(No Model.) 2 Sheets—Sheet 1.

H. A. RAMSAY.

APPARATUS FOR GENERATING HEAT.

No. 474,344. Patented May 3, 1892.

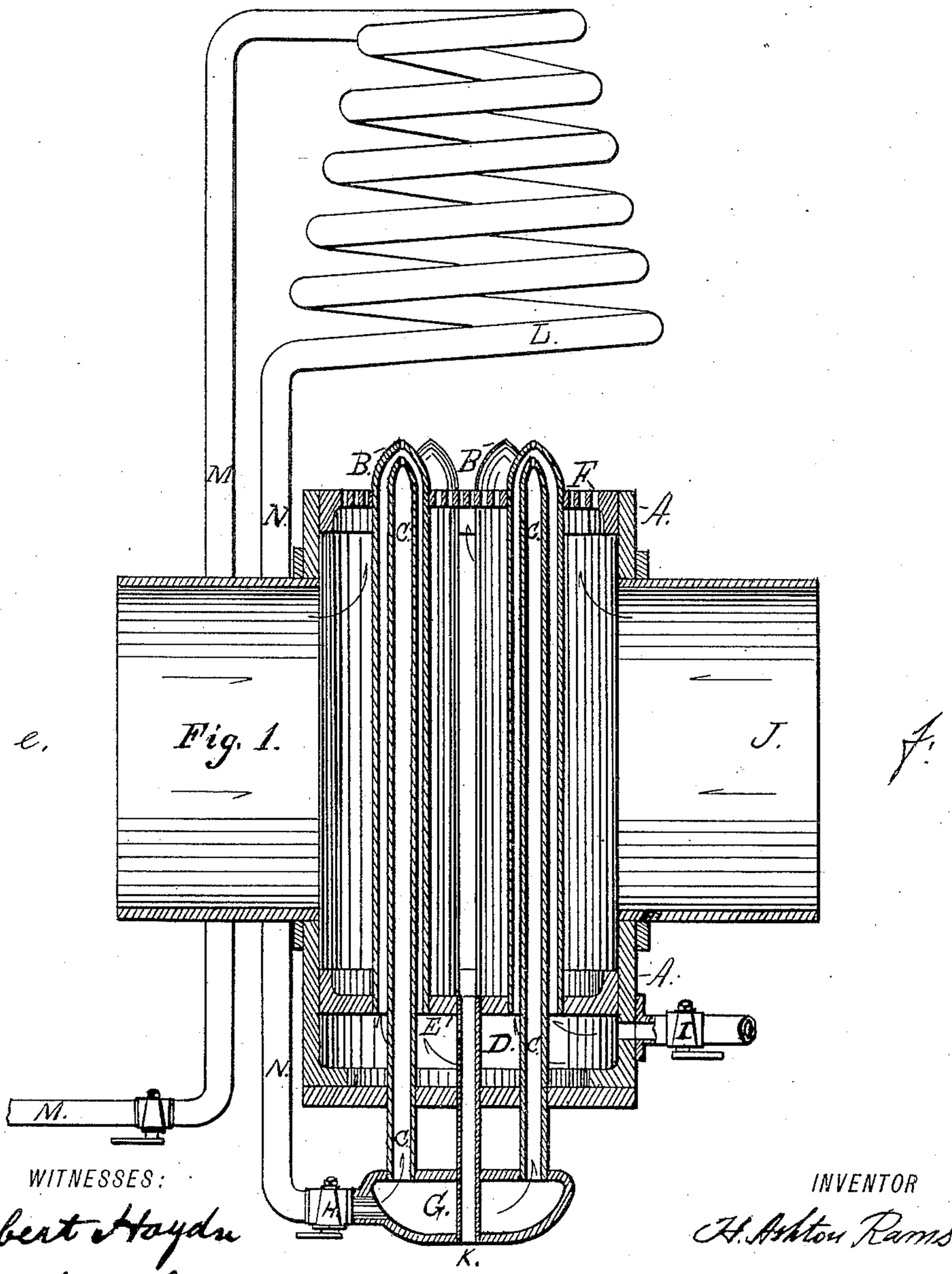

Fig. 1.

WITNESSES:

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INVENTOR

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(No Model.) 2 Sheets—Sheet 2.

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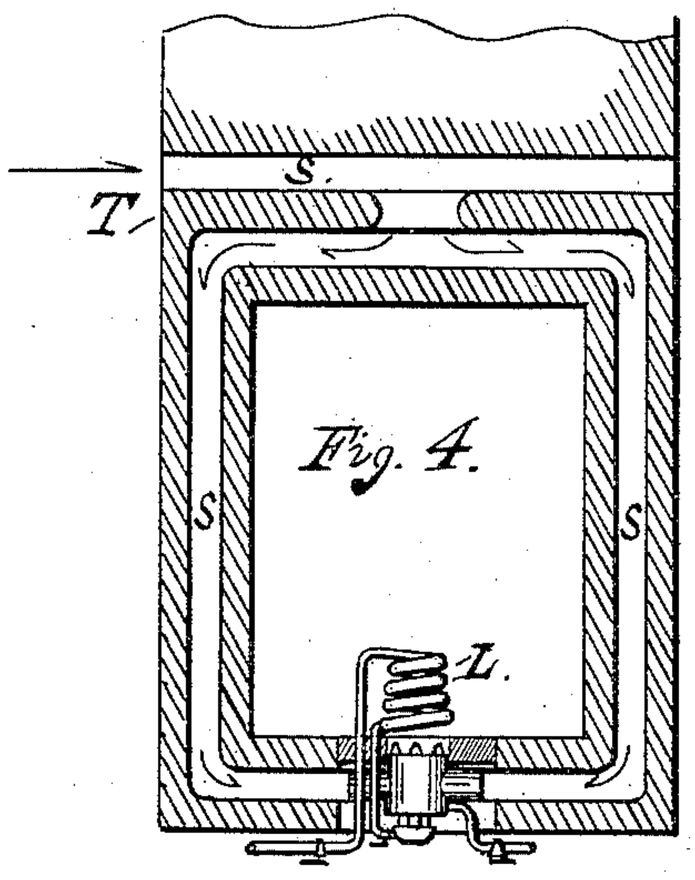

Fig. 4.

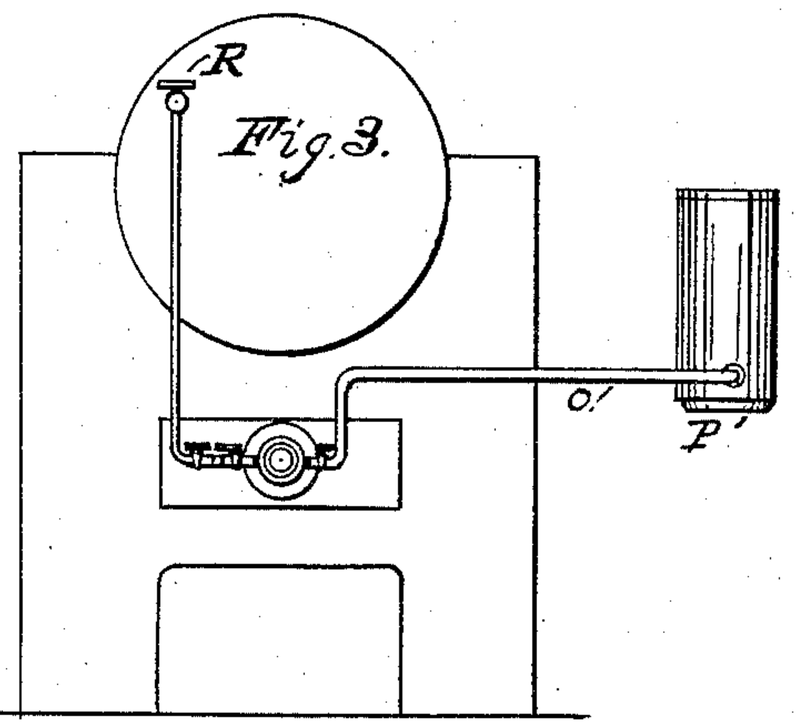

Fig. 3.

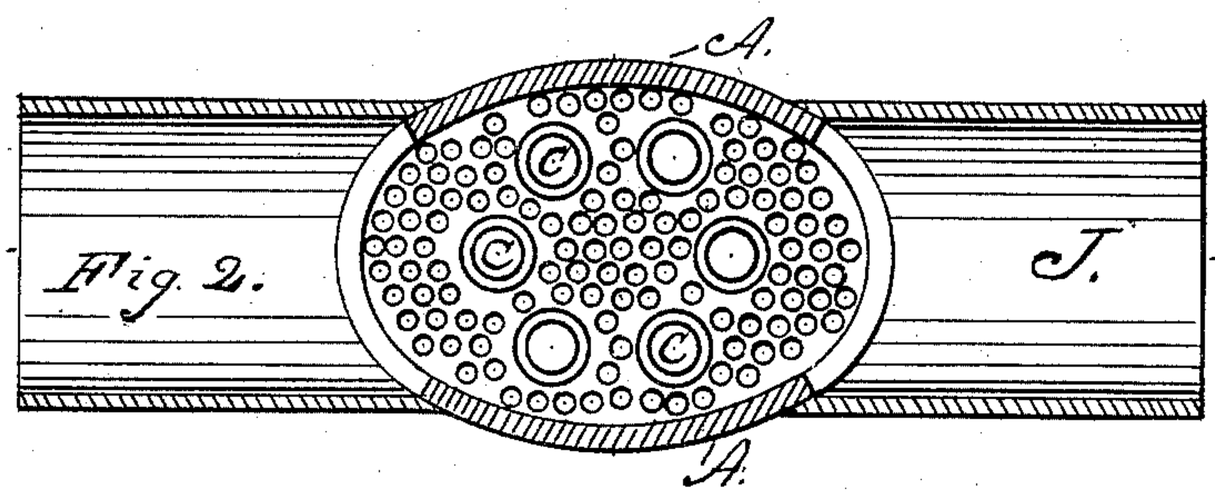

Fig. 2.

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HENRY ASHTON RAMSAY, OF BALTIMORE, MARYLAND.

APPARATUS FOR GENERATING HEAT.

SPECIFICATION forming part of Letters Patent No. 474,344, dated May 3, 1892.

Application filed May 1, 1891. Serial No. 391,238. (No model.)

To all whom it may concern:

Be it known that I, HENRY ASHTON RAMSAY, residing in the city of Baltimore and State of Maryland, have invented a new and useful Apparatus for Generating Heat, the said apparatus being an improvement in and connected with reference to that class of mechanisms known as "Hydrocarbon-Burners," of which the following is a specification.

This invention mainly relates to those systems of heat-generators in which petroleum-oil or its distillates are used for supplying the carbon and wherein the oil, while in a fluid condition, is directed through pipes to the generator from convenient reservoirs for feeding the apparatus, in connection with the application of superheated steam and heated atmospheric air.

In the application of oil in the furnaces of boilers it has heretofore been the practice to admit the oil through pipes either by directly spraying it on live embers of coals or other heated substances, using the oil simply, or by forcing the air in the pipes and injecting oil and air together under a pressure maintained by a pump or otherwise, and in other cases to force steam intimately mixed with the oil through nozzles into the furnace.

The mode or system of applying and operating or working heat-generators to boiler-furnaces or for other purposes and the means and mechanism or apparatus employed therein involving my invention consists as follows:

The oil or its distillates (and I do not confine myself to petroleum-oil, for any fluid oil can be used to feed my apparatus) is placed in some convenient vessel or reservoir, a small pipe conducts the oil and directs it into the burner, where the supply is regulated by a valve. The hydrocarbon-burner having been previously placed in the mouth of a boiler-furnace when the boiler is without steam and when the apparatus is being started under a cold boiler, water is directed in very small quantities through the steam-superheating pipe and into the steam-coil placed immediately in front of the nozzle apparatus of the burner. The burner having been filled with oil, the apparatus is now started with a little oily waste or other substance and the oil dripping through the nozzles ignited, the flame that ensues will quickly heat the coil and convert the water in it into steam, which will now pass around by a proper pipe to the generator or hydrocarbon-burner and, passing through these tubes surrounded by oil, will be ejected out of the nozzle with a force due to its pressure and entrain the annular film of oil surrounding it, and thus generate a hydrocarbon gas which will quickly take the place of the lurid-red flame first produced when burning the oil simply. The combustion is supported by the oxygen of the air, the latter having been previously heated by its transmission through heat-ducts, and is finally ejected through a finely-perforated plate highly heated and surrounding the nozzles of the generator. The result of the combination of the oil, steam, and air is to produce a dazzling white flame free from smoke and resulting in complete combustion.

Having thus generally specified the nature and effects of the invention, I will now proceed to describe it with reference to the accompanying drawings, which illustrate an example of an apparatus, according to the invention and means for carrying the invention into practical effect, such means at the same time constituting examples of apparatus constructed and adapted to operate according to the invention.

Figure 1 is a sectional view of the apparatus cut on a horizontal plane through A B, Fig. 2. Fig. 2 is a vertical section cut through *f e*, Fig. 1. Fig. 3 is an outside front elevation of an ordinary horizontal tubular boiler, showing the generator placed in the mouth of the furnace, the oil-reservoir, and the oil and steam connecting pipes. Fig. 4 is a sectional view cut on a horizontal plane on the line of the furnace-door of the same boiler shown at Fig. 3, illustrating the method of introducing the generator into the mouth of the furnace and the hot-air flues in the bridge-wall and sides of the furnace.

Referring to Fig. 1, A is an oval jacket inclosing the tubes B and C, which are introduced in the heads of the said jacket. At one end the jacket has a chamber D partitioned off. The outer tubes B are secured at one end with open mouths to the partition or tube sheet *e*, their opposite ends being secured to the perforated front partition or tube sheet F. Inside of tubes B other tubes C of smaller

diameter are introduced and do not stop at the aforesaid partition-plate E, but push through and beyond the mouths of the tubes B, projecting through the chamber D into another chamber G. A steam-pipe connection is made with chamber G with a regulating-valve H. Connecting with the chamber D there is also a connecting-pipe for receiving oil and the regulating-cock I. Hot-air pipes J enter the jacket at the points shown. An open tube is provided in the center of the steam-chamber G, passing through chamber D, also giving communication to the inside of the hot-air jacket at K. A small regulating register-valve is provided to give sight to the inside operation of the apparatus and provide an additional amount of air, if desired, for reducing the temperature or otherwise. The tube-head next to the furnace F is perforated with very small holes placed as close as possible to each other. The front ends of the tubes, as shown in the drawings, are drawn in so as to reduce the size of the apertures. Immediately in front of the generator is placed the basket-coil L, which is connected to a section of steam-pipe M, led through the doorway and to another pipe N, which discharges superheated steam into the steam-chamber G of the generator. Mineral wool is to be placed between the inner and outer pipes or tubes B and C; also in the tubular basket-coil L.

Figs. 3 and 4 illustrate an application of the hydrocarbon-generator under an ordinary horizontal tubular stationary boiler. The generator is shown placed in the mouth of the furnace. The oil-pipe *o* conveys the oil from the reservoir P to the oil-chamber of the generator. Steam is taken from the boiler-span of the boiler at R and led through the pipe to the coil L and from thence to the steam-chamber of the generator. The hot-air flues are shown at S, where, as indicated by the arrows, the atmospheric air admitted at the side of the boiler passes through the bridge-wall T and thence through the flues at the sides of the furnace around to the generator in front.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I would state that I have in setting out the objects of the invention shown certain special mode of arrangement for making an application of my invention to the furnace of a steam-boiler with its connection to an oil-reservoir. I wish it to be understood, however, that although this form, mode, and arrangement, as illustrated, may be used with advantage, yet I do not intend to limit my patent to this special application, and as it may be carried out in many ways and in connection with different types of boilers and in smelting and other furnaces without departing from its spirit and scope, and that it is susceptible of many modifications and will necessarily have to be varied in many ways to suit the various conditions and purposes of its application; and

I declare that what I claim in respect of the herein-described invention is—

1. A burner for liquid hydrocarbon, consisting of a casing having a perforated tube-head, a series of open oil-tubes in the casing extending to said tube-head, a series of open steam-tubes within the oil-tubes terminating just within the ends of the oil-tube, and hot-air conduit communicating with the casing, substantially as shown, and for the purpose set forth.

2. The combination, in a burner for liquid hydrocarbon, consisting of a casing having a perforated tube-head, a series of open oil-tubes in the casing extending to said tube-head, a series of open steam-tubes within the oil-tubes terminating just within the ends of the oil-tubes, and hot-air conduit communicating with the casing, and a spiral coil of pipe placed in front of the burner to superheat the steam in its passage to the chamber G, giving communication to the aforesaid series of steam-tubes, all substantially as set forth.

3. In a burner for liquid hydrocarbon, the combination of a casing having a perforated tube-head, a series of oil-tubes secured to and communicating with chamber D at one end and extending through said tube-head of casing at the other end, a series of open steam-tubes within the oil-tubes secured to chamber G outside and independent of chamber D, said steam-tubes passing through oil-chamber D and thence into the oil-tubes, terminating just within the ends of the latter, and connected superheater, together with the hot-air conduits passing through the furnace and connecting with the casing, substantially as described.

HENRY ASHTON RAMSAY.

Witnesses:
FELIX R. SULLIVAN,
F. M. CROOK.