

No. 629,338.

Patented July 25, 1899.

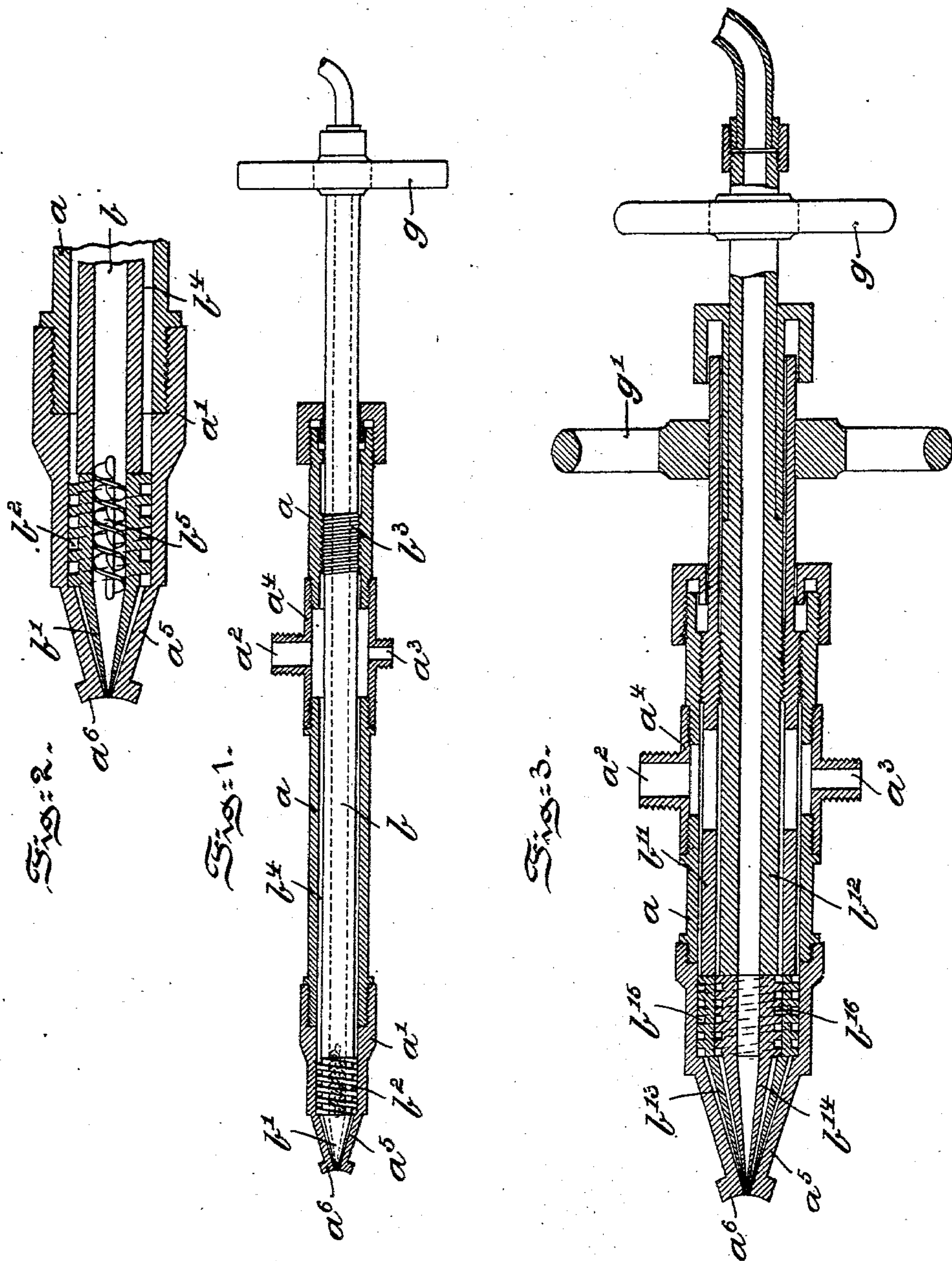
G. CHELIMSKY.

INJECTOR BURNER FOR HYDROCARBON FURNACES.

(Application filed Nov. 29, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:  
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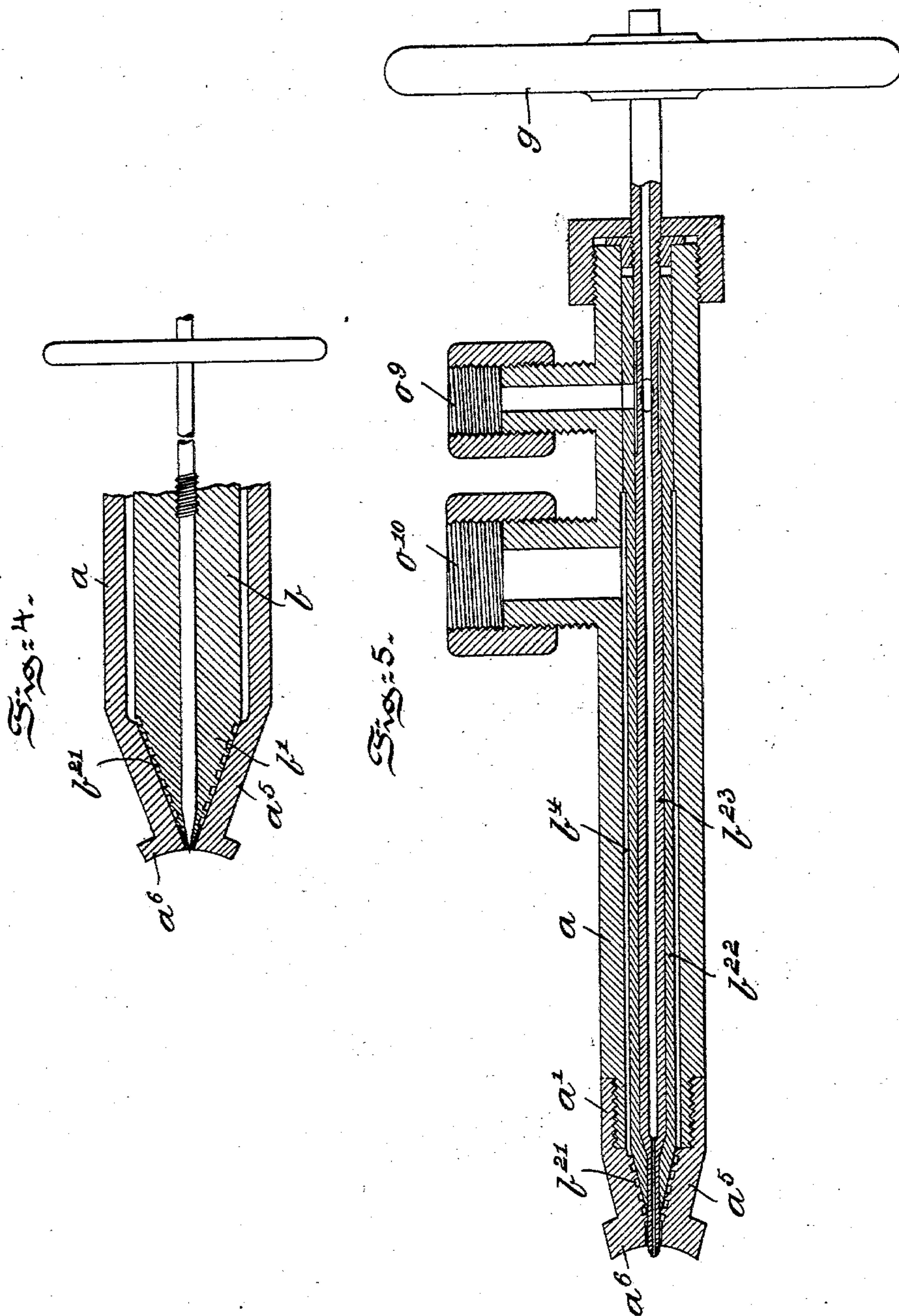
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(Application filed Nov. 29, 1898.)

(No Model.)

**2 Sheets—Sheet 2.**



Witnesses:  
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# UNITED STATES PATENT OFFICE.

GREGORY CHELIMSKY, OF TIFLIS, RUSSIA.

## INJECTOR-BURNER FOR HYDROCARBON-FURNACES.

SPECIFICATION forming part of Letters Patent No. 629,338, dated July 25, 1899.

Application filed November 29, 1898. Serial No. 697,767. (No model.)

*To all whom it may concern:*

Be it known that I, GREGORY CHELIMSKY, a subject of the Emperor of Russia, residing at Tiflis, Russia, have invented certain new and useful Improvements in Injector-Burners for Hydrocarbon-Furnaces, (for which I have obtained British Letters Patent No. 21,651 of 1898, issued January 7, 1899; French Letters Patent No. 281,969, issued January 6, 1899; Belgian Letters Patent No. 138,196, issued October 15, 1898; Austrian Letters Patent No. 49/327, issued January 2, 1899; Hungarian Letters Patent, dated October 14, 1898; German Letters Patent, dated September 23, 1898, and Italian Letters Patent, Vol. XXXV, No. 50,066, issued February 24, 1899,) of which the following is a specification.

My invention has relation to an injector-burner for hydrocarbon and similar furnaces, and in such connection it relates more particularly to the construction and arrangement of such a burner.

The principal object of my invention is to provide an injector-burner for hydrocarbon, furnaces of comparatively simple construction and so arranged that the liquid fuel is finely divided, well mixed with air or oxygenated gas, and precipitated into the furnace in the form of a flame of wide area.

To this end my invention primarily consists in a burner wherein the fuel is forced from the nozzle in a whirling or spiral direction and mixed at the point of issuance from the nozzle with air or other gas necessary for the complete combustion of the flame.

My invention further consists of an injector-burner for hydrocarbon and similar furnaces constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a side elevational view, partly in longitudinal section, of an injector-burner embodying main features of my present invention. Fig. 2 is an enlarged longitudinal sectional view of the nozzle end of said

burner, and Figs. 3, 4, and 5 are longitudinal sectional views of modified forms of the burner illustrated in Figs. 1 and 2.

Referring to Figs. 1 and 2 of the drawings, *a* represents the outer and *b* the inner tube of the burner, which are nested or concentrically arranged, so as to leave a space *b<sup>4</sup>* between their contiguous walls. The outer tube *a* is formed, preferably, in three sections, principally for the purpose of repairs and cleaning. The two main sections are united by a tubular sleeve *a<sup>4</sup>*, having preferably two nipples *a<sup>2</sup>* and *a<sup>3</sup>*. The third section *a'* forms the nozzle for the burner, and it has a conical end *a<sup>5</sup>*, terminating in a flaring or bell-shaped extension *a<sup>6</sup>*, designed to serve as a baffle-plate for the flame as it issues with a whirling motion from the burner into the furnace. The inner tube *b* is provided with a conical end *b'*, fitting into the conical end of the nozzle *a'*, and, as shown in the drawings, it has on that portion adjacent to its conical end a spiral portion *b<sup>2</sup>*, which is formed by cutting threads of suitable pitch on the periphery of the tube or in any suitable manner. The spiral channel may be formed, if desired, upon the interior of the contiguous portion of the nozzle *a'*. The tube *b* may be advanced or retracted in the tube *a* by means of a hand-wheel *g*, the tube *b* being in threaded engagement, as at *b<sup>3</sup>*, with the tube *a*, and thus the volume of fuel may be regulated.

The nipple *a<sup>2</sup>* of the sleeve *a<sup>4</sup>* communicates with the space *b<sup>4</sup>* between the tubes *a* and *b*, and through this nipple *a<sup>2</sup>* is introduced the fuel, which may be petroleum, naphtha, masut, or similar liquids. The fuel is forced under pressure through the space *b<sup>4</sup>* and through the spiral way or channel *b<sup>2</sup>* and escapes from the nozzle in a finely-divided state and with a whirling motion. Air or similar gas is introduced into the tube *b* and may be either forced under pressure through said tube or else sucked through the same by the whirling motion of the fuel at the outlet from the nozzle. In any event the air is mixed thoroughly with the fuel at the outlet from the burner. If desired, the air may also be given a whirling motion prior to being mixed with the fuel. This may be ac-



5 accomplished by inserting in the tube  $b$ , near  
 its conical end, a spiral piece  $b^5$ . When fuel  
 is injected through the nipple  $a^2$ , the other  
 nipple  $a^3$  is closed, and when the burner is to  
 be cleaned the nipple  $a^2$  is closed and the nip-  
 10 ple  $a^3$  is opened and attached to a source of  
 steam-supply, when steam will be blown  
 through the nozzle to remove the accumulated  
 impurities from the burner.  
 15 In the modified form of burner illustrated  
 in Fig. 3 the construction and arrangement  
 of parts are substantially the same as those  
 shown in Figs. 1 and 2, with the exception  
 that the inner tube  $b$  of Figs. 1 and 2 is re-  
 20 placed by two concentric tubes  $b^{11}$  and  $b^{12}$ ,  
 each of which has a conical end  $b^{13}$  and  $b^{14}$ ,  
 adjacent to which the spiral channels  $b^{15}$  and  
 $b^{16}$  are formed. In this modification the  
 outer tube  $b^{11}$  is moved within the outer tube  
 25  $a$  by means of a hand-wheel  $g'$ , whereas the  
 other tube  $b^{12}$  is moved within tube  $b^{11}$  by  
 means of a hand-wheel  $g$ . In this form a  
 double adjustment at the nozzle for the out-  
 flow of fuel is afforded, and the fuel is forced  
 30 through two passages, from each of which it  
 is delivered to the outlet in a whirling spray  
 or vapor.

In Figs. 4 and 5 still further modified forms  
 of burners are shown, wherein the spiral way  
 35  $b^{21}$  is formed at the conical portion of the  
 nozzle, and in Fig. 5 within the inner tube  
 $b^{22}$  is located a second tube  $b^{23}$ , through which  
 a portion of the fuel, together with heated air  
 or gas, is forced, the fuel entering through  
 40 the nipples  $o^9$  and  $o^{10}$ . The main charge of fuel  
 enters through nipple  $o^{10}$  and passes through  
 the space  $b^4$  between tube  $a$  and tube  $b^{22}$ . In  
 the form shown at Fig. 5 the tubes  $a$  and  $b^{22}$

are immovable, and the tube  $b^{23}$  only is ad-  
 justable.

Having thus described the nature and ob-  
 45 jects of my invention, what I claim as new, and  
 desire to secure by Letters Patent, is--

1. An injector-burner for hydrocarbon and  
 similar furnaces, comprising an outer tube, a  
 nozzle having a conical end carried by said  
 outer tube, a curved baffle-plate carried by  
 said nozzle, an air-tube arranged concentric  
 with the outer tube but separated therefrom  
 to form a passage-way for the fuel and a spi-  
 50 ral thread formed between the two tubes at  
 or adjacent to their concentric conical ends  
 and adapted to form a spiral continuation for  
 the passage-way for the fuel, substantially as  
 and for the purposes described.

2. An injector-burner for hydrocarbon and  
 similar furnaces, comprising an outer tube, a  
 nozzle having a conical end and curved baf-  
 fle-plate carried by said outer tube, an air-  
 tube arranged concentric with the outer tube  
 60 and nozzle but separated therefrom to form  
 a passage-way for the fuel, a spiral thread  
 formed between the two tubes at or adjacent  
 to their concentric conical ends and adapted  
 to form a spiral continuation for the passage-  
 way for the fuel, and a spiral piece located  
 65 within the air-tube, substantially as and for  
 the purposes described.

In testimony whereof I have hereunto set  
 my signature in the presence of two subscrib-  
 70 ing witnesses.

GREGORY CHELIMSKY.

Witnesses:

N. WHITEFIELD,  
 CARRYWELL KEPUEPLE.