

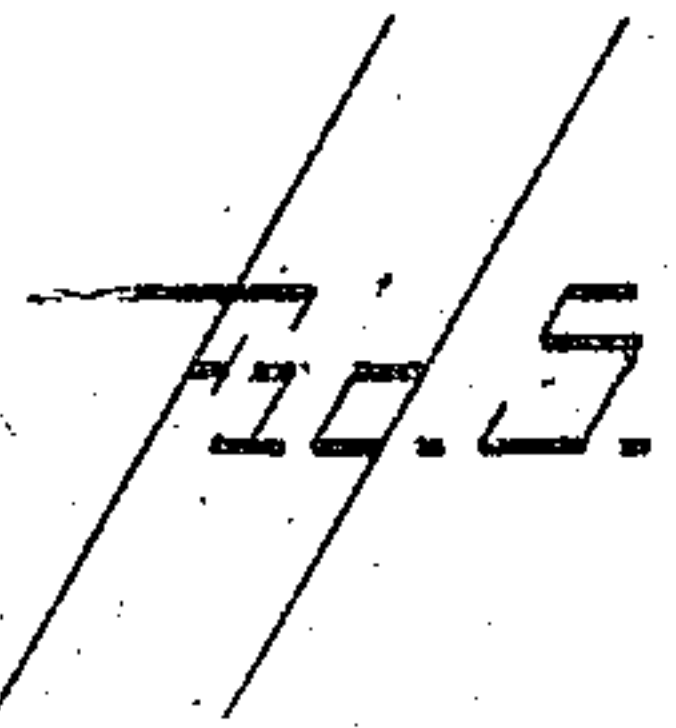
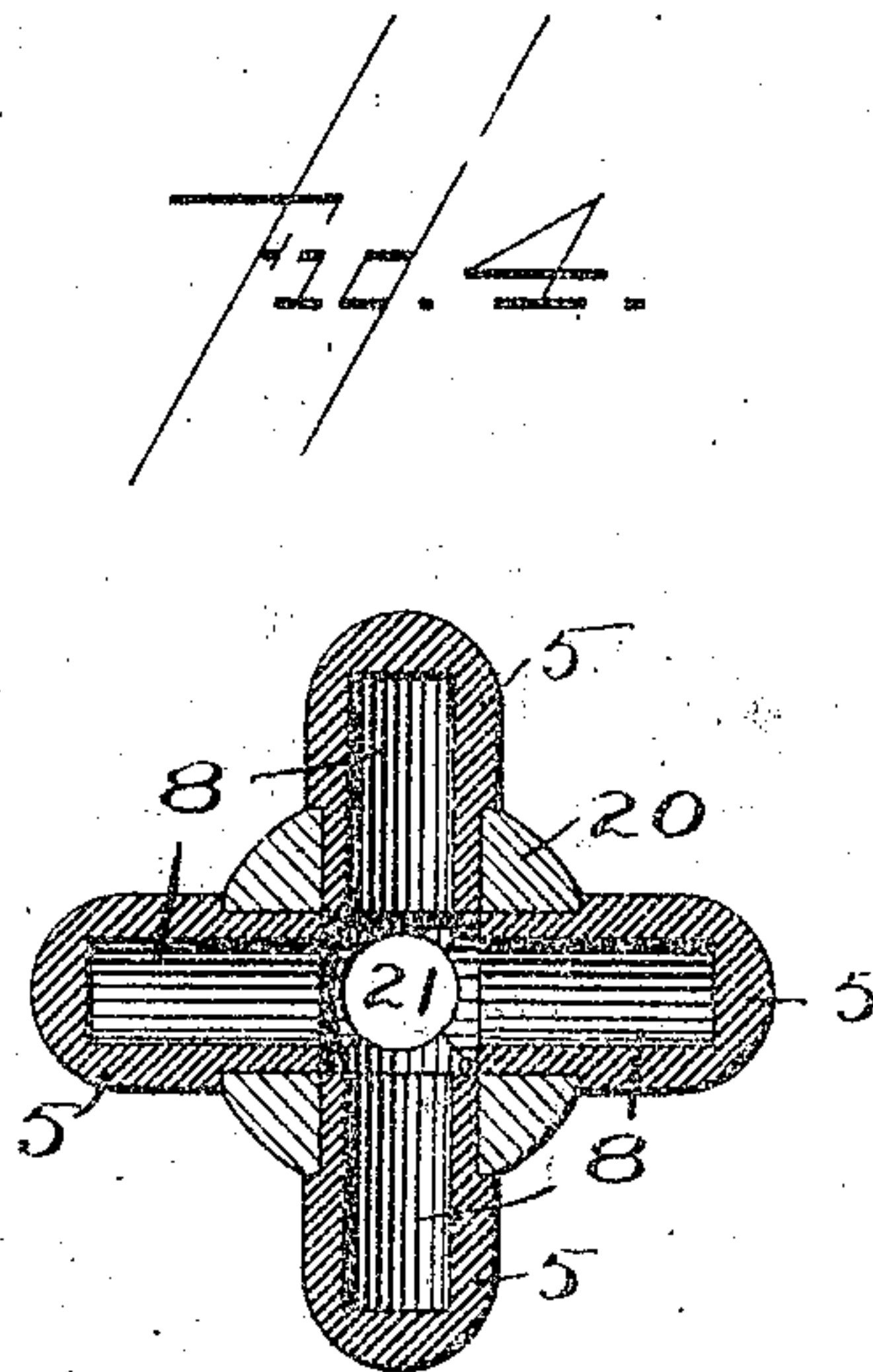
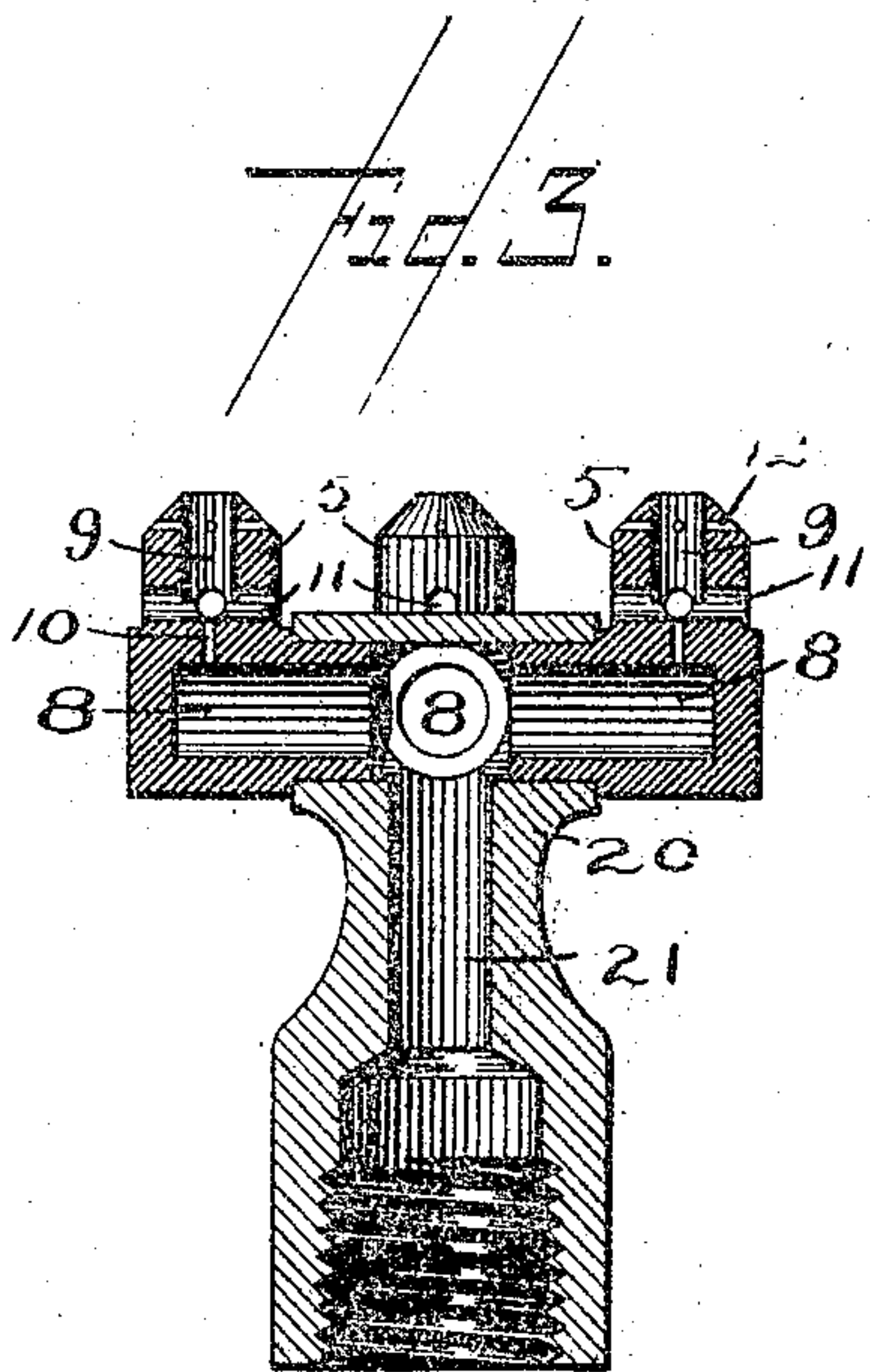
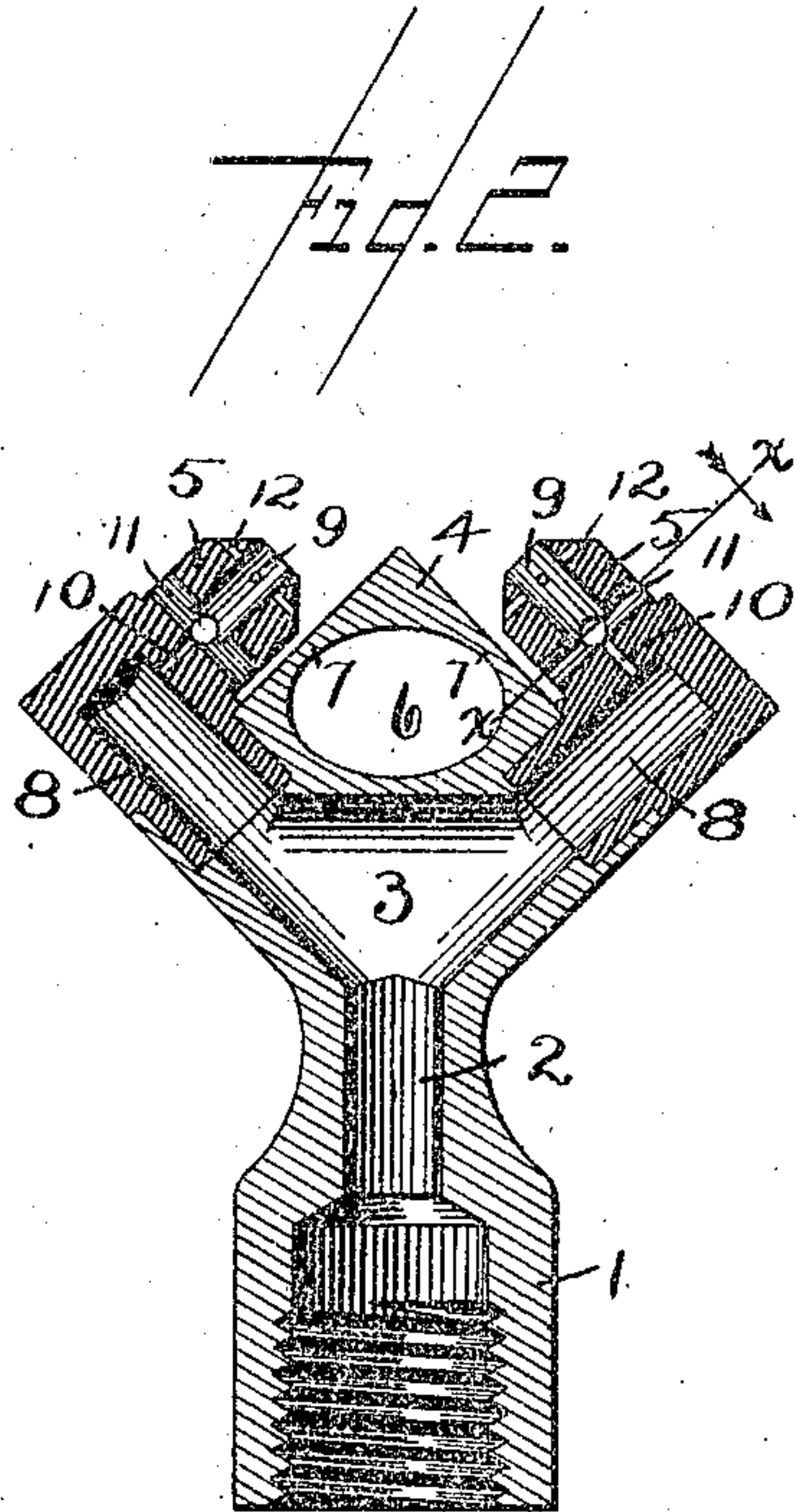
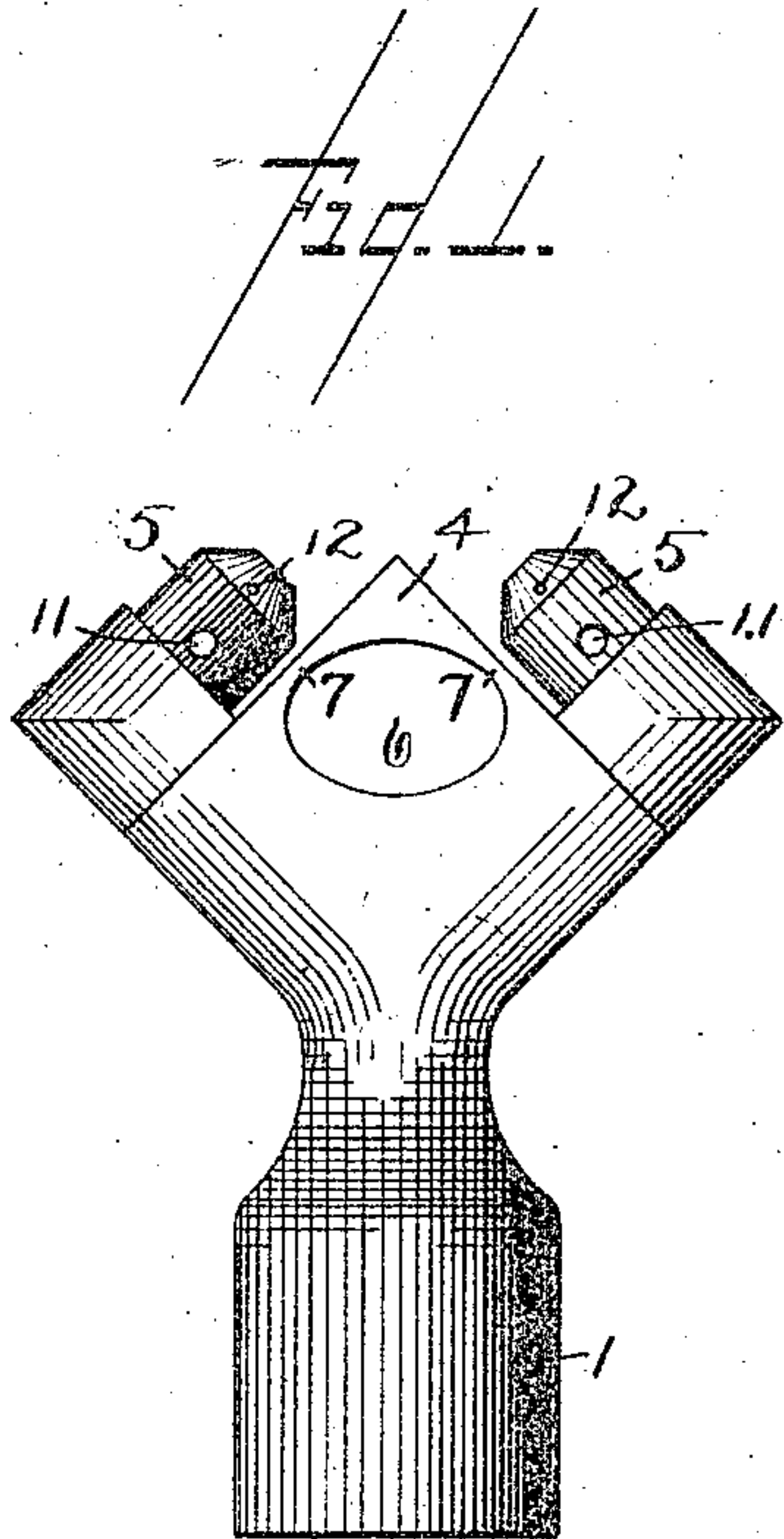
No. 617,942.

Patented Jan. 17, 1899.

H. E. SHAFFER.  
BURNER FOR ACETYLENE GAS.

(Application filed Feb. 5, 1898.)

(No Model.)



Witnesses.

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# UNITED STATES PATENT OFFICE.

HENRY E. SHAFFER, OF ROCHESTER, NEW YORK

## BURNER FOR ACETYLENE GAS.

SPECIFICATION forming part of Letters Patent No. 617,942, dated January 17, 1899.

Application filed February 6, 1898. Serial No. 669,247. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY E. SHAFFER, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Burners for Acetylene Gas; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention has for its objects to provide an improved burner for gas rich in carbon, such as acetylene gas, whereby not only will the light be improved and more perfect combustion had, but the flame will be free from the fluctuations due to variations in pressure of the gas; and to these and other ends the invention consists in certain improvements hereinafter fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings, Figure 1 is a side elevation of a gas-burner constructed in accordance with my invention; Fig. 2, a vertical sectional view of the same; Fig. 3, a similar view of a modification; Fig. 4, a horizontal sectional view of the burner shown in Fig. 3; Fig. 5, a cross-sectional view on the line  $x-x$  of Fig. 2.

Similar reference-numerals indicate similar parts.

In Figs. 1 and 2 I have shown the preferred form of burner, consisting generally of a body portion 1, preferably of metal, having a gas-passage 2, a central chamber 3, and also an upwardly-extending external projection 4, preferably formed with the burner-body and projecting between and preferably close to the under sides of the flames from two burner-tips 5, arranged with their gas-orifices at an angle to each other and receiving gas from the central chamber 3. The object of the projection 4 is to provide a mass of material below the point of cooperation of two gas-jets impinging at an angle, which will become heated by proximity to the flames and will in turn react upon the gas and promote its combustion and heat the air that reaches the flame from below. In order that as little of the heat of the projection 4 as possible shall be transmitted to the burner-body, I reduce

the supporting portions thereof as much as possible by cutting away the metal beneath it, as at 6, leaving only the narrow supporting-arms 7, which are strong enough to hold the projection, but offer a very small heat-conducting surface.

The burner-tips 5 are each constructed of soapstone, lava, or similar refractory material and are preferably provided with two passages 8 and 9, the former, constituting the entrance-passage, being in communication with the interior of the chamber 3, and the latter, being the discharge-passage, extending at an angle to the former and communicating with it through the minute gas-aperture 10. The passage 9 constitutes a chamber for thoroughly mixing the gas issuing from the aperture 10 with air before burning it, and in order to accomplish this in the best manner I provide the lateral air-inlets 11, arranged at right angles to the passage 9 and about half below and half above the bottom of the passage 9, the minute aperture 10 being of course at the lower side of the lateral air-passages, which insures the air entering the passages striking the column of gas at right angles and when it first issues from the aperture 10. I prefer to form the passage 9 by drilling in from the outer end of the tip. Then the minute aperture 10 is drilled, and then the passages 11 are formed by passing a larger drill through from side to side of the tip, the center of said drill being about on a level with the bottom of the passage 9, as will be understood from an inspection of Figs. 2 and 5.

Near the outer end of the passage 9 are provided very small lateral passages 12, serving to admit air to the column of mixed air and gas near the point of combustion, effectually surrounding it and preventing contact with the extreme end of the tip, thereby preventing undue heating of the latter and the formation of a deposit thereon. Tips thus constructed I find give very good results and insure the consumption of all of the gas without causing the deposits which sometimes impair the efficiency of burners of this class, and by the arrangement of the passages 8 and 9 at an angle, as shown, the tips may be readily employed not only in the form of burner shown in Figs. 1 and 2 for producing a flat flame,



but also to produce separate vertical jets, as shown in Figs. 3 and 4, as will be described.

The burner shown in Figs. 1 and 2 not only is well adapted for use in connection with the particular form of tip shown, but the feature of having a central gas-chamber 3 and the gas-passages to the tip out of line with the inlet-passages is particularly advantageous, because the flame is relieved from fluctuations due to variations in the pressure of the gas, the gas contained in the chamber forming a cushion to some extent and insuring a comparatively even supply to the flame, and the angular arrangement of the passages 8 and 9 in the tip contributes also to this result.

While it is desirable to have the burner-tips herein shown and described arranged at an angle to produce a flat flame, they are capable of use in a burner-body of the form of that shown in Figs. 3 and 4, in which the upper portion (indicated by 20) is provided with horizontal radial apertures adapted to receive the tips, the passages 9 being vertically arranged to produce a series of vertical flames, and while I have shown four tips attached any number desired could be employed. In this construction also it will be noted that the interior of the body constitutes a chamber and the passages in the tips are not in a direct line with the inlet-passage 21, so that the flickering of the flame due to variations in pressure is materially reduced.

The tips could be molded or otherwise formed, if desirable, and the specific form changed without departing from the spirit of my invention; but I prefer that the channels 8 and 9 be arranged at an angle, as shown, as this feature prevents undue flickering by reason of the change in direction of the flow of gas and also facilitates the application to the forms of burner-bodies shown herein.

I claim as my invention—

1. In a burner for acetylene and similar gases, the combination with the burner-body having the tapering extension and the round gas-apertures discharging gas in converging streams above the extension and substantially parallel with the faces thereof, thereby causing the extension to be heated by the flames.

2. In a burner for acetylene and similar gases, the combination with the burner-body having the tapering extension, of tips having the round gas-discharge apertures and the surrounding air-supply passages, said apertures discharging air and gas in converging streams above the extension substantially parallel with the faces thereof, thereby causing the extension to be heated by the flames.

3. The combination with the burner-body

and the burner-tips discharging gas in converging streams above the body, of the extension formed on the body and arranged between the tips and having a narrow connection with the body to prevent conduction of heat to the latter.

4. A burner-tip having the discharge passage or channel open at one end to the air, a gas-aperture smaller than the passage and arranged at and discharging axially into the bottom thereof, and separate air-channels extending at right angles to the open passage and operating to supply air to the gas as it first issues into the passage.

5. A burner-tip having the discharge passage or channel open at one end to the air, a gas-aperture smaller than the passage and arranged at and discharging axially into the bottom thereof, and separate air-channels extending into the passage at right angles thereto and intersecting it in the plane of the small gas-aperture, whereby the air will be thoroughly mixed with the gas at the point of exit into the passage.

6. A tip for acetylene-gas burners, composed of a single piece of refractory material having the inlet and discharge passages arranged at an angle with each other, and the small gas-aperture between the end of the discharge-passage and the side of the other, and air-passages leading into the discharge-passage.

7. As an article of manufacture, a tip for acetylene-gas burners composed of a single piece of refractory material having the entrance and discharge passages arranged at right angles to each other, said discharge-passage having separate air-passages leading into it from the sides.

8. A tip for acetylene and similar gas burners having the discharge-passage for the gas and air, the small gas-aperture leading into said passage, and the separate air-passages extending from the outside of the tip into the lower end of the discharge-passage and directing the air upon the column of gas at right angles to its plane of movement, thereby causing a thorough mixture of air and gas.

9. A burner-tip for acetylene and similar gas burners, having the discharge-passage 9, the small aperture 10 at the bottom thereof, the lateral air-channels discharging air upon the gas at right angles to the plane of the latter and at the sides of the aperture 10, and the small lateral air-passages 12 near the end of the passage 9, substantially as described.

HENRY E. SHAFFER.

Witnesses:

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