(No Model.)

A. HARMUTH.

MEANS FOR HEATING WITH LIQUID FUEL.

No. 516,928. Patented Mar. 20, 1894.

Fig. 1.

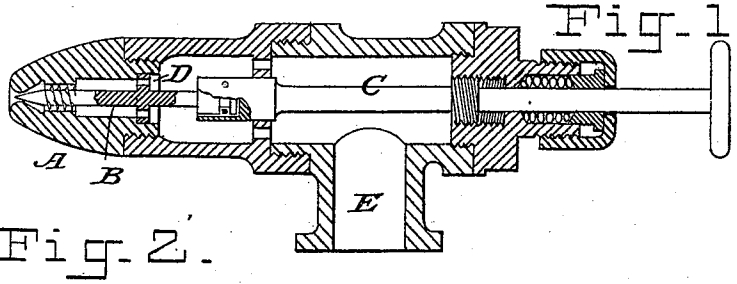


Fig. 2.

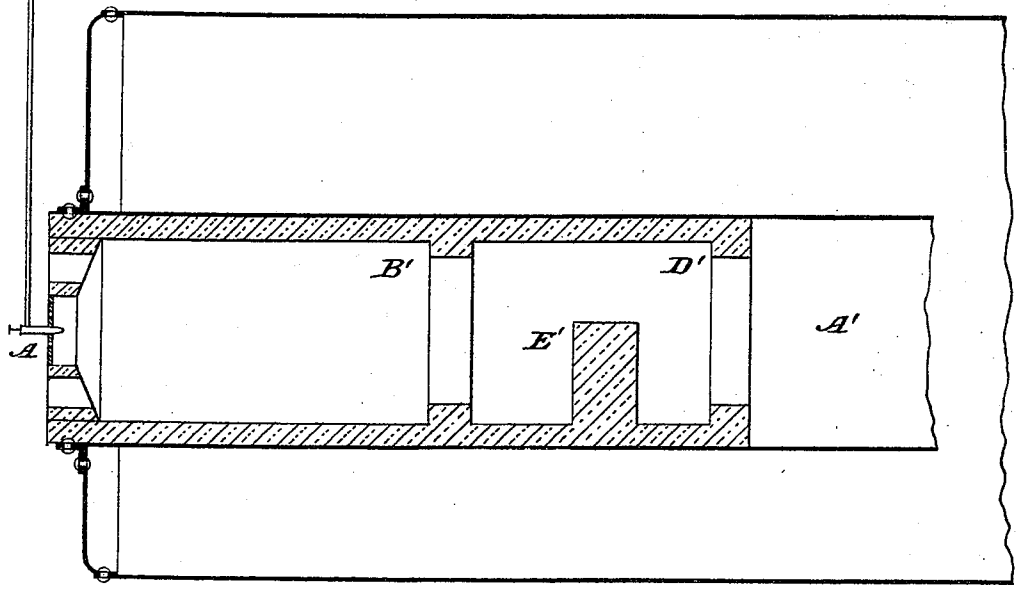
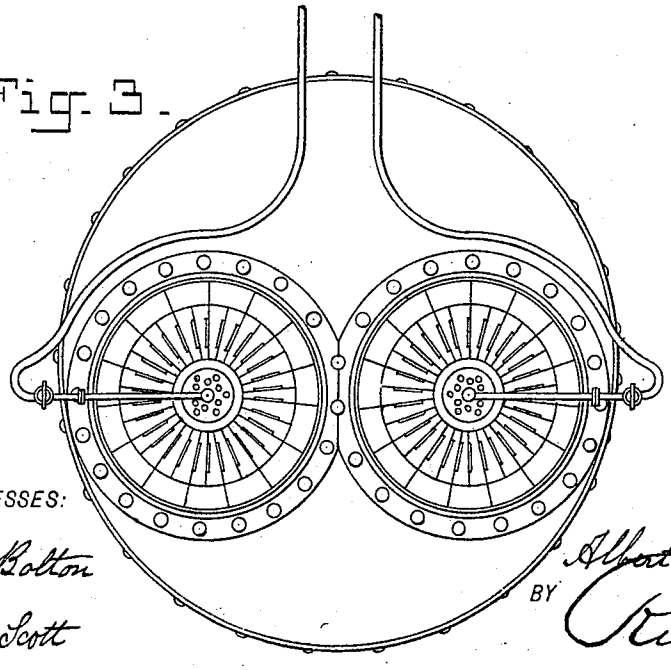


Fig. 3.



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MEANS FOR HEATING WITH LIQUID FUEL.

SPECIFICATION forming part of Letters Patent No. 516,928, dated March 20, 1894.

Application filed June 26, 1893. Serial No. 478,829. (No model.)

To all whom it may concern:

Be it known that I, ALBERT HARMUTH, a subject of the Emperor of Germany, residing in St. Petersburg, Russia, have invented certain new and useful Improvements in Means for Heating with Liquid Fuel; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

It is known, that jets of liquids, driven by means of considerable pressure through narrow channels of screw thread or spiral shape, whereby a quick rotating motion is imparted to the liquid, are reduced to a state of very fine division or pulverized, as soon as these liquids leave the said channels and issue into the atmosphere. To my knowledge no use has been made of this fact, up to now, for the pulverization of liquid fuel residues from mineral oils, for instance, or at least, where such way of pulverization has been adopted, it has always been complicated and the costs of pulverization very much increased by using at the same time steam or compressed air, or both, the disadvantage of using steam or air (besides the greater costs) being the noise, which is produced (a serious drawback with locomotive or marine boilers). The steam has the further disadvantage, that it reduces the temperature of the flame very materially, which is very disadvantageous especially in many metallurgical operations. Of all these drawbacks the pulverization as adopted by me is free or nearly so. The noise, produced by the injection of the liquid fuel, which for simplicity sake, I shall henceforth call "oil" is insignificant and the expenses for producing the power, to force the oil through the pulverizer is very trifling compared with the costs for driving steam or air with the other process.

In the drawings Figure 1, is a view of the nozzle. Fig. 2, represents the same in position to discharge the fuel into a boiler tube lined with fire brick and Fig. 3, is a front view of a boiler having my improvement.

A is the mouthpiece, within which the pin B with its pointed and threaded end may be moved backward and forward. The back end of the pin B is lodged in the corresponding cavity of the spindle C. The pin, which by the rotation of the spindle, imparted to the latter by means of hand wheel, has no rotative motion but is moved only backward and forward, the pin being guided by the knobs D, the perforations of which serve for the passage of the oil to the pulverizer. It is so easy to regulate exactly the quantity of oil to be consumed. The conical end of the valve projects beyond the screw threaded portion and is perfectly plain so that the conical part and threaded part are independent of each other, and the complete closure of the nozzle mouth can be quickly and securely effected.

E is the inlet for the oil communicating with a small oil reservoir, which is closed and must stand a certain pressure and which is supplied with oil by any liquid forcing arrangement, preferably by means of a small force pump, capable of supplying the necessary quantity of oil under certain pressure, preferably forty-five pounds. Before entering the inlet E, the oil is preferably passed through a fine gauze of iron wire, in order to free it from sand and other impurities. The pulverization of the oil by means of the apparatus described takes place in a satisfactory manner only if the oil represents a liquid of waterlike fluidity and it is therefore indispensable, to reduce oil, which at the ordinary temperature does not possess sufficient fluidity, to this state by applying heat. A temperature of 80° to 90° Celsius is about the proper one with regard to the residues coming from the distillation of mineral oils from the Russian districts around Baku.

In order to burn the "oil-dust" without smoke within the fireplace, it is necessary to have the latter of the proper size, rather roomy, lined with firebricks or other refractory material and to take care of giving to the air, which serves for the combustion the easiest possible access to the burning fuel. The perfect mixing with air I attain in a satisfactory manner, by giving first of all to the flame cone sufficient room to develop within the fireplace and by collecting or narrowing the cone again, as it were, by means of a ring-like narrowing of the fireplace. It is of advantage, at least in fireplaces with a not very

high temperature, as is the case in oil-fired Cornish boilers, the fireplace of which being surrounded by water, does not under ordinary circumstances attain a very high temperature, to let the slightly collected flame cone impinge against a column of fireproof material, whereby the last unconsumed particles of the flame are exposed as it were in thin layers to the action of the air of combustion.

I will now describe the construction of the fireplace of a Cornish boiler in order to show, how to meet the difficulty of perfect combustion under circumstances, where the temperature of the fireplace is not very elevated. The arrangements serving to attain a perfect combustion, can be simplified if the temperature of the fireplaces runs higher but these arrangements must be adapted to the special use the furnaces are put to, and it is the instance of the Cornish boiler, which will guide any experienced man, to devise the proper arrangement.

Fig. 2 shows the arrangement for heating a Cornish boiler. A′ is the flue, part of which, say eight feet in length, is lined with firebricks two and one-half inches thick; B′ is a ring made of fireproof material; D′ is a second ring; E′ a column or sill. The front end of the flue A′ is closed by a fireproof slab, perforated for the admittance of air, with a number of radial slits which may be closed or opened more or less by movable iron plate provided with similar slits. In the center of the slab a hole is left for the introduction of the nozzle of the pulverizer.

I claim as my invention—

1. In combination, the boiler having the tube A′, the fire brick lining to said tube having the column E′ and the fire proof rings one in front and one in rear of the column E′ forming a contracted outlet from the fire proof lining, the perforated front in the fire proof lining adapted to admit air thereto and the fuel supply nozzle projecting centrally through the front plate, with the said perforations extending concentrically about it substantially as described.

2. The combination of a boiler or other furnace with the fuel supply nozzle having a spindle provided with a thread near its end, and a plain conical point projecting beyond the said threaded portion to bear on the valve seat, the said spindle being movable longitudinally in order that the plain part may bear on the said seat substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT HARMUTH.

Witnesses:
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