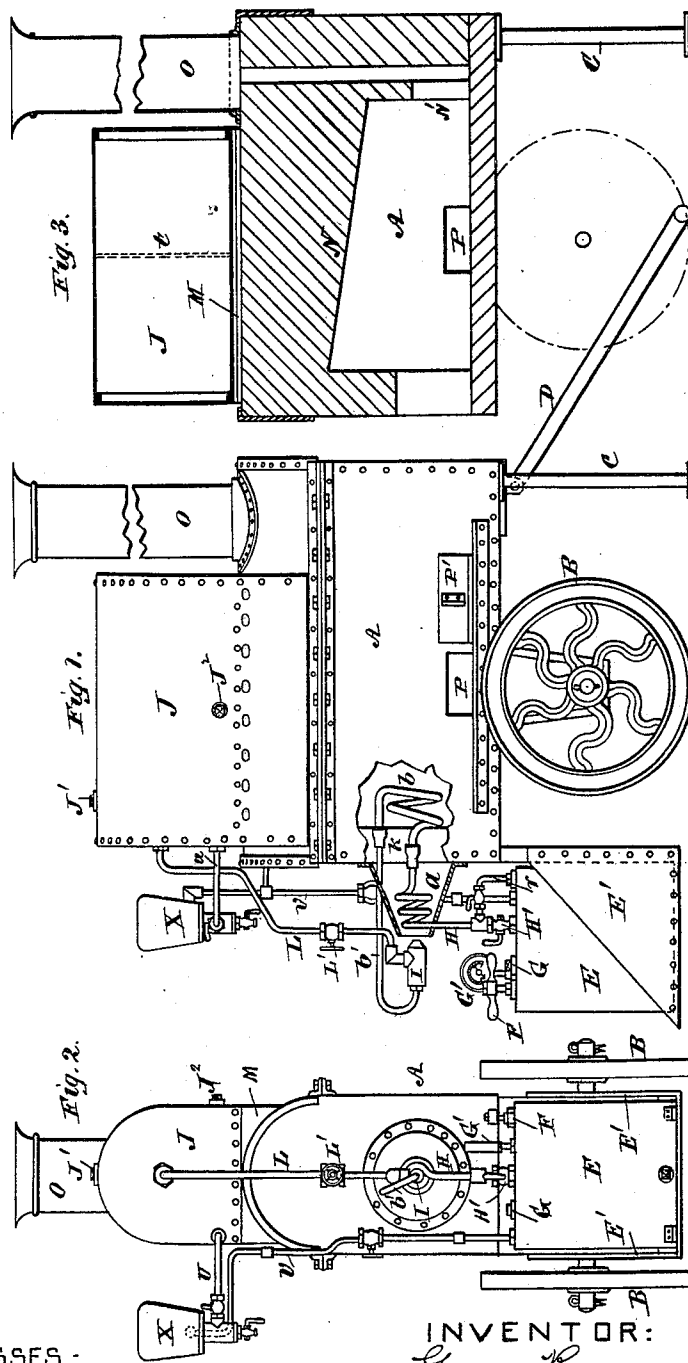


(No Model.)

G. ROSE.
LIQUID FUEL FURNACE.

No. 461,589.

Patented Oct. 20, 1891.



WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE ROSE, OF GLASGOW, SCOTLAND.

LIQUID-FUEL FURNACE.

SPECIFICATION forming part of Letters Patent No. 461,589, dated October 20, 1891.

Application filed November 8, 1889. Serial No. 329,712. (No model.) Patented in England December 6, 1888, No. 17,826.

To all whom it may concern:

Be it known that I, GEORGE ROSE, a subject of the Queen of Great Britain, and a resident of the city of Glasgow, Scotland, have
5 invented certain new and useful Improvements in Furnaces Heated by the Combustion of Liquid Fuel, (patented in Great Britain December 6, 1888, No. 17,826,) of which the following is a specification.

10 This invention relates to improvements in furnaces for rivet-heating, smelting, or other purposes, and in the apparatus for heating the same by the combustion of mineral or other oils in the form of spray; and it has for
15 its object to improve and simplify the construction or arrangement of parts of such furnaces and heating apparatus.

Furnaces as generally constructed, when heated by the combustion of liquid fuel, require either a connection to a steam-boiler or an air-compressor. Under this invention all
20 necessity for connection with an air-compressor or a steam-boiler can be obviated, although in situations where it may be found
25 desirable to connect the oil-spraying apparatus to a steam-boiler this can be done with advantage.

In order that my said invention may be properly understood, I have hereunto appended two explanatory sheets of drawings,
30 whereon—

Figure 1 shows a rivet-heating furnace in side elevation, a part being broken away. Fig. 2 is an end view of the furnace, Fig. 1.
35 Fig. 3 is a sectional view of the interior of the furnace, Fig. 1.

On the drawings the reference-letters wherever repeated indicate similar or like parts.

A portable self-contained furnace for heating rivets and the like, as constructed in accordance with this invention, consists, as
40 shown at Figs. 1, 2, and 3, of the vessel fire-brick-lined body A or furnace proper. This body A, I preferably mount upon two wheels B B in front and support it by two legs C C or feet at the rear end. I also provide it with shafts or handles or a single shaft D to enable it to be easily removed from place to
45 place, as required. Instead of having only two wheels B B, it may have four wheels, as with the ordinary portable furnaces of this class. To the back, or it may be the front or

other suitable part of the furnace, I, under my invention, wherein the mineral or other oil is burned in the form of spray by the action of a self-generated steam-jet, secure a
55 small closed tank or vessel E for containing water. This tank E, which is supported on a bracket E', fitted at the back of the furnace, as shown, has or may have fitted on or
60 in connection with it a small force-pump F for forcing air into the tank. This pump is preferably fitted to work in the inside of the tank, as shown, or it may be fitted on top of the tank or in any other suitable situation. 65
The tank has also a filling-screw G, Fig. 2, for filling in water when desired, and a gage G'. The water, by the action of the compressed air forced into the tank through the pump F, is caused to pass through a pipe connection
70 H, having a cock H' on it, into a steam-generating coil-pipe K, where it is converted into steam by the heat of the flame. This steam-generating coil-pipe K is preferably made in two portions a b, as shown, the portion a serving
75 as a boiler, while the portion b serves as a superheater or steam-producer. By making the coil in two parts the part b, which is always highly heated, can be renewed when necessary. The part b, as shown, is preferably made
80 from a pipe of larger diameter than the part a. The superheated steam is led from the coil b by the pipe b' to the back of the burner I, which is so situated as to be just below or at the outer end of the steam-generating
85 coil-pipe K aforesaid, the flame issuing from the burner I passing right through the center of the steam-generating coil-pipe and heating it in its passage.

The oil to support combustion, by being
90 sprayed from the burner I, is led through a pipe connection L, fitted with a valve L' or cock for regulating the oil-supply to the burner, from an oil tank or reservoir J, which is by preference mounted on top of the furnace, as shown, in order that the oil can be
95 supplied by gravitation. An air-space M is preferably left at the under side of the tank J to prevent the oil therein becoming highly heated. The oil-tank is provided with a filling-plug J' and a cleaning-plug J". 100

The products of combustion pass off from the furnace—which may have a sloping roof, as shown at N, Fig. 3, the highest portion be-

ing to the front or toward the end where the burner is situated—by the small flue N' to the chimney O. The openings P at the sides of the furnace are for filling in the rivets to be heated. Sliding covers P', as usual, would be used to cover the holes.

If desired, one or more damper doors or gratings may be fitted on the furnace, these doors being capable also of being used to clean out the furnace.

The steam-generating chamber is preferably inclosed in a thin sheet-metal casing (shown at Fig. 1) to protect it from the chilling influences of the atmosphere and to at the same time form a receptacle for the naphtha or other oil-saturated waste used for the preliminary heating when it is done in the ordinary manner. I prefer, however, to heat the chamber or coil at starting by spraying the oil by means of an air-jet led from the air-space of either the water or oil tank through the pipes r H. After the air-blast has been in operation sufficiently long to heat the generating-chamber water is turned on and is immediately converted into steam, which passes to the burner and sprays the oil. The casing may or may not, as desired, have a hinged or sliding door at top to inspect the chamber or to insert naphtha waste. It may have one or a number of holes for admitting an air-supply to the flame.

The burner may be so arranged that the flame issuing therefrom will pass into and strike against an obstruction made in or on the furnace-hearth for the purpose of splitting up the flame, and so aid in equalizing the heat.

Instead of having separate oil and water tanks, as hereinbefore described, a single tank having a partition dividing it into two compartments, one for oil and one for water, may be used, as indicated in dotted lines at t', Fig. 3; or the oil-tank may be made with a jacket or pocket on it to hold the water-supply, or vice versa.

An auxiliary lamp or burner X, Figs. 1 and 2, is preferably fitted on top or to the side of the furnace for lighting up the furnace and surroundings at night. This auxiliary burner or lamp is preferably constructed on the same principle as the self-generating steam-heater of the furnace, and is in this case supplied by the pipe u with oil from the tank J, and by the pipe v with water from the tank E; or it may be a vapor-lamp of any suitable construction. In this case it would be supplied with oil alone from the tank J. Any other class of lamp may, however, be used.

Instead of using only one burner, as described, for heating the furnace, two or more may be used.

A furnace may be constructed on the same lines for smelting metals and be heated by the heating apparatus hereinbefore described.

In situations, where found desirable, the steam may be supplied from a steam-boiler to the burner or to the steam-chamber for spraying the oil.

If desired, the water may be supplied from a gravitation-tank fitted on or in connection with the furnace.

The construction of furnace and burners may be slightly modified without departing from my invention.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A furnace wherein is combined a brick-lined body, an oil-tank fitted on top of said body, a water-tank, an oil-spray burner, and a coil-pipe consisting of two portions, in the first of which water from the water-tank is converted into steam by the heat of the flame issuing from said burner and in the second of which the steam is superheated, substantially as hereinbefore described.

2. The combination, with a furnace having a curved outer surface, of an oil-tank supported above the said furnace, the plate which constitutes the bottom of the tank being curved substantially like the outer surface of the furnace and being situated at a distance above the said outer surface, whereby there is formed an air-space M between the furnace and the tank, substantially as set forth.

3. The combination, with a furnace, of the water and the oil tanks or receptacles, an oil-spray burner, and the steam generating and superheating coils a and b, situated in front of the burner, the superheating portion b being separate and separable from the part a and situated within said furnace, substantially as and for the purposes set forth.

4. The combination, with the furnace A, the tank E, air-pipe r, water-pipe H, and tap H', of the steam-generating coil K, a portion of which is situated within said furnace, and the burner I, substantially as set forth.

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

GEORGE ROSE.

Witnesses:

HUGH FITZPATRICK,
Patent Agent, Glasgow.

JOHN BAXTER,
Clerk, Glasgow.