H. F. HAGEMEYER.

BURNER.

APPLICATION FILED NOV. 10, 1913.

1,105,031.

Patented July 28, 1914.

2 SHEETS—SHEET 1.

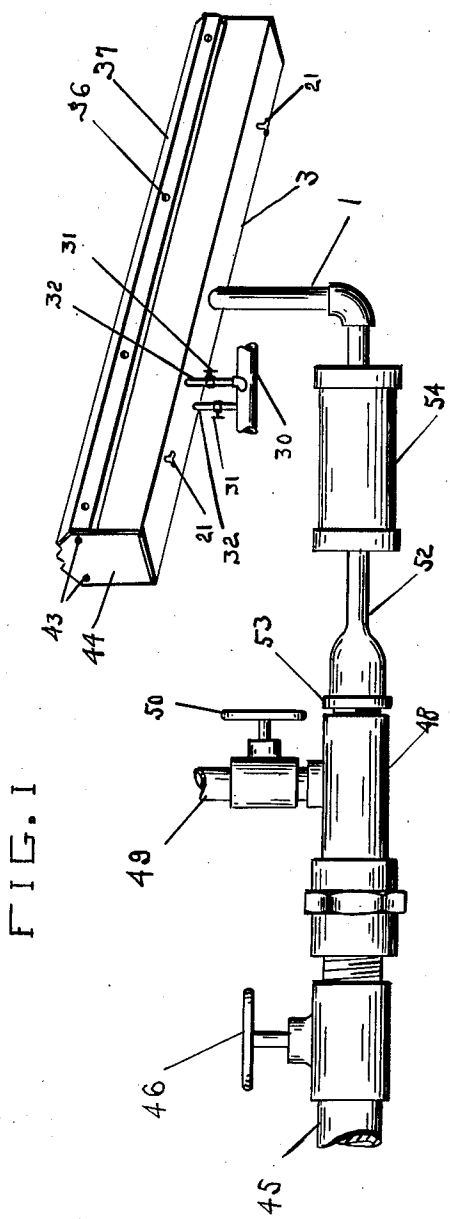


FIG. 1

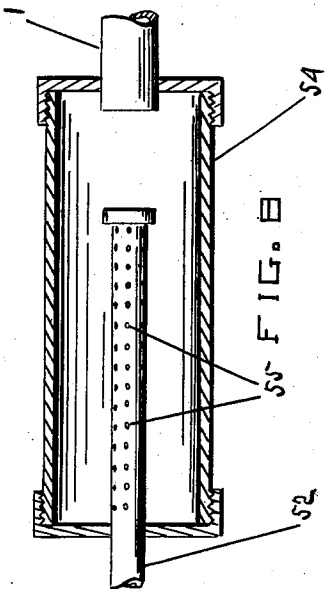


FIG. B

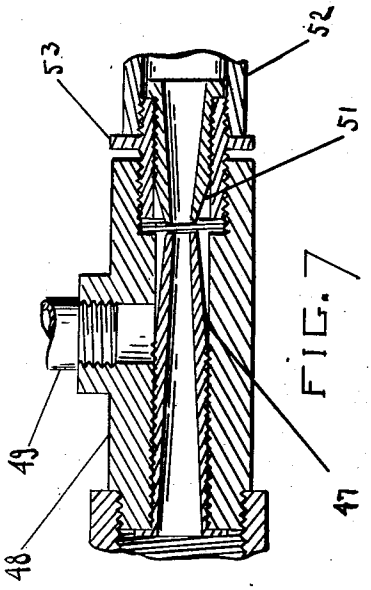


FIG. 7

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2 SHEETS—SHEET 2.

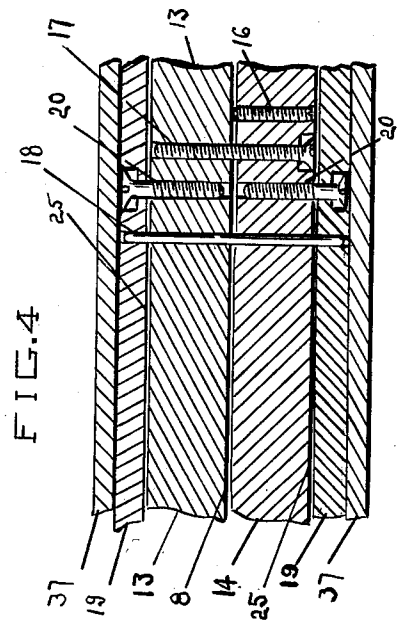


FIG. 4

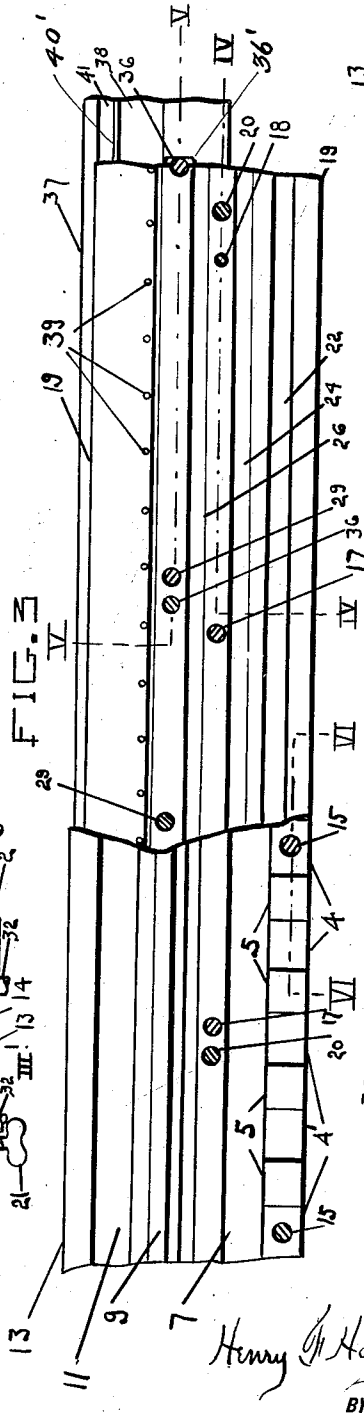


FIG. 3

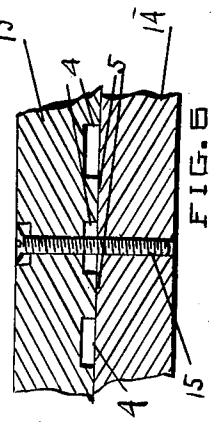


FIG. 6

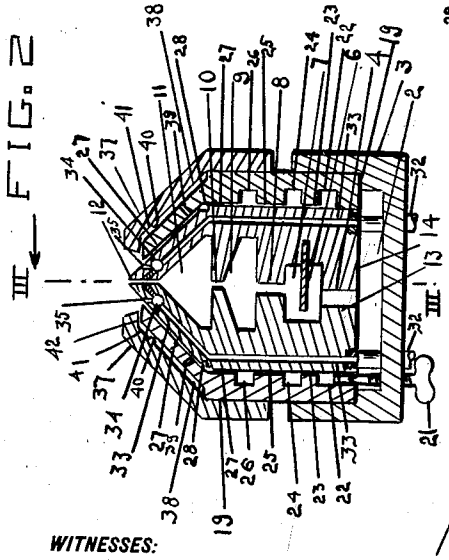


FIG. 2

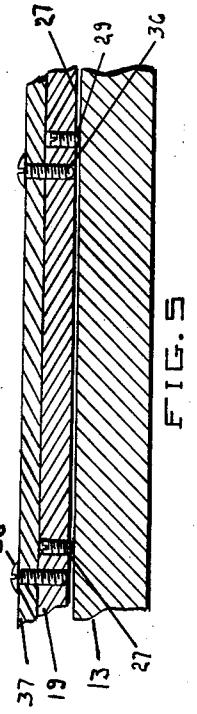


FIG. 5

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UNITED STATES PATENT OFFICE.

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BURNER.

1,105,031. Specification of Letters Patent. Patented July 28, 1914.

Continuation in part of application Serial No. 732,809, filed November 22, 1912. This application filed November 10, 1913. Serial No. 800,062.

To all whom it may concern:

Be it known that I, HENRY F. HAGEMEYER, a citizen of the United States of America, residing at Toledo, Lucas county, Ohio, have invented a new and useful Burner, of which the following is a specification.

This invention relates to the propagation of combustion, especially at a high velocity. This invention has utility when embodied in fluid burners, particularly for local heatings of considerable intensity.

Referring to the drawings: Figure 1 is a perspective view of an embodiment of the invention in a burner for gaseous fuel; Fig. 2 is a transverse section, on an enlarged scale, through the burner body; Fig. 3 is a fragmentary view of one half of the burner body on the line III—III, Fig. 2, the lower channel member being omitted; Fig. 4 is a section on the line IV—IV, Fig. 3; Fig. 5 is a section on the line V—V, Fig. 3; Fig. 6 is a section on the line VI—VI, Fig. 3; Fig. 7 is a medial longitudinal section through the fuel supply connections; and Fig. 8 is a medial longitudinal section through the fuel commingling chamber.

The commingled gaseous fuel from the duct 1 passes into the chamber 2 in the lower channel member 3 of the burner body. From this chamber 2 the fuel supply passes through the openings 4 between the lugs 5 striking the baffle 6 in the chamber 7. Leading from the chamber 7 is the slot passage 8 of area slightly less than the aggregate area of the holes 4. This slot 8 leads to the chamber 9 having the slot passage 10 leading to the chamber 11, which has the primary fuel supply opening or slot 12. The area of the slot 12 is to advantage less than the area of the opening 10, and opening 10 is less than the area of the opening 8. This feature assists in stepping up the velocity of the fuel supply, while with the chamber volumes larger as the openings are smaller, notwithstanding the increased velocity, there is effective commingling. The series of chambers with the connecting passages insures uniform pressure distribution throughout the length of the primary fuel supply opening or burner slot 12. These chambers and passages are shown as formed between the burner body members 13, 14. These members 13, 14, are held snugly together at the bottom by the screws 15 (Fig. 6), while provision is made by the screws 16 (Fig. 4) for adjusting the upper spacing between these members 13, 14. Adjacent the spacing screws 16 are the clamping screws 17 insuring a firm locking of the members in adjusted position. The slight outward tilting is small but permits great refinement in adjusting the openings for fuel supply.

In assembling the members 13, 14, they are lined up for the various screws by the dowel pins 18, which may extend through the auxiliary body members 19. The members 19 are clamped to the body members 13, 14, by the screws 20 (Fig. 4). The needle valves 21 are adjustable to regulate the auxiliary fuel supply from the chamber 2 to the chamber 22, from which the fuel may flow through the passage 23 to the chamber 24, and thence via the slot passage 25 to the chamber 26 having the slot fuel supply opening 27 directed toward the main fuel supply slot 12. This auxiliary fuel supply from the opening 27 may to advantage operate as a less velocity envelop for the main fuel supply, thereby making possible greater velocity of burning at the main fuel supply opening 12. The enlargement 28 at the angle in the slot passage 27 precludes retarding of velocity at this point. Adjustment is permitted by the screws 29 (Fig. 5) so the passages may be closely regulated. The screws 20, serve to hold the tilted members 19 in the adjusted positions.

In some fuel mixtures it is desirable to supply additional air for better supporting combustion, and provision is made therefor from the supply line 30 having the valves 31 in the ducts 32 leading to the passages 33 in the members 13, 14. These ducts 33 lead to the longitudinally extending chambers 34 having the discharge slots or openings 35 between the opening 12 and the openings 27. The volume and pressure of this supplemental air supply may be regulated as the occasion warrants.

The screws 36 by extending through slots 36′ (Fig. 3) in the members 37 (Fig. 5) may serve to clamp the members 37 in adjusted positions adjacent the members 19 to provide chambers 38 supplied with fuel from the passage 27 by the openings 39. The

chambers 38 are connected by the passages 40 with the chambers 41 having the slot openings 42 directed toward the auxiliary openings 27 and main opening 12 the beads 40′ (Fig. 3) on the members 37 serve to partially separate the chambers 38 from the chambers 41. As these beads 40′ do not extend to the members 19 the passages 40 between said chambers are provided. Adjustment of the members 37 varies the openings 42. There is accordingly provided two auxiliary fuel supply openings which may emit fuel at different velocities to form envelops for the main thin sheet of flame from the long narrow or line discharge opening. With the fuel from the main discharge opening flowing at too great a velocity to remain ignited, the fuel from the primary or inner auxiliary fuel supply openings may be supplied at a slightly less velocity while the secondary or outer auxiliary fuel supply openings supply fuel at a still less velocity. The function of the auxiliary fuel supply openings is to bring the relative flow rates within the rate of flame propagation for the fuel.

The screws 43 (Fig. 1) serve to clamp the end closure plates 44 in position to thereby complete the chambers and passages longitudinally extending in the burner body.

The air supply line 45 may be controlled by the valve 46 having the nozzle 47 in the housing 48. The fuel supply or gas line 49 may be controlled by the valve 50 to supply fuel about the nozzle 47 in the housing 48. The velocity of the combustion supporting supply from the duct 45 in passing to the oppositely directed and somewhat larger reversely extending nozzle 51, draws in an envelop of fuel which is at once commingled in the expansion due to the enlargement of the passage 52. This reverse nozzle 51 may have its distance varied from the air nozzle 47, thereby permitting great nicety of adjustment of fuel and air. This adjustment is effected through the bushing 53. While some commingling is thus brought about, further agitation besides that effected in the burner body, may be caused by leading the duct 52 into the chamber 54. Openings 55 from the duct 52 may be of such area as to care for the fuel supply at the velocity of flow in the duct 52. These openings 55 direct the incoming fuel toward the walls of the chamber 54. From this chamber 54 the mixed fuel passes into the duct 1 to the burner body.

The disclosure is a simple burner for producing high temperature results with cheap fuels. In action the burner is self cleaning. In structure it is accessible for inspection or such adjustments as may be desired, even to varying the directed flame within the burner length.

What is claimed and it is desired to secure by Letters Patent is:

1. A burner comprising a burner body provided with a fuel supply duct, a discharge slot for fuel burning supply, and a plurality of chambers in series between said duct and slot, said chambers having different size openings therebetween for pressure equalization.

2. A burner comprising a burner body provided with means for main fuel burning supply embodying a high velocity discharge slot, and said burner body being further provided with means for an auxiliary fuel burning supply embodying a less velocity discharge slot parallel to and directed toward said main fuel discharge slot.

3. A burner comprising a burner body provided with a main high pressure fuel discharge opening having a duct leading thereto, and said burner body being further provided with an auxiliary lower pressure fuel supply discharge opening having a duct leading thereto, said auxiliary discharge opening being directed along and toward the main discharge opening to direct its fuel to travel with the main fuel discharge, thereby diminishing the relative velocity between the fuel of the main discharge opening and the auxiliary discharge opening.

4. A burner comprising a burner body provided with a main discharge slot for fuel burning supply, and a plurality of parallel auxiliary discharge slots for supplemental fuel burning supply directed toward the main discharge slot.

5. A burner comprising a burner body provided with a main discharge slot for fuel burning supply and a pair of auxiliary discharge slots parallel to the main discharge slot, one on each side of the main discharge slot and directed theretoward.

6. A burner comprising a burner body provided with a main discharge slot for fuel burning supply and a plurality of auxiliary discharge slots parallel to the main discharge slot, on one side of the main discharge slot and directed theretoward.

7. A burner comprising a burner body provided with a main discharge slot for fuel burning supply and a pair of auxiliary discharge slots on each side of the main discharge slot, parallel to the main discharge slot and directed theretoward.

8. A burner comprising a burner body provided with a discharge opening for a primary fuel burning supply, and discharge means having a slot directed along and toward the primary discharge opening to provide an enveloping fuel supply of less velocity than the primary fuel supply, thereby diminishing the relative velocity between the fuel of the primary discharge opening and the enveloping fuel supply.

9. A burner comprising a burner body provided with a discharge opening for a primary fuel burning supply and discharge means providing outer and inner enveloping fuel supplies for the primary supply, the outer of said enveloping supplies being of less velocity than the next inner.

10. A line burner comprising a burner body provided with a long narrow discharge opening for fuel burning supply to produce a thin continuous sheet of flame, and independently controllable air-blast means parallel to said line opening and directed theretoward to provide a combustion supporting envelop for the sheet of flame along the sides of said flame.

11. A line burner comprising a burner body provided with a pair of long narrow discharge openings for fuel burning supplies directed toward each other, and air blast means therebetween whereby a thin continuous sheet of flame is produced co-extensive with the length of one of the discharged openings.

12. A line burner comprising a burner body provided with a long narrow discharge opening for a primary fuel burning supply, parallel long narrow discharge means directed toward the primary discharge opening to provide an enveloping fuel supply, and means for supplying air between the discharge opening and the discharge means, whereby a thin continuous sheet of flame of high velocity may be produced, said flame being co-extensive in length with the length of the discharge opening.

13. A line burner comprising a burner body provided with a fuel supply duct, a long narrow discharge opening for fuel burning supply, a plurality of chambers in series between said duct and opening, passages connecting said chambers and duct, and a baffle in one of said chambers disposed between the openings of said chamber to deflect the fuel in its travel therethrough.

14. A line burner comprising a burner body provided with a fuel supply duct, a long narrow discharge opening for fuel burning supply to produce a continuous sheet of flame co-extensive with the length of said opening, a plurality of chambers in series between said duct and opening and provided with connecting passages, and means including a pair of relatively adjustable members for varying the area of said discharge opening whereby the flame may be controlled.

15. A line burner comprising a burner body provided with a fuel supply duct, a long narrow discharge opening for fuel burning supply to produce a sheet of flame co-extensive with the length of said opening, means for varying the width of said opening including a pair of parallel relatively adjustable members to control said sheet of flame, and auxiliary fuel discharge slots directed toward said discharge opening.

16. A line burner comprising a burner body provided with a fuel supply duct, a long narrow discharge opening for fuel burning supply to produce a sheet of flame co-extensive with the length of said opening, a plurality of chambers in series between said duct and opening and provided with connecting passages therebetween, and means including opposing relatively movable members for adjusting the widths of said passages to control said sheet of flame.

17. A line burner comprising a burner body provided with a main long narrow fuel discharge opening and means for feeding fuel thereto, said burner body being further provided with a parallel auxiliary fuel discharge opening and means for feeding fuel thereto, said auxiliary discharge opening being directed toward the main discharge opening to direct its fuel to travel with the main fuel discharge, and means for adjusting the width of one of said openings whereby a controllable high velocity sheet of flame may be produced co-extensive with the length of the main opening.

18. A line burner comprising a burner body provided with a main fuel discharge opening and means for feeding fuel thereto, said burner body being further provided with an auxiliary fuel discharge opening and means for feeding fuel thereto, said auxiliary discharge opening being directed toward the main discharge opening to direct its fuel to travel with the main fuel discharge, and means for adjusting the widths of said openings whereby a controllable high velocity sheet of flame may be produced co-extensive with the length of the main opening.

19. The combination of a burner and controlling mechanism therefor embodying an air supply duct, controlling means therefor, a fuel supply duct, controlling means therefor, a housing to which said ducts lead, a mixture carrying duct from the housing to the burner, said housing providing concentric discharge openings for said air and fuel supplies, and a relatively adjustable member in said housing opposing said concentric discharge openings for varying the supply to the burner through the mixture carrying duct independently of the air-controlling means and of the fuel controlling means.

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

HENRY F. HAGEMEYER.

Witnesses:
GEO. E. KIRK,
ROBERT M. CORD.