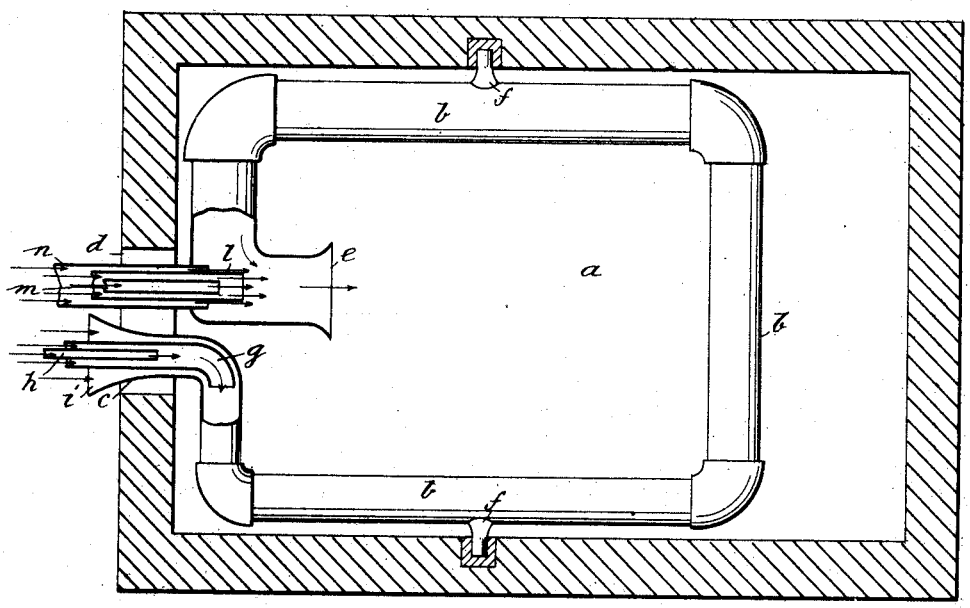
(No Model.)

J. WILSON & A. MASON.

PROCESS OF BURNING PETROLEUM OR OTHER HYDROCARBONS.

No. 423,012. Patented Mar. 11, 1890.

FIG. 1.



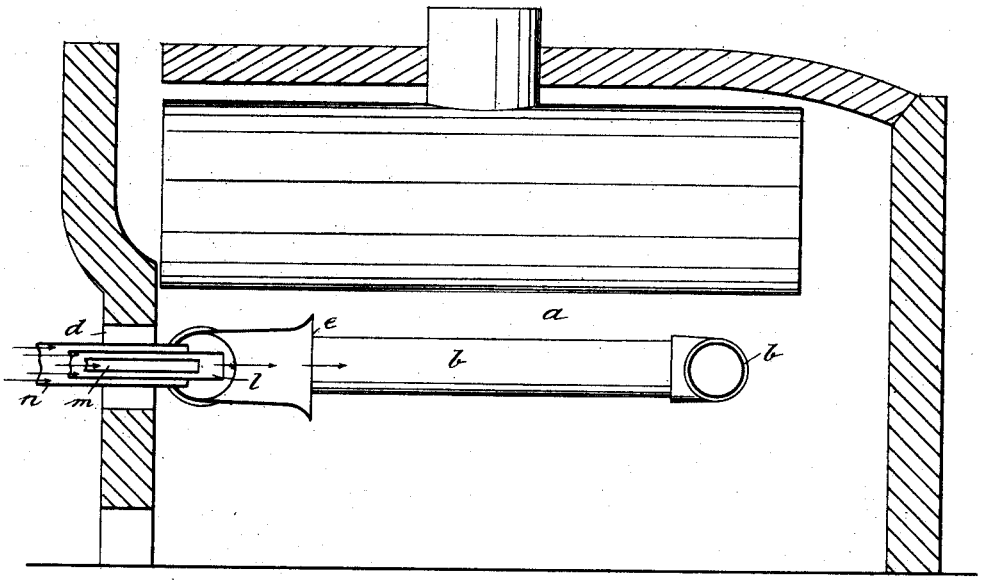


FIG. 2.

WITNESSES

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UNITED STATES PATENT OFFICE.

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PROCESS OF BURNING PETROLEUM OR OTHER HYDROCARBONS.

SPECIFICATION forming part of Letters Patent No. 423,012, dated March 11, 1890.

Original application filed December 5, 1887, Serial No. 256,998. Divided and this application filed August 3, 1888, Serial No. 281,897. (No model.)

To all whom it may concern:

Be it known that we, JOHN WILSON and ALLAN MASON, citizens of the United States, and residents of New York city, in the county and State of New York, and Brooklyn, Kings county, New York, respectively, have invented certain new and useful Improvements in Processes of Burning Petroleum and other Hydrocarbons, of which the following is a specification.

This invention is an improved method of burning liquid hydrocarbon, which consists of injecting oil, steam, and air into a pipe-retort located in and subject to the heat of the furnace-chamber, passing the same unobstructedly along and mixing, expanding, and gasifying them therein; also, injecting additional oil, steam, and air into the retort near the issue and together discharging the highly-heated gases and the directly-injected elements together *en masse* at the burning-point, and thus effecting superior combustion and greater heat, all as hereinafter fully described, reference being made to the accompanying drawings, in which we represent apparatus by which our improved process may be carried out.

Figure 1 is a horizontal section of a furnace and partly a plan view and partly a sectional view of some of the apparatus. Fig. 2 is a longitudinal sectional elevation of the furnace and apparatus.

In any boiler or other furnace-chamber *a* we arrange a pipe-retort *b*, with an inlet branch *c*, entering the fire-door *d*, the general arrangement of the said pipe-retort being a circuit of the combustion-chamber along the inner walls with a terminal issue *e* of its inner extremity for the discharge of the gases and vapors projected inward from the fire-door alongside of the inlet branch *c*, and being successively larger in diameter along the different sections; but the form and arrangement may be varied at will, as it may be coiled several turns either vertically or horizontally along the rear transverse part or along the side walls of the furnace, if desired, and said transverse part may be located at the rear wall of the furnace, instead of in the advance position of the same, as here shown. We also prefer to arrange said pipe-retort *b* on trunnion-pivots *f*, or in any other approved way, whereby the front and rear may be respectively elevated or depressed to shift its pitch or inclination, as varying conditions may require, as to change the application of the heat and to vary the flow of the matters passing through it; and with the inlet *c* we arrange an oil-feeder *g* and a steam-jet nozzle *h* for introducing the oil and steam and spraying the oil to be mixed, vaporized, and gasified and introduced into the furnace through the issue *e*, and with the oil and steam thus we also provide for the introduction of air through the inlet *c* at *i* along with them.

With the highly-combustible elements thus produced and calculated to burn with great intensity and corresponding limit of projection of the flame at the issue *e* we take advantage of the facility afforded by the bend where the retort *b* terminates in the issue *e* for introducing additional measures of oil, steam, and air, either under pressure or not or heated or not, by providing the respective inlets *l*, *m*, and *n* therefor, which, like the others *h*, *g*, and *c*, are to have the suitable connections for feeding or injecting the respective elements as required. With these additional inlets the longer flame of the less volatile elements thus directly admitted to the burner may be had in combination with the shorter but more volatile and inflammable gases generated in the retorts.

The issue nozzle or burner *e* may have the flaring mouth represented in Figs. 1 and 2, together with or without the curled extremity there shown for the expansion and distribution of the escaping vapors, which we find in practice a very efficient and practical form.

It is to be noted that our invention is essentially favorable to the expansion and rarefaction of the combustible matters by reason of the progressively-increasing dimensions of the retort or retorts and the unobstructed issue out of which the vapors or gases escape in more expanded and therefore more com-

bustible condition than when subject to compression by retention in the retorts through the effect of contracted issues.

By the greater expansion in the retort the vapors and gases are proportionately hotter, as well as more expanded, when reaching the point of combustion.

We are aware that the vapor of steam and oil, but without air, has been introduced from the vaporizing-retort into a mixer in which air has been mixed with the vapor prior to issuing at the burner, steam being also employed as a means of accelerating the jet when the vapor-jet from the retort alone is insufficient, as in the patent to Avery, No. 398,873, March 5, 1889. We are also aware that other oil has been introduced into the vapor of oil and steam on its issue from the retort, as in the patent to Chandler and Wray, No. 132,440, October 22, 1882; but neither of these represents our process, which comprises oil, steam, and air introduced together to the retort in the first place, which, being regulated to the proper proportions in both instances, produce better and more effective combustion and constitute a process materially different from these both as to the essential elements used and the results.

What we claim, and desire to secure by Letters Patent, is—

The process of burning liquid hydrocarbon, which consists in injecting oil, steam, and air into a highly-heated retort, vaporizing and gasifying said hydrocarbons, and combining with said highly-heated gases other oil, steam, and air and discharging the resultant products at the burning-point, substantially as described.

Signed at New York city, in the county and State of New York, this 19th day of June, A. D. 1888.

JOHN WILSON.
ALLAN MASON.

Witnesses:
W. J. MORGAN,
WILFRED B. EARLL.