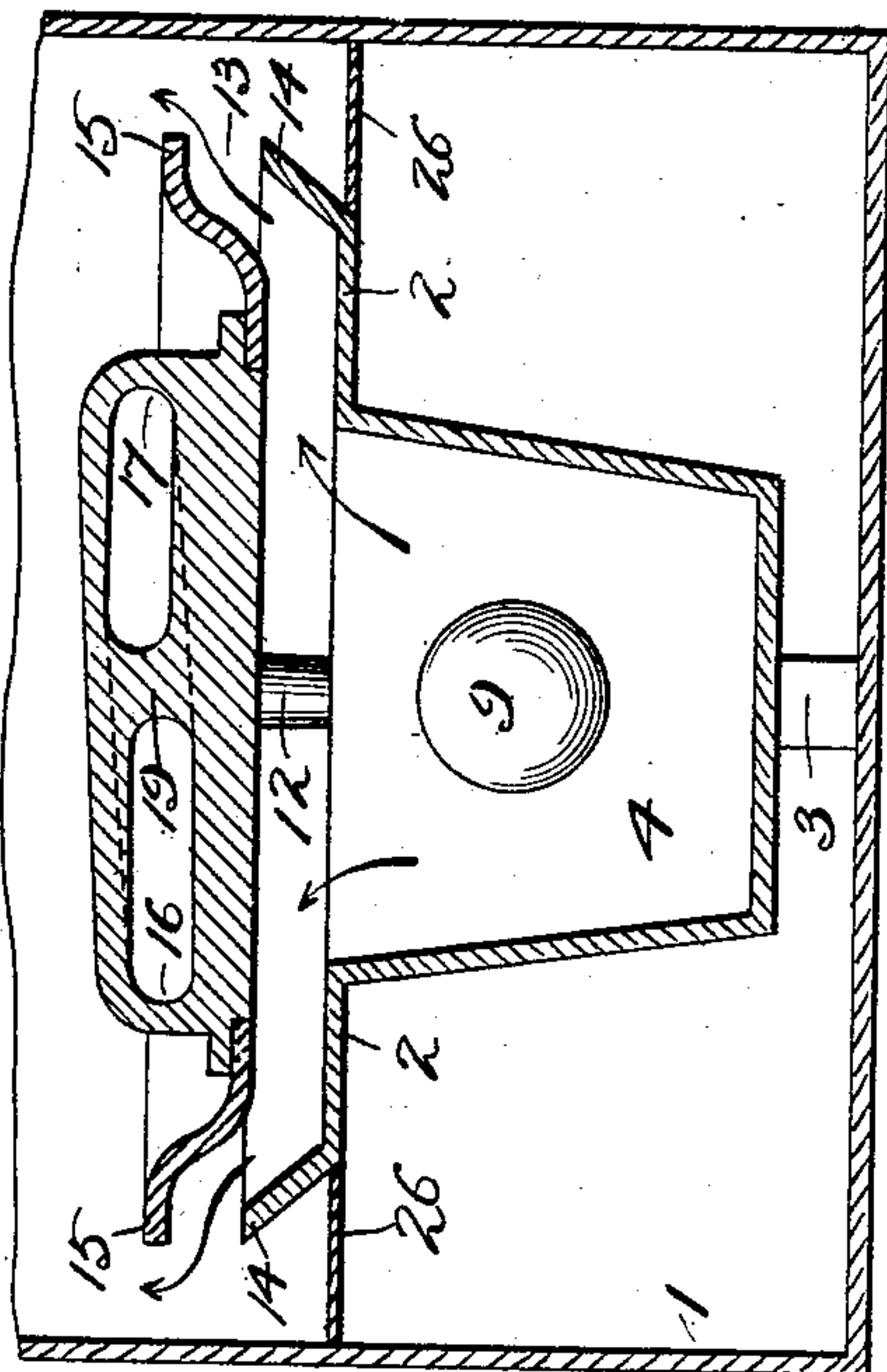


Fig. 4.



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UNITED STATES PATENT OFFICE.

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HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 608,290, dated August 2, 1898.

Application filed December 28, 1896. Serial No. 617,146. (No model.)

To all whom it may concern:

Be it known that I, JONATHAN JOHNSTON, a citizen of the United States, residing at Morgan Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a full, clear, and exact specification.

My invention relates to improvements in that class of burners usually employed for burning hydrocarbon and other crude oils, and, in short, all volatile combustible liquids, and in which the oil is usually vaporized by the heat of the burner itself projected against a suitable retort, to which the liquid fuel is conducted and from which the generated vapors are conveyed to the injector, which latter projects the combustible vapor or vapors with the requisite quantity of air into the combustion-chamber of the burner.

One of the important objects of my invention is to prevent the residuum or other non-volatile products of the oil or liquid fuel used from collecting in the retort or other parts of the burner, and thus clogging up the passages and to a greater or less degree destroying its efficiency.

Another object of my invention is to prevent the noise or buzzing sound usually produced by the injector while in operation, resulting from the current of vapor coming into sudden contact with the air at its mouth or discharge-opening; and my invention has for its object, finally, to simplify and improve the construction and arrangement of the parts generally, whereby a hydrocarbon-burner of great efficiency, durability, and simplicity in both operation and construction is produced and one in which the parts liable to destruction from use may be readily renewed or replaced at slight cost and without removing the burner as a whole from the furnace or fire-box in which it is situated.

With these ends in view my invention consists in certain features of novelty in the construction, arrangement, and combination of parts by which the said objects, and certain other objects hereinafter appearing, are attained, all as fully described with reference to the accompanying drawings and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a plan view of my improved hydrocarbon-burner, showing the same situated in a fire-box or combustion-chamber. Fig. 2 is a front view thereof. Fig. 3 is a vertical sectional view taken on the line 3 3, Fig. 1; and Fig. 4 is a vertical sectional view taken at right angles to the section of Fig. 3 on the line 4 4, Figs. 1 and 3.

In the said drawings I have shown my invention in connection with a fire box or chamber 1, which in this example is of square formation in plan view and may constitute a part of an ordinary furnace or stove or any other heating or cooking device in connection with which it is desired to use my improved burner as a source of heat; but the particular form of fire-box 1 is of course immaterial and is dependent upon the design of the particular stove or furnace desired to be used.

Situated within the fire-box or fire-pot 1 is a plate 2, supported upon a number of legs 3 and having a central opening under which is formed a chamber 4, which constitutes the combustion-chamber of the burner and in which the vapor is ignited, the chamber 4 being preferably formed integrally with or otherwise secured to the plate 2, so as to prevent the escape of any of the products of combustion or of the vapors excepting through the upper side of such chamber. The plate 2 is also formed with a funnel 5, which extends horizontally into the chamber 4 and into the outer flaring end of which the stream of hydrocarbon vapor is admitted, such flaring end being preferably located in the doorway or other opening 6 in the fire pot or box 1, so as to substantially fit such opening 6 and prevent the introduction of air excepting through the funnel 5. Located opposite the outer end of the funnel 5 is the injector 7, provided with the usual needle-valve 8 and arranged to inject the hydrocarbon vapor directly through the funnel and into the combustion-chamber 4, whose rear wall is preferably curved from the forward side of such chamber, at the lower end thereof, to the upper end of the rear side, as more clearly shown in Fig. 3, so as to direct the vapors upwardly through the opening in the plate 2, and in order that such vapors may be more intimately commingled with the air in the combustion-chamber 4 I

prefer to provide the rear wall of such chamber with a deflector or spreader 9, of convex form, arranged directly opposite the mouth of the injector 7, so as to engage with the incoming current and deflect it in all directions. The injector 7 is located at considerable distance from the outer end of the funnel 5, as shown in Fig. 3, whereby it will induce an inward current in the external air and entrain the same into the combustion-chamber.

In order that the hissing or buzzing sound usually produced by the injector may be prevented without destroying the desirable characteristics of the current of vapor issuing from the injector, the end or mouth 10 of the latter is made substantially bell or funnel shaped, as shown in Fig. 3, so that the sides of the mouth 10 converge toward the needle-opening, into which projects the valve 8.

Removably supported upon the plate 2 is a second plate or lid 11, provided with a number of supporting feet or legs 12, which rest upon the plate 2 and hold the plate or lid 11 at a slight elevation therefrom, so as to constitute a deflector for spreading the rising flame in all directions and compelling it to discharge through the annular opening 13, constituted by the upwardly-turned lips 14 15 around the edges of the plates 2 and 11, respectively. The plate 11 is provided with a central opening 16, (shown more clearly in dotted lines in Fig. 1,) and in which is supported the retort 17, in which the hydrocarbon or other liquid fuel is converted into combustible vapor. This opening 16 in the plate 11 therefore is preferably complementary in form to the bottom of the retort 17, so as to expose the entire bottom area of the retort to the influence of the heat rising from the chamber 4, and inasmuch as such retort is substantially pear-shaped in outline the opening 16 is of a similar formation and is extended outwardly over the funnel 5 and through the edge of the plate 11, as indicated by the dotted line in Fig. 1. The bottom of the retort 17 fits down into the opening 16 and is provided with a surrounding flange 18, which rests upon the plate 11, and thus supports the retort removably over the combustion-chamber 4, while making it constitute substantially an unbroken continuation of the plate 11. The purpose of this separate formation of the retort 17 and plate 11 is to provide for the renewal of either of such parts independently of the other.

The retort 17 is in the form of a continuous passage looped or turned back upon itself, the two branches of the passage being separated or defined by a partition 19. The inlet to the retort is shown at 20 and with which communicates a pipe 21, leading from a supply of hydrocarbon oil or other fuel to be burned, while the outlet of the retort is shown at 22 and is connected by a downwardly-extending fitting or pipe 23 with the inlet-neck 24 of the injector. The inlet 20 of the retort is located at a considerably higher elevation

than the outlet 22, and the bottom or floor of the retort constitutes a continuous incline from the inlet to the outlet, whereby the sluggish or semifluid portions of the fuel otherwise liable to collect in the retort are prevented from remaining in one place a sufficient length of time to become hard and incapable of passing off with the vapor through the discharge end.

In order that the maximum area of the retort 17 may be exposed to the flame rising in the combustion-chamber 4, a space is left above the top of funnel 5, as shown in Fig. 3, so that the products of combustion can reach the inlet and outlet necks of the retort.

In the use of my improved burner thus described it is desirable that the entire volume of air admitted to the fire-box or fire-pot 1 for supporting the combustion be conveyed through the funnel 5, and therefore in order that air finding its way into the lower part of the fire-pot 1 below the plate 2 may not rise around the lips 13 15 I provide the feet 3 with flanges 25, upon which is supported a diaphragm 26, which fits around the edge of the plate 2 and completely fills the box or pot 1, the form of the outer edge of the diaphragm 26 being dependent upon the shape of such fire pot or box.

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

1. A hydrocarbon-burner having in combination an injector, the elevated plate 2 having the depressed combustion-chamber 4 provided with an upwardly-curved wall at its rear side arranged opposite said injector, and a second plate and retort supported over said combustion-chamber and overlapping said first plate, said retort being connected with said injector, substantially as set forth.

2. A hydrocarbon-burner having in combination an injector, the elevated plate 2 having the depressed combustion-chamber 4 provided with an upwardly-curved wall arranged opposite said injector, a funnel formed on the bottom of said plate 2 and projected toward said curved wall of the combustion-chamber, a retort supported over said combustion-chamber and extending over said funnel, there being a space for the passage of the products of combustion between the upper side of said funnel and said retort, and a connection between said retort and injector, substantially as set forth.

3. A hydrocarbon-burner having in combination a combustion-chamber, a plate 2, a plate 11 supported upon and at a distance above plate 2 over said combustion-chamber and being provided with a central opening, a retort constituting a continuous passage and having its inlet and outlet located on the same side, supported in and filling said opening and an injector connected with the outlet of said retort and discharging into the combustion-chamber, substantially as set forth.

4. The combination with a fire pot or box,

of the plate 2 supported therein and having the funnel 5 and combustion-chamber 4 arranged thereunder, the diaphragm 26 supported around said plate 2, a retort supported 5 over said combustion-chamber and an injector arranged at the mouth of said funnel and connected with said retort, substantially as set forth.

5. The combination with a fire-box or fire- 10 pot, of the plate 2 having the upwardly-extending surrounding lip 14, the depending combustion-chamber 4 provided with an upwardly-curved rear wall formed with the spreader 9, the funnel 5 formed under said 15 plate and communicating with said combus-

tion-chamber, the legs 3 secured to said plate and having flanges 25, the diaphragm 26 supported upon said flanges 25 and extending across said fire-pot, a plate 11 having the upwardly-extending lip 15, arranged at a distance above said plate 2, the legs 12 supported 20 upon plate 2, a retort supported by said plate 11, and an injector connected with said retort and discharging into said funnel, substantially as set forth.

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