W. SCRIMGEOUR.

HYDROCARBON BURNER.

APPLICATION FILED DEC. 26, 1907.

928,886.

Patented July 20, 1909

2 SHEETS—SHEET 1.

Fig. 1.

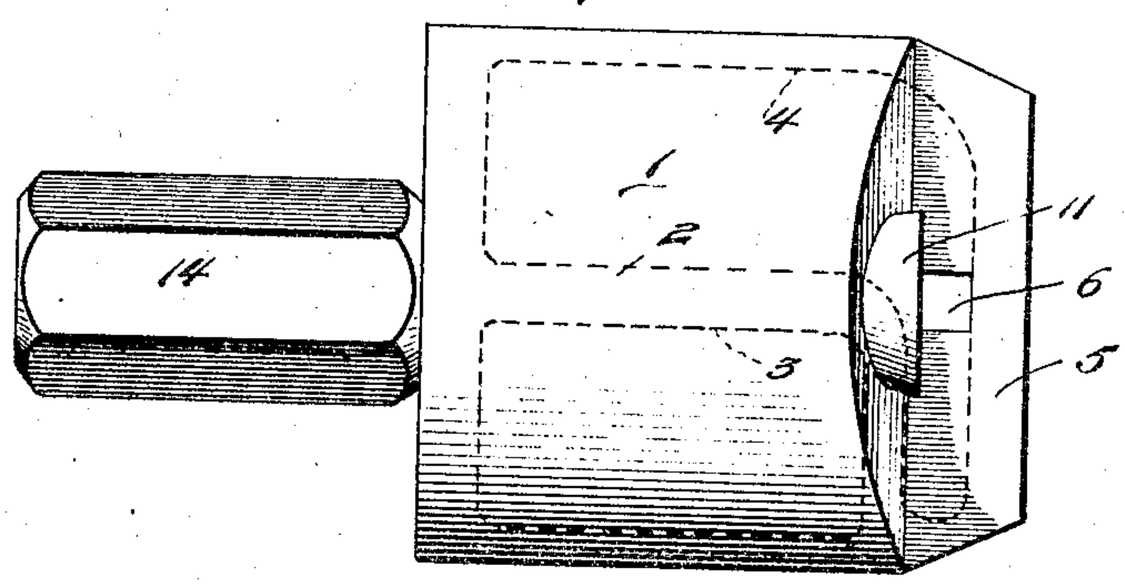


Fig. 2.

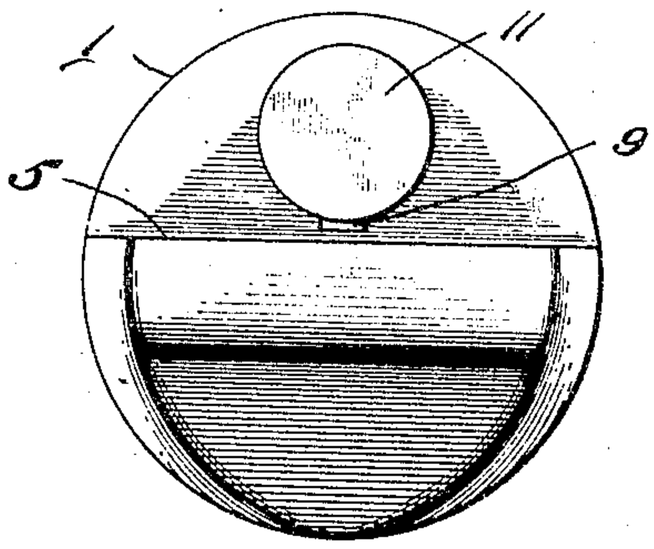


Fig. 3.

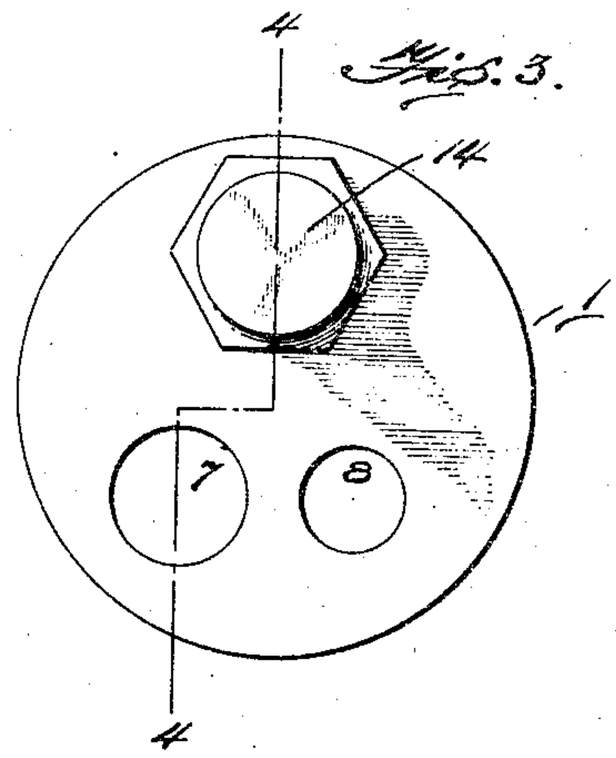


Fig. 4.

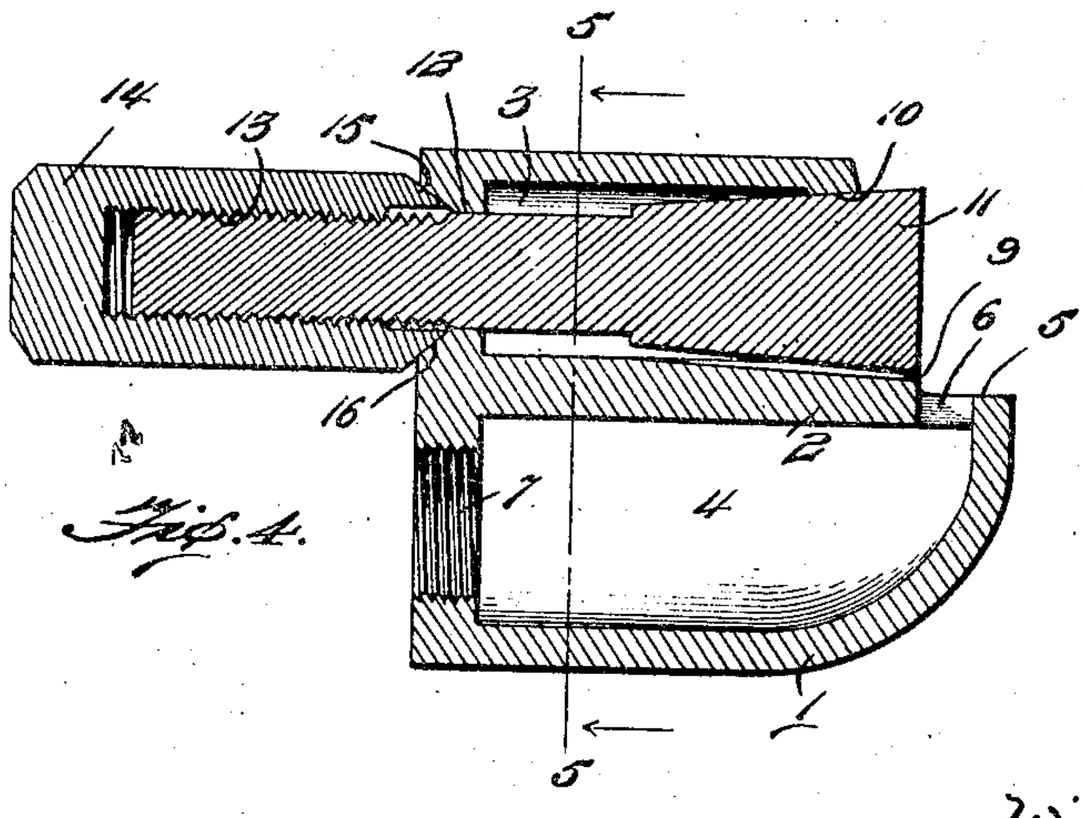
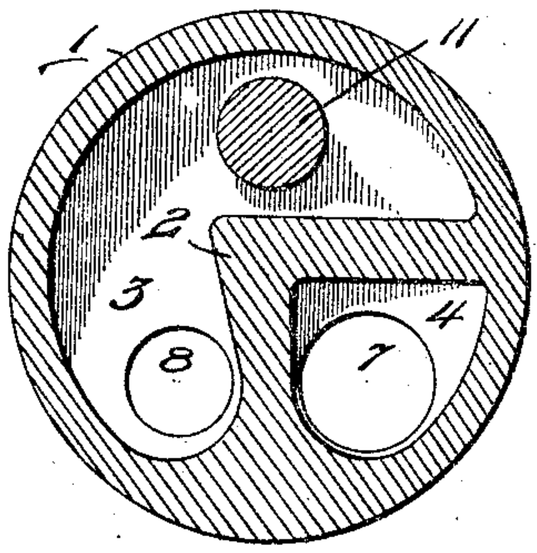


Fig. 5



Witnesses

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2 SHEETS—SHEET 2.

Fig. 6.

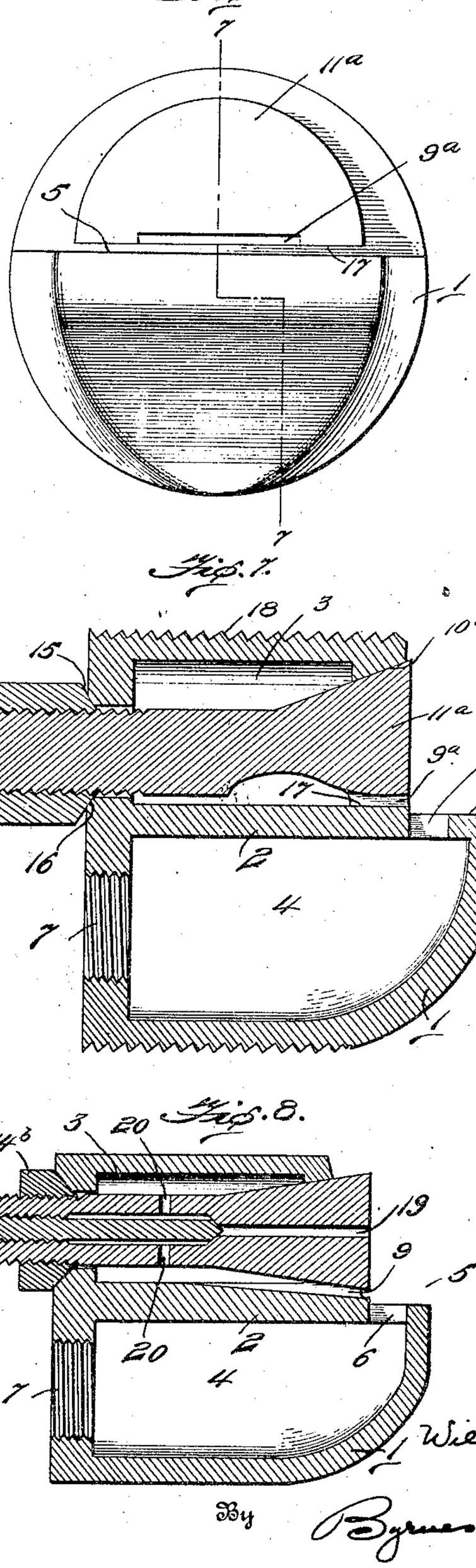

Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE.

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HYDROCARBON-BURNER.

No. 928,886. Specification of Letters Patent. Patented July 20, 1909.

Application filed December 26, 1907. Serial No. 408,091.

To all whom it may concern:

Be it known that I, WILLIAM SCRIMGEOUR, a citizen of the United States, residing at Portsmouth, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

The object of this invention is to provide a simple, durable, economical and efficient burner for hydrocarbon and other fuels, the burner being of the type wherein the fuel is atomized or distributed and burned by means of steam or air under comparatively high pressures.

A preferred form of burner constructed in accordance with the invention is illustrated in the accompanying drawings wherein—

Figure 1 is a plan view of one form of burner, the fuel and the air or steam chambers being indicated in outline by dotted lines; Fig. 2 is a front elevation of the same; Fig. 3 is a rear elevation of the same; Fig. 4 is a longitudinal vertical section of the same on the broken line 4—4 of Fig. 3; Fig. 5 is a vertical transverse section on line 5—5 of Fig. 4 looking in the direction of the arrows; Fig. 6 is a front elevation of a modified form of burner adapted for the production of a larger flame; Fig. 7 is a vertical longitudinal section of the broken line 7—7 of Fig. 6, and Fig. 8 is a sectional view illustrating a modified form of plug provided with a valve-controlled supplemental port for air or steam.

Referring particularly to Figs. 1 to 5, the burner is represented as comprising a cylindrical casing 1, usually of brass, the rearward portion being divided longitudinally by an L-shaped partition 2 in such manner as to provide a steam or air chamber 3, and a smaller fuel chamber 4. At the front of the burner a prolongation of the fuel chamber 4 extends transversely across the burner beneath a projecting lip 5, through which extends the central fuel port 6.

7 represents the fuel inlet for connection by means of valved pipes in the usual way to a source of supply fuel under suitable pressure.

8 is an inlet aperture for steam or air, communicating with the chamber 3 at its rear end: the steam or air chamber 3 extends transversely across the casing 1 above the partition 2, and the steam or air is delivered through a contracted port 9 located above and to the rear of the lip 5 and in close proximity to the fuel-port 6 in said lip. The arrangement of the fuel and air or steam ports is such that the fuel flowing upwardly through the port 6 is sprayed or atomized and burned by the jet of air or steam from the port 9, the said jet being directed across and impinging upon the fuel at its point of discharge: this relative arrangement of the fuel and air or steam ports is such as is commonly employed in the art.

Centrally disposed above the lip 5 in the front wall of the casing 1 is an aperture 10. This aperture is circular in form with the exception of the lower groove or extension 9 forming the air or steam port above referred to, and tapers inwardly to receive the plug 11. The forward end of the plug 11 is tapered to correspond to the aperture 10, and when fully retracted accurately closes the same with the exception of the port 9. The plug 11 extends rearwardly through the air or steam chamber 3 and through a circular orifice 12 in the rear wall of the casing 1, the protruding or rear end of the plug being screw-threaded as indicated at 13. An elongated cap-nut 14 extends over the end of the plug 11, this nut having an accurately beveled bearing surface 15 engaging the outwardly tapering walls 16 of the aperture 12 and forming a steam-tight joint therewith. The construction is such that when the nut 14 is turned to retract the plug 11 the apertures 10 and 12 are simultaneously closed; whereas by loosening the nut 14 the plug 11 may be thrust forward or completely removed. The port 9 may be cleared of any obstructing matter merely by advancing the plug 11 and utilizing the pressure of the air or steam for clearing the orifice; or in case

of necessity the removal of the plug affords free access to the interior of the steam or air chamber.

In case a wider aperture for the discharge of fuel and air or steam is desired, thereby providing a larger flame, I prefer to modify the construction in the manner shown in Figs. 6 and 7. The general construction and arrangement of parts is as above described, but in order to provide space required for the greater width of the air or steam port 9^a, the plug 11^a is semi-circular in form at its forward end, its lower flat surface 17 being suitably grooved to provide an air or steam port of the form and dimensions desired. Obviously the groove may be formed in the wall of the casing beneath the plug instead of in the plug. It is obvious that in this construction the air or steam port may be extended laterally as desired, and the construction is therefore more particularly adapted to burners of relatively great heating capacity.

In Fig. 7 I have illustrated screw-threads 18 formed in the exterior of the cylindrical casing 1. This feature is equally applicable to all forms of cylindrical burner casings, and permits any burner to be screwed into place in a furnace wall, shield or the like, thereby protecting both the burner and operator from the heat of the flame. In burners of large capacity it is advantageous to provide the cap-nut 14 with a rearward extension 14^a of sufficient length to permit its ready manipulation while the burner is in operation.

In Fig. 8 I have shown a further modification consisting in the provision in the plug 11 of a supplemental air or steam port 19 extending to the forward end of the plug above the air or steam port 9, the purpose of this supplemental port being to supply directly to the flame air or steam in excess of that which can be economically supplied through the regular port 19, or which is required to atomize or spray the fuel. The supplemental port 19 communicates with the air or steam chamber 3 through radial ports 20 in the plug 11, and is controlled by a valve 21 extending through the rear end of the plug. In this construction the cap-nut 14 may be replaced by a short nut 14^b, permitting the operation of the valve 21, from the rear of the burner.

While I have specifically described the adaptation of the supplemental, valve-controlled air or steam port to the form of aperture shown in Figs. 1 to 5, it will be understood that the same is equally applicable to the modification illustrated in Figs. 6 and 7.

The burners of the form described are found in practice to be economical, efficient and easy of operation and control. The construction provides a relatively large steam chamber which partially incloses the fuel chamber, the effect when operating the burner with steam being to very effectively pre-heat the fuel and thus to increase the efficiency of combustion; the construction furthermore renders the burner capable of sustaining combustion with fuels other than the hydrocarbon oils, the burner having proven effective for the combustion of molasses or the like. The construction of the plugs 11 or 11^a affords so ready a means for clearing the air or steam ports that the burner is capable of uninterrupted service under the most adverse conditions. The provision of the valve-controlled supplemental port for air or steam permits the supply of larger amounts of fuel than could otherwise be economically used, and greatly increases the heating capacity of the burner.

I claim:

1. In a hydrocarbon burner, a burner casing having a projecting lip and a casing wall extending upwardly therefrom, fuel and air or steam chambers in said casing, a port in said lip communicating with said fuel chamber, an aperture in the casing wall at the rear of said fuel port, and a plug partially closing said aperture, said plug located above said lip and extending rearwardly through the burner casing.

2. In a hydrocarbon burner, a burner casing having a projecting lip and a casing wall extending upwardly therefrom, fuel and air or steam chambers in said casing, a port in said lip communicating with said fuel chamber, an aperture in the casing wall at the rear of said fuel port, a plug partially closing said aperture, said plug located above said lip and extending rearwardly through the burner casing, and an adjustable retaining device for said plug.

3. In a hydrocarbon burner, a burner casing having a projecting lip and a casing wall extending upwardly therefrom, fuel and air or steam chambers in said casing, a port in said lip communicating with said fuel chamber, a tapered aperture in the casing wall at the rear of said fuel port, and a tapered plug partially closing said aperture, said plug located above said lip and extending rearwardly through the burner casing.

4. In a hydrocarbon burner, a burner casing having chambers for fuel and for air or steam, a fuel port, an aperture in said casing at the rear of said fuel port, a plug partially closing said aperture, a supplemental air or steam port in said plug, and a valve for controlling said supplemental port.

5. In a hydrocarbon burner, a burner casing having chambers for fuel and for air or steam, a fuel port, an aperture in said casing at the rear of said fuel port, a plug partially closing said aperture, a supplemental air or steam port extending from said air or steam

chamber to the forward end of said plug, and a valve for controlling said supplemental port.

6. In a hydrocarbon burner, a burner casing having a projecting lip, fuel and air or steam chambers in said casing, a port in said lip communicating with said fuel chamber, a tapered aperture in said casing at the rear of said fuel port, a tapered plug partially closing said aperture, and an adjustable retaining device for said plug.

In testimony whereof, I affix my signature in presence of two witnesses.

WILLIAM SCRIMGEOUR.

Witnesses:
C. P. TOWNSEND,
N. P. LEONARD.