A. G. SCHUMANN.

OIL OR GAS BURNER.

APPLICATION FILED SEPT. 29, 1921.

1,437,201. Patented Nov. 28, 1922.

2 SHEETS—SHEET 1.

FIG. 1.

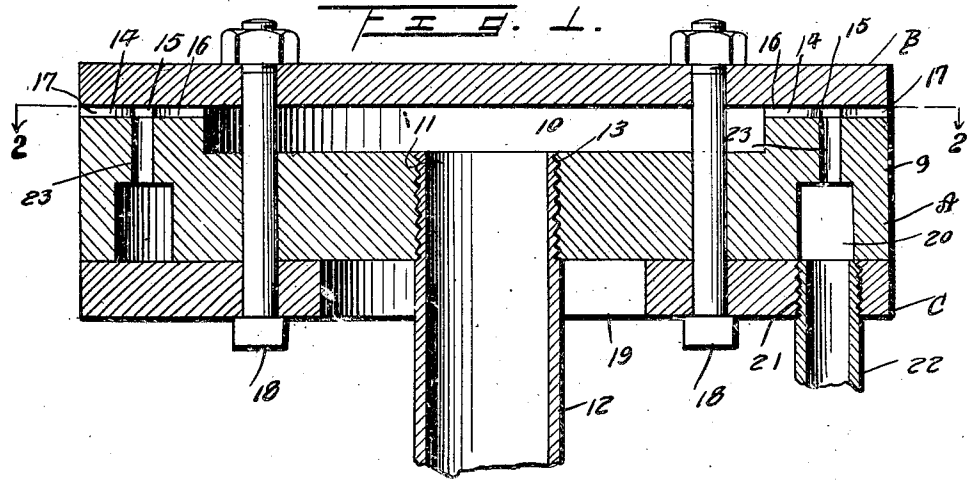
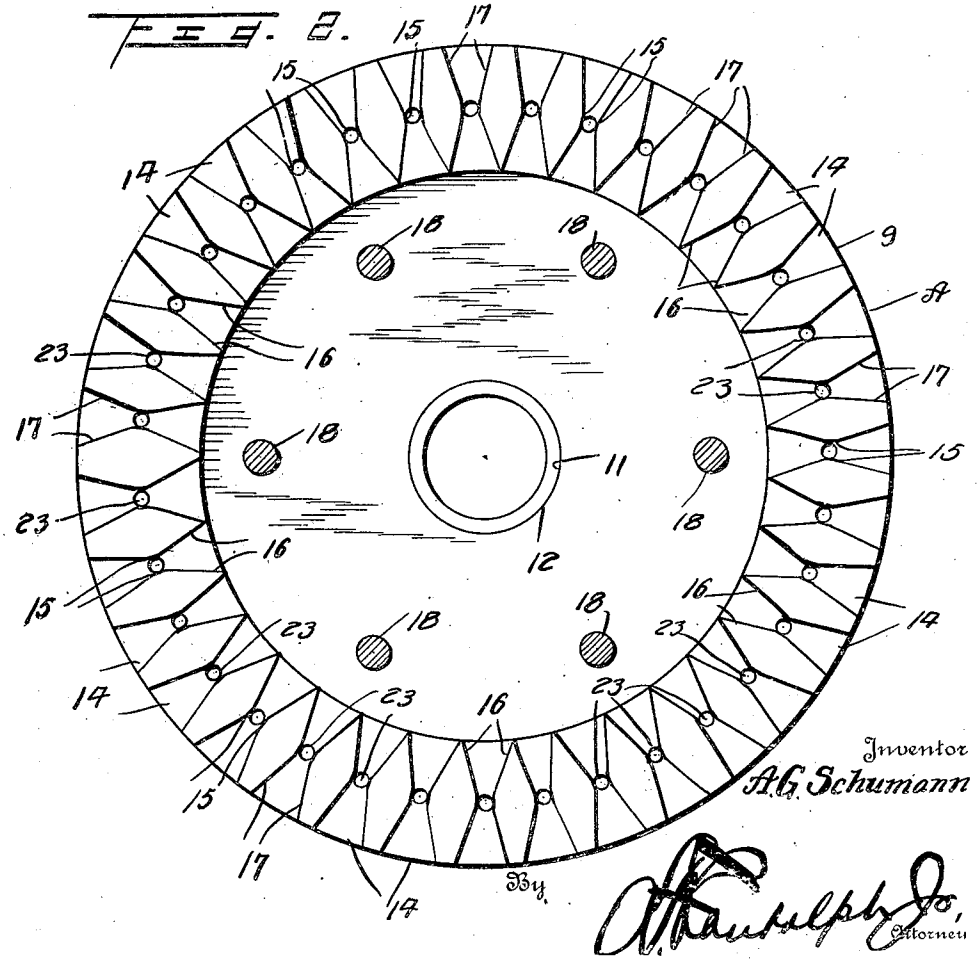



FIG. 2.




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2 SHEETS—SHEET 2.

FIG. 3.

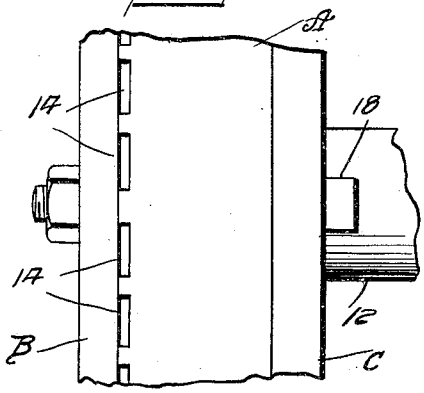



FIG. 4.

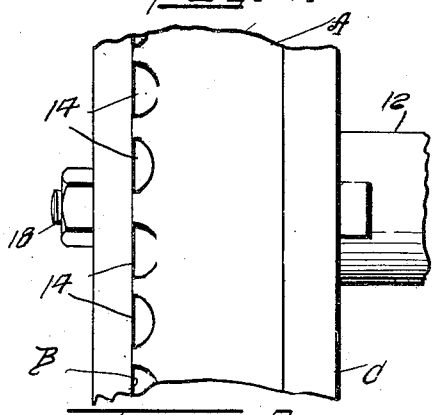



FIG. 5.

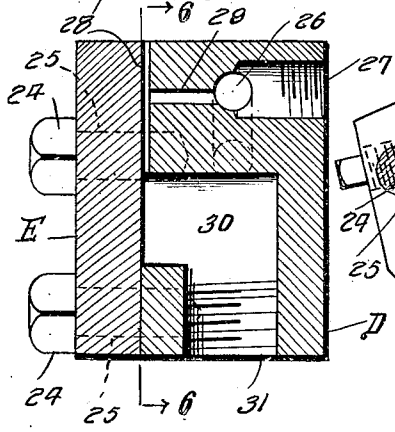



FIG. 6.

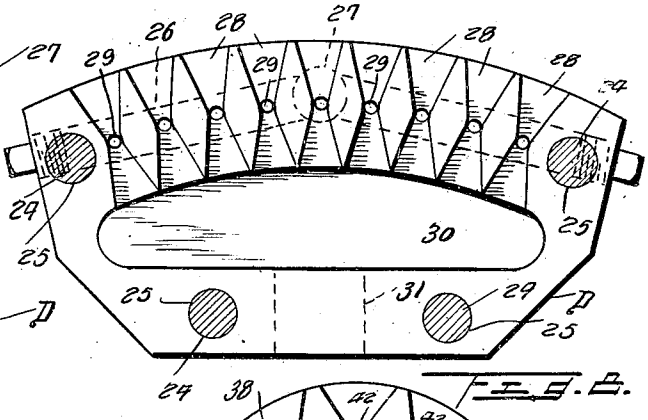



FIG. 7.

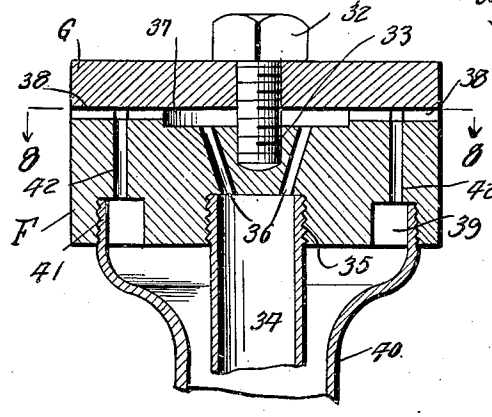
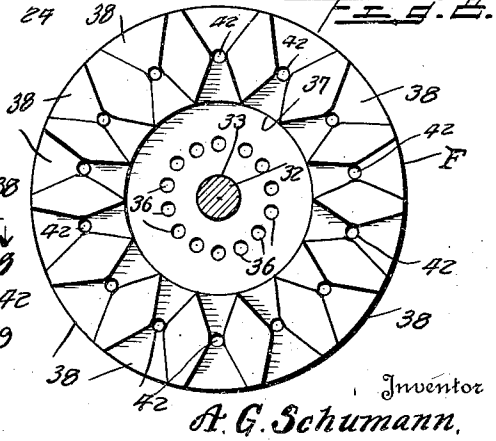



FIG. 8.




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By

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Patented Nov. 28, 1922. 1,437,201

# UNITED STATES PATENT OFFICE.

ALFRED G. SCHUMANN, OF BALTIMORE, MARYLAND.

## OIL OR GAS BURNER.

Application filed September 29, 1921. Serial No. 504,006.

*To all whom it may concern:*

Be it known that I, ALFRED G. SCHUMANN, a citizen of the United States, residing at Baltimore, in the city of Baltimore, and State of Maryland, have invented certain new and useful Improvements in Oil or Gas Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a burner particularly applicable for use in steam boiler furnaces to produce maximum heat from a minimum quantity of fuel such as oil, tar, gas or powdered coal.

It is an aim to provide various types of burners to reduce to practice to a greater degree the form disclosed in my pending application for an improved oil or gas burner, Serial Number 461,299, filed April 14, 1921, and to use the principles thereof in burners of different shapes.

In addition, an aim is to improve the construction of burners generally as will appear from a consideration of the description following, taken in connection with accompanying drawings illustrating practical embodiments, and to provide a form which may essentially use a body casting and a cover plate of such combination and construction as to enable rapid and expeditious manufacture.

A further object is to provide burners having venturi shaped fuel orifices or ports varying in depth to produce flame tips at variable distances from the burner or to insure a more uniform temperature throughout the fire box or furnace in which the burner is disposed.

Additional objects and advantages will become apparent as this description progresses.

In said drawings:—

Figure 1 is a central vertical section through one form of burner,

Figure 2 is a cross sectional view on the line 2—2 of Figure 1;

Figure 3 is a fragmentary side elevation;

Figure 4 is a fragmentary side elevation showing fuel orifices or outlets of different shape from those of Figure 3;

Figure 5 is a vertical sectional view through a second form of burner;

Figure 6 is a cross section on the line 6—6 of Figure 5;

Figure 7 is a cross section taken vertically and centrally through a third form of burner, and

Figure 8 is a cross sectional view on the line 8—8 of Figure 7.

Like reference characters designate like or similar parts where they occur throughout the views.

In the first form of the invention as illustrated in Figures 1, 2, and 3, the burner essentially comprises a body member A and a cover plate member B. In the upper surface of the body member A a marginal flange 9 extends around a central recess or manifold 10. A central opening 11 is provided through the body A in communication with the recess 10 and a pipe or conduit 12 communicates therewith and is threaded therein as at 13. Through the pipe 12 and opening 11 air or steam, under pressure is admitted to the recess 10. In the upper surface of the flange 9 discharge passageways 14 are provided having their axes radially disposed from the center of the body A and substantially midway of their ends having restricted throats 15 from which the side walls flare as at 16 towards the recess 10 and at 17 towards the marginal edge of the body. Thus the ports or orifices 14 are generally venturi shaped as in said pending application, Serial Number 461,299. A bottom plate C is provided and said body A, cover plate B, and bottom plate C are detachably secured together by means of bolts 18 extending transversely therethrough. Plate C is preferably enlarged at 19 to permit insertion and passage of the conduit 12 therethrough. In the lower surface of the body A an annular or continuous passageway 20 is provided which is closed from below by the plate C except for an opening 21 having screw threads therein detachably engaged by those of a supply pipe or conduit 22 to convey fuel to the passageway 20. From the passageway 20 a plurality of outlet openings or passageways, as at 23, extend which communicate with the discharge ports 14 at the bases of the throats 15.

It will be seen that a suitable fuel may be supplied through the pipe 22 into the passageway 20 and thence through the passageways 23 into the discharge ports 14 at their throats. Simultaneously, air or steam is admitted through the pipe 12, port 11, and manifold 10 and thence into the ports 14 through the portion 16, there becoming more

compressed and at the point of greatest velocity striking the fuel emerging from the passageways 23 and thoroughly atomizing the same as it passes through the portion 17 and is ignited at said portion. This burner will give a substantially flat, long, endless flame of intense heat with the minimum expenditure of fuel.

As shown in Figure 3, the ports 14 may be of the same depth, however, as shown in Figure 4, they may vary in depth in any manner desired and for instance, alternately as shown, which I find produces flame tips at variable distances from the burner and insures more uniform temperature throughout a fire box or furnace in which the burner is disposed. Also as shown in said Figure 4, the walls of the opening or port 14 may be transversely curved or arcuate, which I find in practice can be produced more readily, efficiently and at less expense than ports having a flat bottom wall and vertical or straight side walls.

In the form shown in Figures 5 and 6, a body D is employed having a cover plate E associated therewith and secured thereto as by bolts or set screws 24 passing through the plate E and into openings 25 in the body D. Body member D and plate E are substantially segmental in form and may be provided in any suitable size or shape or portion of a circle. A manifold 26 is provided to receive fuel through an inlet passageway 27 adapted to receive a pipe or conduit leading from any suitable source. Plate E, of course, is detachable and covers a plurality of discharge ports 28 to which passageways 29 lead from the manifold 26. Passageways 28 are preferably of the shape shown either in Figure 3 or 4 and employed in the form first described. Said passageways 28 also communicate with a steam or air manifold 30 having a connecting port 31 for a steam or air inlet pipe.

In said form of Figures 5 and 6, the fuel from manifold 26 passes through passageways 29 into the discharge openings 28 at their throats and is there impinged by air or steam under pressure flowing from manifold 30, so as to thoroughly atomize the fuel prior to its ignition.

The third form illustrated in Figures 6 and 7 may have a body member F and a cover plate G detachably secured thereto by means of a bolt or set screw 32 passing through the cover G and into an opening 33 of the body F provided with screw threads. A compressed air supply pipe 34 is screw threaded into an opening 35 in body F and from said opening a plurality of passageways, preferably inclined, may be provided at 36 communicating with a manifold recess 37, in turn, communicating with discharge ports or passageways 38 of the form shown either in Figure 3 or Figure 4. An annular or endless passageway 39 is provided in the base of body F and a fuel supply pipe 40 is screw threaded to the outer wall of the passageway 39 as at 41, so that fuel will flow from the pipe 40 into the passageway 39. From passageway 39, branch passageways 42 lead to convey the fuel to the ports 38. Thus the fuel flows through passageway 40, passageway 39, passageway 42, and enters the discharge ports 38 at their throats. Simultaneously air or steam under pressure passes through pipe 34 and the inclined passageways 36 into the manifold recess 37 and thence into the ports 38, impinging upon the fuel as it emerges from passageways 42 at the throats of ports 38.

It is to be understood that I have disclosed merely preferred forms which seem at present best capable of the practice of my invention, in view of which fact, many changes in the details of construction, combination, arrangement of the parts and in priciple may be resorted to.

I claim as my invention:—

1. A burner of the class described having a body member, said body member having substantially radially disposed discharge ports, a cover member disposed over said ports, said body member having a manifold recess in communication with said ports, means to supply an atomizing medium to said manifold, and means to supply fuel through said body to said ports.

2. A burner of the class described having a body member provided with outlet ports, said body having a manifold recess in communication with said ports, means to supply a pressure medium through said body to said manifold recess, said body having an endless passageway, and branches extending from said endless passageway to said ports, and means to supply fuel to said endless passageway.

3. A burner of the class described having a body member, said body member being provided with fuel outlet ports and a manifold recess in communication with said ports, a cover member disposed over said ports and manifold recess, means to supply a pressure medium to said manifold recess, and means to supply fuel to said ports.

4. A burner of the class described having a body member provided with a manifold recess, said body member having a portion disposed across the recess, said portion in its outer surface being provided with fuel outlet ports, a cover member disposed on said portion and over said recess and ports, means to supply a pressure medium to said manifold recess, and means to supply fuel to said ports.

5. A burner of the class described having a body member provided with a manifold recess in one face thereof and a flange surrounding said recess, said flange in its outer

surface having a plurality of discharge ports in communication with said recess, said body member in the surface opposite to said manifold recess having an endless passageway, branch passageways leading from said endless passageway to said ports, a bottom plate disposed over said endless passageway, fastening means to secure said plate and body in rigid relation, an air supply means passing through the bottom plate and communicating with said manifold passageway, and a fuel supply pipe secured in said bottom plate and communicating with said endless passageway.

6. A burner of the class described having a body member, a cover member detachable from said body member, said cover member and body member having circumferential edge portions, said body member having ports with their outlets at said edge portions, said ports being covered by said cover member, said body having a fuel manifold passageway and branch passageway leading from said manifold to said ports, means to admit fuel to the manifold, and said body member having a manifold in communication with said ports, and means to supply a pressure medium to the second mentioned manifold.

7. A burner of the class described having a body member provided with a manifold in one face thereof, and discharge ports leading from said manifold, a cover disposed over said manifold and ports, a fastening means passing removably through said cover and into said body member, a pipe to supply a pressure medium secured to said body member, said body member having a plurality of ports leading to said manifold from the discharge end of said pipe, said body member in the face thereof opposite to said manifold and ports having an endless passageway, said body member having passageways leading from said passageway to said ports, and a fuel supply pipe screw threaded into the first mentioned passageway.

8. A burner of the class described having a body member, said body member having substantially radially disposed discharge ports varying in size and disposed in a row, a cover member disposed over said ports, said body member having a manifold recess in communication with said ports, means to supply an atomizing medium to said manifold, and means to supply fuel through said body to said ports.

9. A burner of the class described having a body member, said body member having substantially radially disposed discharge ports varying in size, alternate ports being of the same size, a cover member disposed over said ports, said body member having a manifold recess in communication with said ports, means to supply an atomizing medium to said manifold, and means to supply fuel through said body to said ports.

10. A burner of the class described having a body member, said body member having substantially radially disposed discharge ports, said ports varying in depth, alternate ports being of the same depth, a cover member disposed over said ports, said body member having a manifold recess in communication with said ports, means to supply an atomizing medium to said manifold, and means to supply fuel through said body to said ports.

11. A burner of the class described having a body member, said body member having substantially radially disposed discharge ports, said ports being flat and varying in size, a cover member disposed over said ports, said body member having a manifold recess in communication with said ports, means to supply an atomizing medium to said manifold, and means to supply fuel through said body to said ports.

12. A burner of the class described having a body member, said body member having substantially radially disposed discharge ports, said discharge ports varying in depth, alternate ports being of the same depth, a cover member disposed over said ports, said body member having a manifold recess in communication with said ports, means to supply an atomizing medium to said manifold, and means to supply fuel through said body to said ports.

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

ALFRED G. SCHUMANN.

Witnesses:
ROSA GERDING,
HENRY E. GERDING.