B. W. CRIBB.

WELDING OIL BURNER.

APPLICATION FILED JAN. 20, 1909.

936,220.

Patented Oct. 5, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

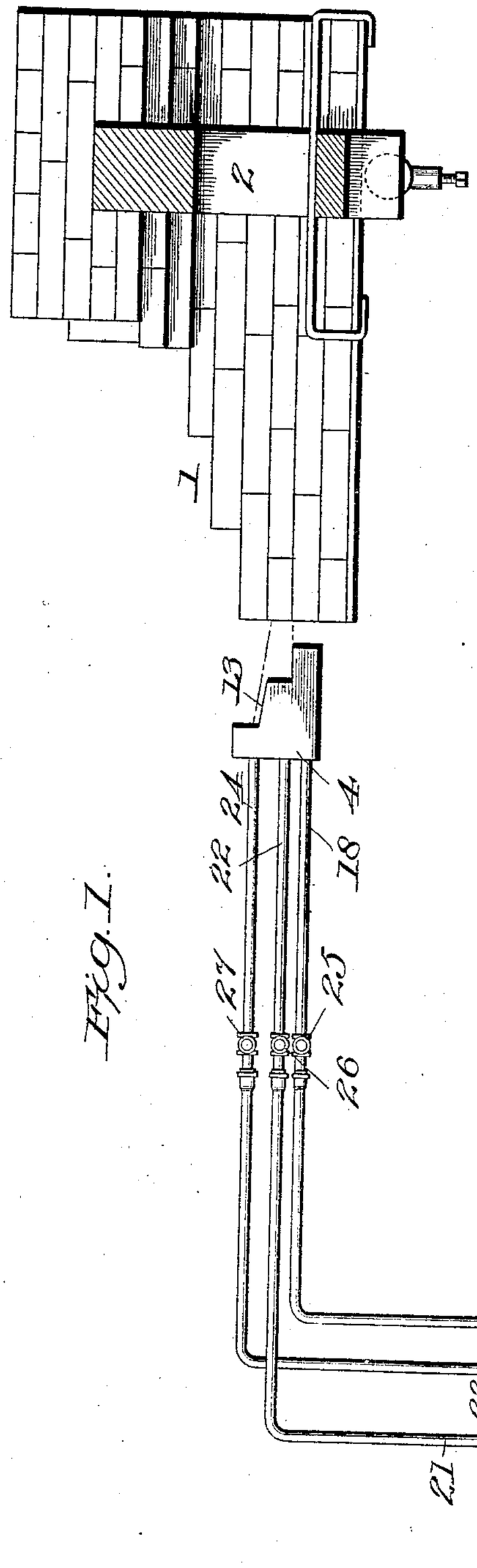
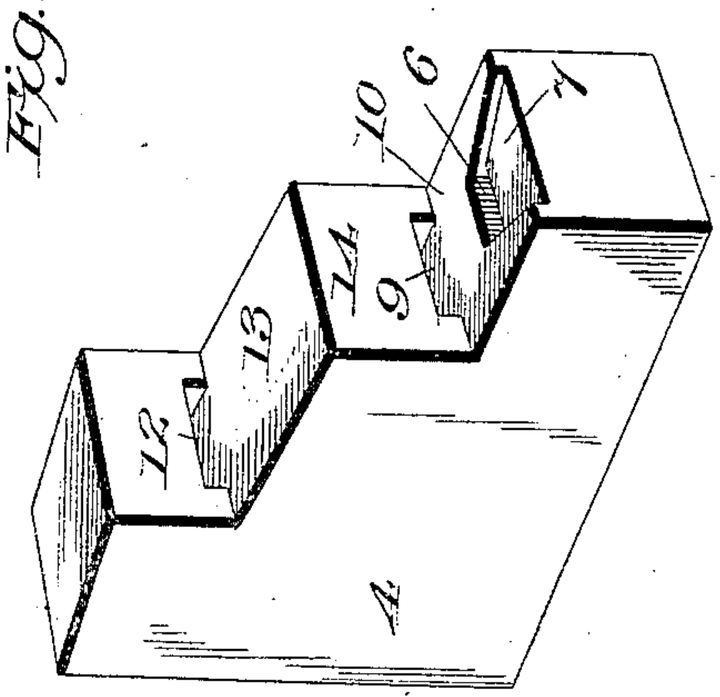


Fig. 2.



Witnesses

Geo. A. Bruce.

W. Mack Duvall.

Inventor

B. W. Cribb, by

Wiseman Fiske & Wilkinson

Attorneys

B. W. CRIBB.

WELDING OIL BURNER.

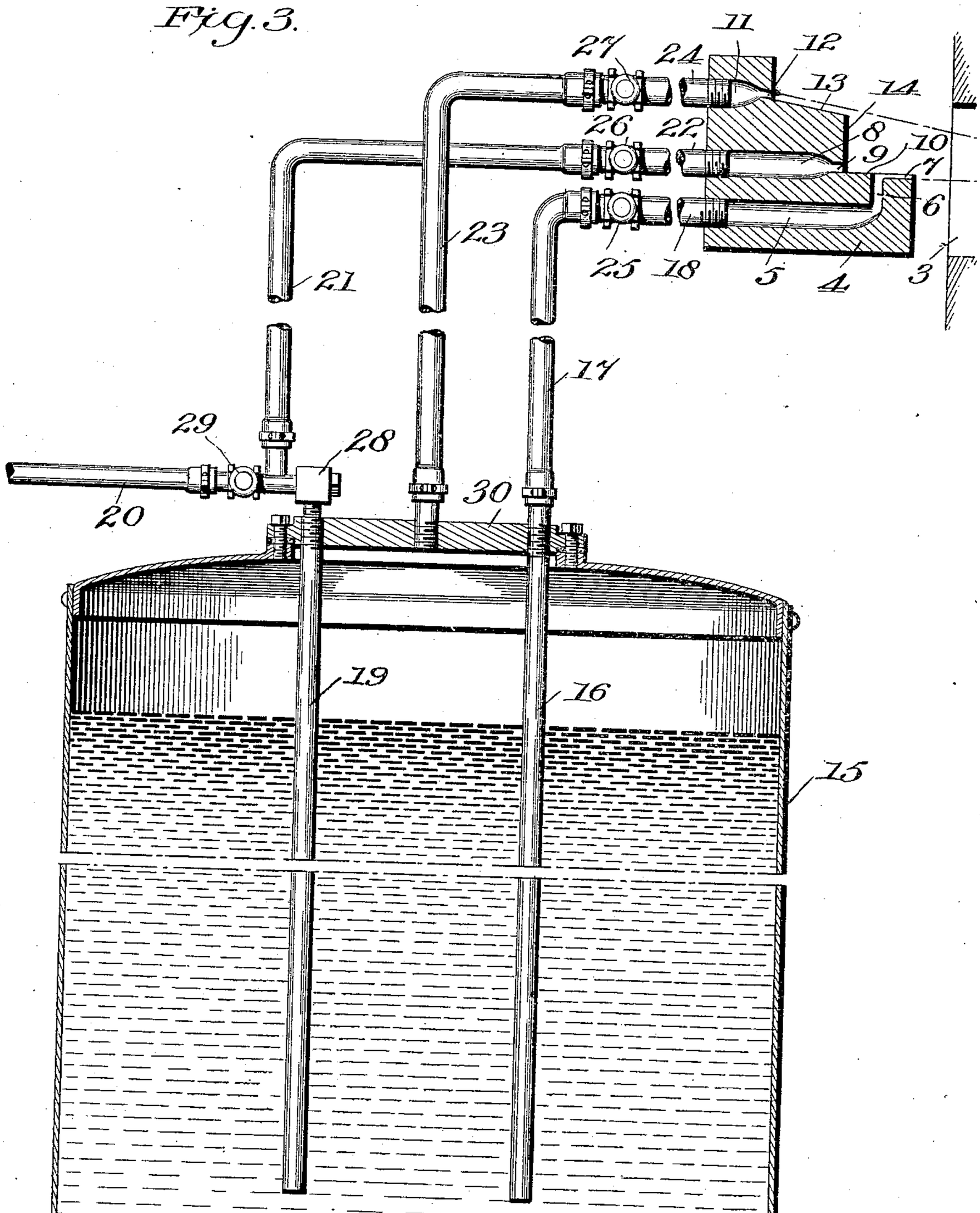
APPLICATION FILED JAN. 20, 1909.

936,220.

Patented Oct. 5, 1909.

3 SHEETS—SHEET 2.

Fig. 3.



Witnesses

Geo. A. Bruce.

W. Mac. Worrall.

Inventor

B. W. Cribb, by

Wickenden Fisher & Wickenden

Attorneys

B. W. CRIBB.

WELDING OIL BURNER.

APPLICATION FILED JAN. 20, 1909.

936,220.

Patented Oct. 5, 1909.

3 SHEETS—SHEET 3.

Fig. 4.

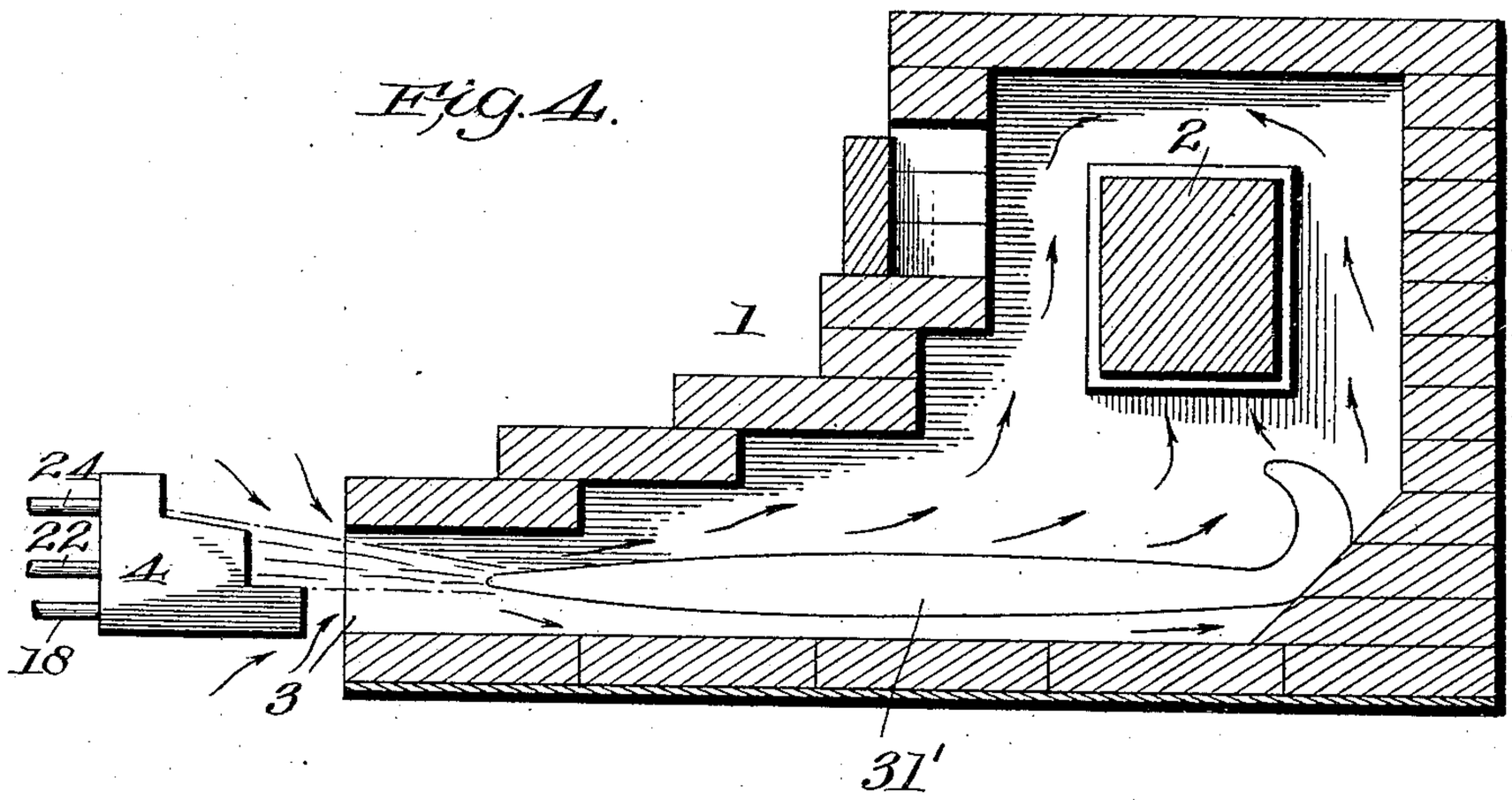
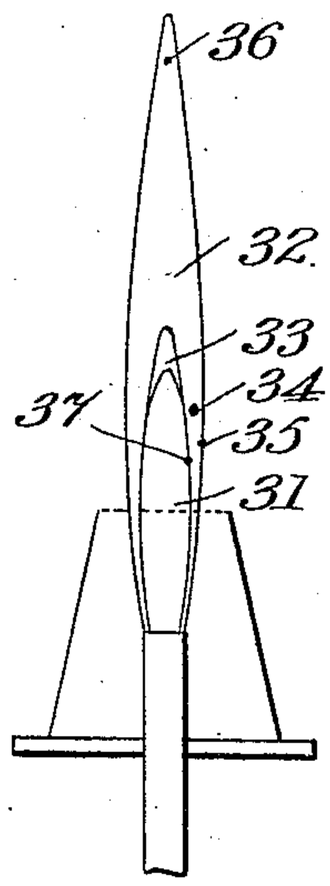


Fig. 5.



Witnesses
Geo. H. Bruce.
W. Mald. Dorall.

Inventor
B. W. Cribb, by
Wilkinson Fisher & Wilkinson
Attorneys.

UNITED STATES PATENT OFFICE.

BREWSTER W. CRIBB, OF BALTIMORE, MARYLAND, ASSIGNOR TO EDWARD W. CREECY, OF WASHINGTON, DISTRICT OF COLUMBIA.

WELDING OIL-BURNER.

936,220. Specification of Letters Patent. Patented Oct. 5, 1909.

Application filed January 20, 1909. Serial No. 473,277.

To all whom it may concern:

Be it known that I, BREWSTER W. CRIBB, a citizen of the United States, residing at Baltimore, in the county of Baltimore City and State of Maryland, have invented certain new and useful Improvements in Welding Oil-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.

My invention relates to oil burners for welding furnaces, and has for its object the production of a simple and cheap burner which will be capable of readily furnishing a reducing flame at the fracture to be welded instead of an oxidizing flame, and thereby avoid burning the metal while at the same time furnishing sufficient heat to produce an autogenous weld.

To these ends the invention consists in the combinations of parts and details of construction more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals refer to like parts in all the views:—Figure 1, is an elevational view of a furnace with my burner applied thereto; showing the casting in section and extending outside the burner; Fig. 2, is a perspective view of the nozzle portion of the burner detached, and showing the passages for oil, air and carbureted vapors. Fig. 3, is a sectional view showing the burner and oil tank and its relation to the furnace. Fig. 4, is a sectional view illustrating the character of flame that is given by my burner and its applicability to welding; and Fig. 5, is an elevational view of a well known blow pipe flame illustrating the various components of the same.

1 indicates a suitable welding furnace; 2 the projecting end of a casting or other heavy frame work, which it is desired to weld, and around which the furnace may be built if desired. The casting in this instance is shown as protruding outside of the furnace.

3 represents the inlet for the combustible mixture, and 4 the delivery nozzle of the burner. This nozzle is preferably of a stepped form, as shown, but of course could be made of other forms, and is provided with a passage 5 for the oil, having an upwardly extending portion 6 delivering on a preferably sunken surface 7.

8 represents an air passage, preferably restricted at 9, and 10 an extending inclined preferably flat surface forming a continuation of the bottom of the restriction 9, and surrounding on three sides the surface 7, as shown in Fig. 2.

11 represents a passage for carbureted vapors, restricted at 12; and 13 an extending downwardly inclined surface forming a continuation of the bottom of passage 11.

14 represents an abrupt wall like surface between the inclined surfaces 10 and 13.

15 represents an oil supply, 16 a pipe leading almost to the bottom thereof, 17 a hose connected at one end to said pipe and at its other to a connection 18, leading to the oil passage 5.

19 represents an air pipe extending almost to the bottom of tank 15, 20 an air supply, 21 a hose connected at one end to said supply and at the other to a pipe 22 leading into the air passage 8 of the nozzle 4.

23 is a hose connected at one end to the space above the oil in the tank 15, and at its other end to the pipe 24 leading into the carbureted vapor passage 11 of the nozzle.

25, 26 and 27 are regulating cocks in the pipes 18, 22 and 24 respectively, 28 is any suitable reducing valve in the connection between the air supply 20 and air pipe 19; and 29 a regulating valve in said air supply 20.

30 represents a suitable detachable closure for the tank 15, which carries the pipe connections of the burner, and which is readily removable with said connections from the tank.

The well known blow pipe flame illustrated in Fig. 5, consists of the dark cone 31 composed almost wholly of carbon monoxid, CO, gas; of the mantle 32 formed by the further oxidation of this CO gas as it comes into contact with the additional oxygen of the air; and of the luminous tip 33 of the dark cone 31 which only appears when the air supply is somewhat deficient, and which is exceedingly useful for reducing actions. It is called the upper reducing zone or flame. In addition to the above well recognized parts of the flame, that portion of the mantle 32 located at 34, is the well recognized fusing zone, which is the hottest part of the flame and often reaches to a temperature of 2300° C. This fusing

zone lies midway between the outer and inner edge of the mantle, as indicated, and very close to it on the outer edge of the mantle is the well known lower oxidizing flame at the portion 35, as shown; while the upper oxidizing flame is located at the portion 36.

37 represents the lower reducing zone or flame on the inner border of the fusing zone 34 and next to the dark zone 31.

In welding metals, especially iron or steel, it is very desirable that no oxids form in the weld, for if they do the joint will be defective, and also a portion of the metal will be unmanageable, or burnt as it is called. Therefore, it is of the utmost importance that a welding burner be so constructed as to produce such a flame that the portion which comes into contact with the fracture shall not furnish oxygen thereto, but shall rather take away or reduce any oxygen that might be present. It is for these and other reasons that the various regulating valves have been provided on the pipes of my burner.

The operation is as follows:—The compressed air supply being turned on by opening the cock 29, a portion of the air passes down through the reducing valve 28 and pipe 19, and bubbles up through the oil into the space above said oil, which soon becomes filled with carbureted vapors under a pressure controlled by the adjustment of the reducing valve 28. This pressure causes the oil to pass up the pipe 16, through the hose 17, valve 25, pipe 18 and passage 5 to the surface 7 where it spreads out into a thin film. Likewise the air from the supply 20 passes through the hose 21 and passage 8 along the inclined surface 10 and onto the film on the surface 7, whereupon the said film of oil is atomized. Likewise the carbureted vapors pass through the hose 23 to the passage 11, and along the inclined surface 13. The deliveries from the various passages 5, 8 and 11 are so inclined that they converge to a single point; and when the burner is located just outside of the furnace, the point at which the three jets meet may be located just inside thereof, while the said jets suck in air to aid in the combustion, as illustrated in Fig. 4. Upon igniting these jets, a flame having all the characteristics of that disclosed in Fig. 5 will be produced, the length and size of which will depend upon the pressure in the various jets. In practice, by carefully manipulating the valves 29, 28, 25, 26 and 27, the blue cone 31′ in the furnace can be made to just reach and be deflected from the back wall, as indicated, so that the upper reducing flame 33 (Fig. 5) will surround or play upon the fracture, while the upper and lower oxidizing parts 36 and 35 are so located as not to touch the fracture at all. The fusing zone 34 being quite near the upper reducing flame 33, and inside the oxidizing portion 35, it is evident that by properly adjusting the valves and through them the pressure of the jets, that I may with my burner fuse the parts without oxidizing them, and therefore may join the same by an autogenous weld. The necessary pressure to get the best results is best ascertained by practice, and by observation of the flame through a peep hole in the furnace.

It is evident that changes may be made in my burner by those skilled in the art without departing from the spirit of the invention, and therefore I do not desire to be limited to the details of construction, except as specified in the claims.

What I claim is:—

1. An oil burner provided with oil, air and carbureted vapor passages; means for causing the fluid from the air passage to atomize the oil; a container for said oil; connections between said oil and vapor passages and said container; a connection between said air passage and said container; said passages being so inclined as to converge toward a single point; and means to regulate the pressures in each of said passages, substantially as described.

2. In an oil burning apparatus, the combination of an oil burner provided with a nozzle having oil, air and carbureted vapor passages; valved pipes connected to said passages; an oil tank; connections between each of said valved pipes and said tank, a reducing valve controlling the pressure of air in said tank; and a removable cover for said tank through which each of said last mentioned connections pass, substantially as described.

3. A nozzle for an oil burner consisting of a block provided with oil, air and carbureted vapor passages; the oil passage provided with the upturned portion 6, and terminating in the flattened surface 7; the air passage terminating in the inclined surface 10, adapted to deliver air to the surface 7; and the carbureted vapor passage terminating in the inclined surface 13 located above said surface 10, substantially as described.

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

BREWSTER W. CRIBB.

Witnesses:

T. A. Witherspoon,

W. Max. Duvall.