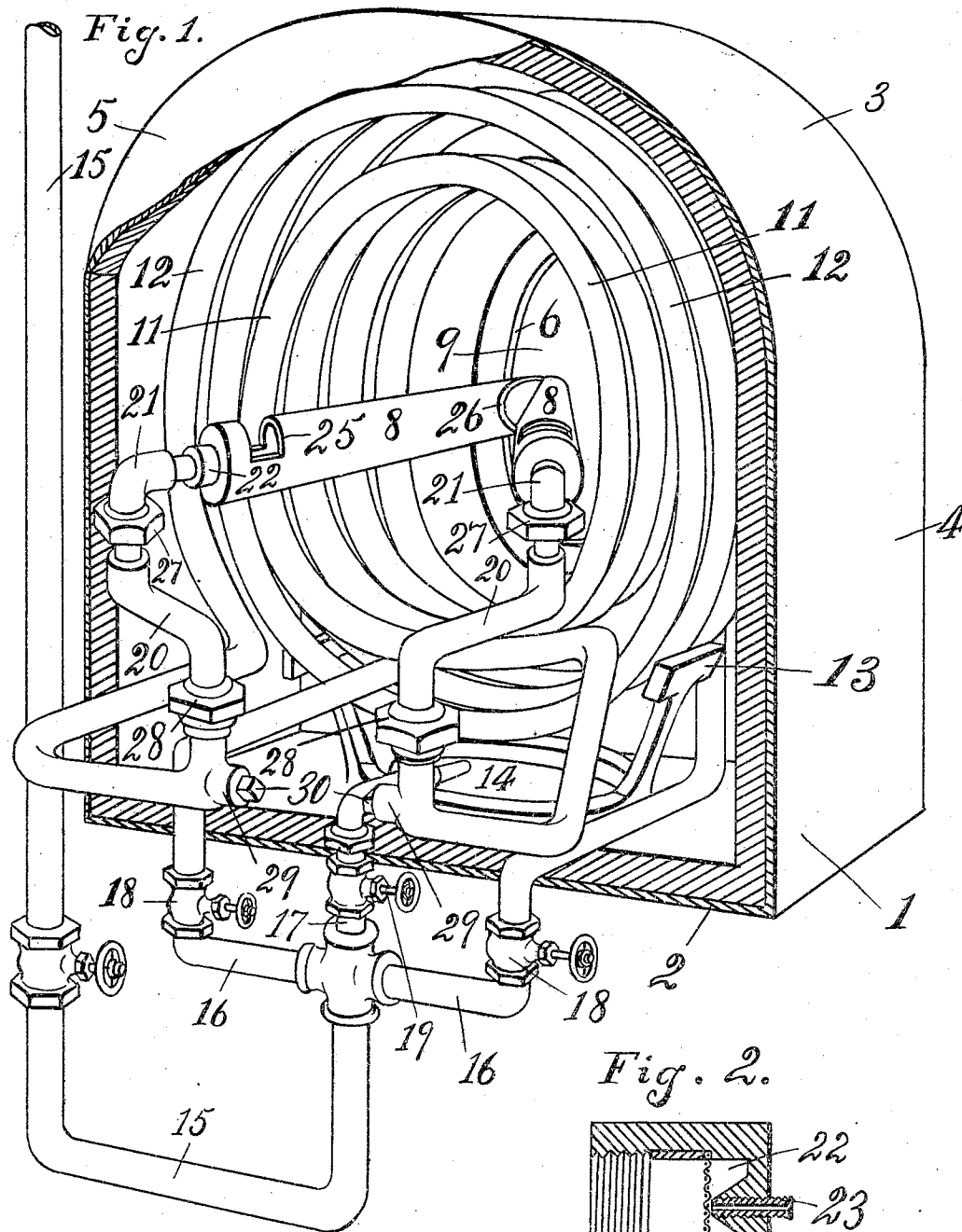
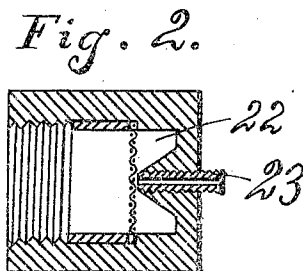


No. 790,734.

PATENTED MAY 23, 1905.

F. H. LYNN.
FLUID FUEL BURNER.
APPLICATION FILED SEPT. 15, 1904.

2 SHEETS—SHEET 1.



Inventor:

Francis W. Lyman

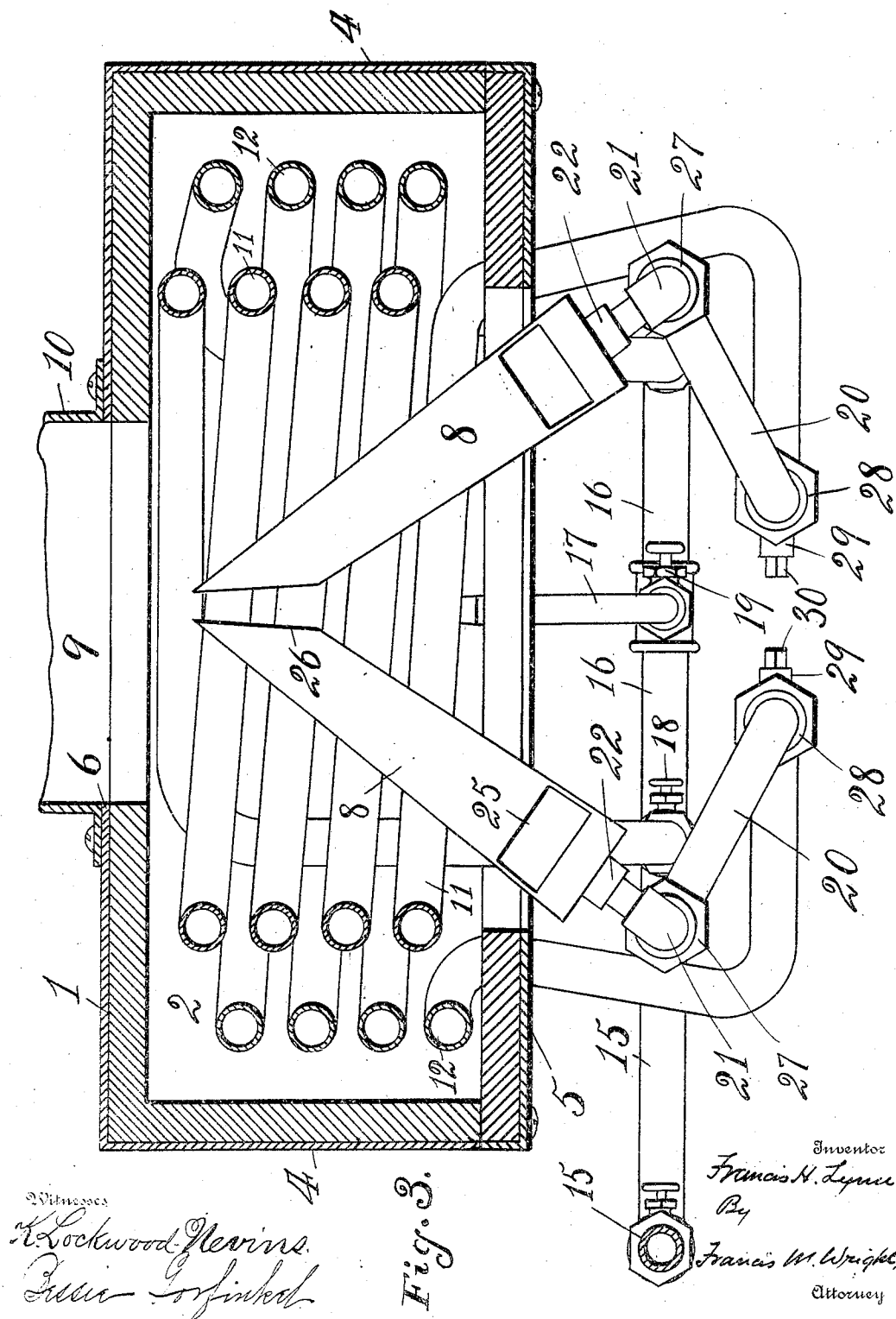
By Francis W. Wright
Attorney

Witnesses

K. Lockwood Nevins
Jessie Gorfinkel

F. H. LYNN.
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

FRANCIS H. LYNN, OF SAN FRANCISCO, CALIFORNIA.

FLUID-FUEL BURNER.

SPECIFICATION forming part of Letters Patent No. 790,734, dated May 23, 1905.

Application filed September 15, 1904. Serial No. 224,497.

To all whom it may concern:

Be it known that I, FRANCIS H. LYNN, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Fluid-Fuel Burners, of which the following is a specification.

This invention relates to fluid-fuel burners, the object of the invention being to provide a burner by means of which intense heat may be generated for the reduction of ores, the heating and melting of metal, and for the generation of heat for any other desired purposes, which shall be compact in form and of small size, so that it can readily be carried about and used wherever needed, and may be used to burn gasoline, distillates, and certain grades of coal-oil or fuel-gas, if desired.

In the accompanying drawings, Figure 1 is a perspective view of my improved burner, the front wall of the casing being broken away to show the interior thereof. Fig. 2 is a cross-section of the gas-delivery chamber, and Fig. 3 is a horizontal section immediately above the nozzles.

Referring to the drawings, 1 represents a suitable casing, having a flat bottom 2 and a curved top 3, terminating in straight vertical sides 4, extending to said bottom. The casing is covered at the front and rear, respectively, by a front wall 5 and a rear wall 6, the front wall having an aperture 7 sufficiently large to permit the entrance of the twin nozzles 8, while the rear wall has also a circular aperture 9, through which the flames pass, said aperture being surrounded by a flange 10, extending parallel with the general direction of the flames. This flange 10 may, however, be omitted when desired. Within the casing are two helical coils 11 12 of pipe, in which the gas to be burned is generated. One of these coils, 11, lies within the other, 12. The inner coil is sufficiently rigid to support itself upon the terminal portions of the coil, while the outer coil 12 is supported by upwardly-extending arms 13 from an ignition-plate 14, resting upon the bottom of the casing. The fluid fuel, supplied by a pipe 15, is conducted by two lateral branches 16, controlled by valves 18 to the ends of the coils in the rear

of the casing, so that the fluid travels in said coils from the rear to the front of the casing. It is then conducted by bent pipes 20 and elbows 21 into gas-delivery chambers 22, into each of which is screwed a gas-pipe 23, through which the gas emerges with great velocity into mixing chambers or nozzles 8. Into these mixing-chambers the air is drawn through an aperture 25 by suction on account of the high velocity of the jet of gas, and the air and gas are thoroughly commingled therein. From said mixing chambers or nozzles the mixtures of gases for combustion emerge with great force and are burned at the open extremities 26 of the nozzles, each of which is cut at its end at a small inclination with its axis. These nozzles being tubular in form, the cut ends are in the form of ellipses of great eccentricity. These openings 26 in the ends of the air-chambers face each other at a short distance. Each burner has two swivel connections 27 28 with the end of its corresponding coil, so that by properly turning the bent pipes 20 upon the ends of the coils and the nozzles and parts secured thereto upon the bent pipes 20 the openings 26 in the nozzles can be moved to or from each other, or the nozzles may be moved in or out of the casing, more or less, according to the use to which the burner is to be put. The end of each coil where it turns upward to connect with the bent pipe 20 has an extension 29, closed by a plug 30. A third pipe 17, controlled by a valve 19, leads from the junction of the branches 16 with the supply-pipe to a point above the ignition-plate 14 to supply oil thereto to start the operation of the burner.

The operation of the apparatus is therefore as follows: The valve is first opened and a sufficient amount of oil is allowed to flow onto the ignition-plate. The valve 19 having been closed and a small supply of waste or other suitable material having been placed in the ignition-plate, (if the oil used is of too high a grade to burn of itself,) a light is applied and a fire is started which heats the coils 11 12. When these have been sufficiently heated, the valves 18 are opened and fluid fuel is admitted to the coils. This fuel, if not already in the form of gas, is converted into gas by the

heat of the coil. When the apparatus has been in use for a sufficient length of time, the coils 11 12 become very highly heated. In order to more highly heat the coils, the aperture 9 in the rear wall, through which the flames issue, is made smaller than the inner coil and small enough to deflect part of the flames from the burner and project said flames under said coils, thus very highly heating the same. The fluid fuel, if in a liquid form, is very quickly converted into gas, and this gas in passing through the remainder of the coils becomes very highly heated and is discharged into the gas-delivery chamber at a high pressure. It then emerges from said gas-delivery chamber into the nozzle at a very high temperature, and thus heats the air drawn into said nozzle by the suction of the jet of gas.

A very important feature of my invention is the arrangement of the nozzles, by means of which the mixed gases of combustion from the two burners impinge against each other at a small angle of deviation from the axis of the burner, the flames resulting from ignition thereof then proceeding onward along said axis. The value of this arrangement is that it creates a powerful suction for additional air of combustion drawn in between the two bodies of gas and also around the same, so that the gas is thoroughly mixed with amply-sufficient air to produce complete combustion, and this in addition to the high temperature imparted to the gas by the coils is the reason why I obtain such an intense heat by this form of burner. The casing being made of incombustible and non-conducting material, such as magnesite, retains the heat of the flames and reflects the flames through the coils, so that all parts of the coils are thoroughly heated. The coils are easily maintained free from deposits of carbon, because on account of their form and composition they are sufficiently elastic that a sharp tap or blow given to the coil knocks off from the interior surface thereof any deposits of carbon or scale, and these may be washed or blown out through the openings in the extensions 29.

I claim—

1. In a fluid-fuel burner, the combination of a casing, coils of pipe in said casing, a pair of nozzles connected with said coils, said nozzles extending within the coils and inclining toward each other at a slight deviation from the axis of the casing, the openings in the nozzles facing each other whereby the combustible gases and flames issuing from said nozzles impinge against each other and proceed in a direction substantially midway between that of the nozzles, and means for supplying fluid fuel to the coils, substantially as described.

2. In a fluid-fuel burner, the combination of

a casing, coils of pipe in said casing, a pair of nozzles having a double swivel connection with the coils whereby they may be moved into or drawn out from the coils or moved to or from each other, said nozzles extending within the coils and inclining toward each other at a slight deviation from the axis of the casing, the openings in the nozzles facing each other whereby the combustible gases and flames issuing from said nozzles impinge against each other and proceed in a direction substantially midway between that of the nozzles, and means for supplying fluid fuel to the coils, substantially as described.

3. In a fluid-fuel burner, in combination with the casing, inner and outer helical coils of pipe therein, means for independently supplying fluid fuel to said coils, movable nozzles within the coils and connected thereto, the ends of said nozzles having discharge-openings facing each other, the directions of discharge being at small angles to the direction of the flame midway between the nozzles, said angles being substantially equal, substantially as described.

4. In a fluid-fuel burner, in combination with the casing, inner and outer helical coils of pipe therein, means for independently supplying fluid fuel to said coils, movable nozzles within the coils and connected thereto, the ends of said nozzles having discharge-openings facing each other, the directions of discharge being at small angles to the direction of the flame midway between the nozzles, said angles being substantially equal, the casing having a front wall with a restricted opening, through which the flames issue and by which they are partly reflected upon the coils, substantially as described.

5. In a fluid-fuel burner, in combination with the casing, inner and outer helical coils of pipe therein, means for independently supplying fluid fuel to said coils, movable nozzles within the coils and connected thereto, the ends of said nozzles having discharge-openings facing each other, the directions of discharge being at small angles to the direction of the flame midway between the nozzles, said angles being substantially equal, the casing having a front wall with a restricted opening, through which the flames issue and by which they are partly reflected upon the coils, and the opening having a flange extending parallel with the axis of the burner, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FRANCIS H. LYNN.

Witnesses:

FRANCIS M. WRIGHT,
BESSIE GORFINKEL.