W. H. RUSSELL.

Improvement in Apparatus for Burning Hydrocarbons as Fuel.

No. 128,914. Patented July 9, 1872.

Fig: 1.

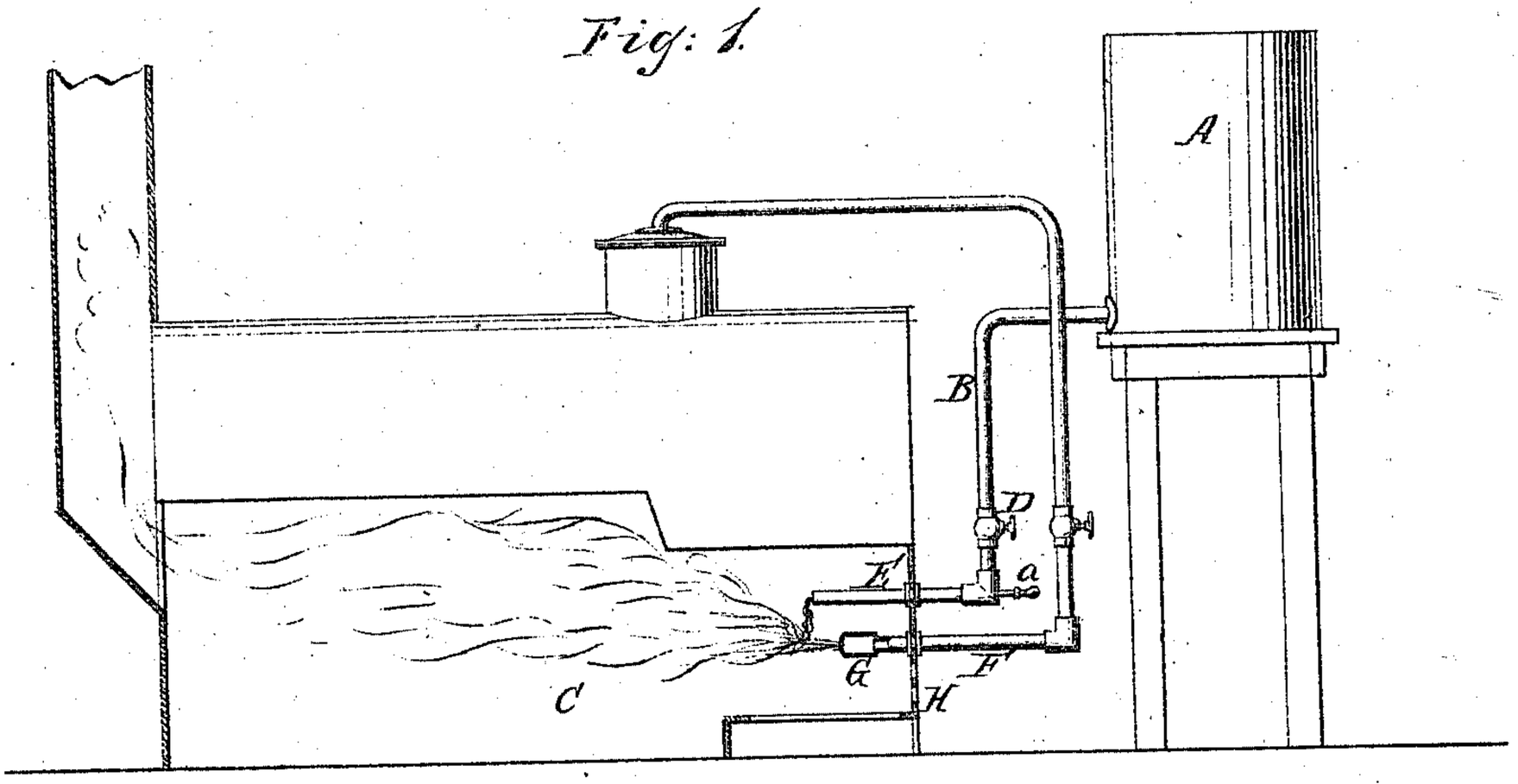


Fig: 3.

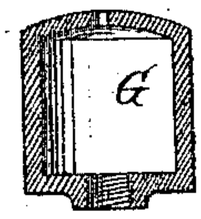
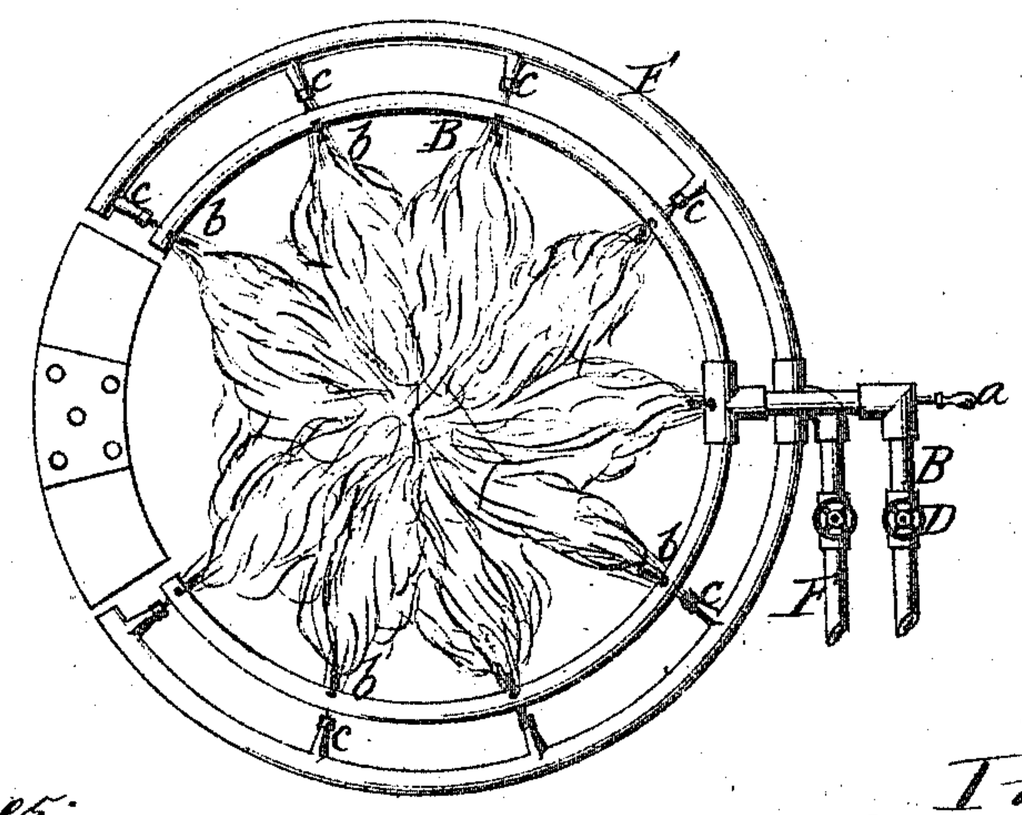


Fig: 2.



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128,914

UNITED STATES PATENT OFFICE.

WILLIAM H. RUSSELL, OF BROOKLYN, NEW YORK, ASSIGNOR TO HIMSELF AND JAMES M. BROOKFIELD, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR BURNING HYDROCARBONS AS FUEL.

Specification forming part of Letters Patent No. 128,914, dated July 9, 1872.

To all whom it may concern:

Be it known that I, WILLIAM H. RUSSELL, of the city of Brooklyn, county of Kings and State of New York, have invented a new and Improved Apparatus for Using Hydrocarbons as Fuel; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 is an elevation of my apparatus, the furnace being shown in section. Fig. 2 is a modification, which shows how the invention can be used in glass houses. Fig. 3 is a separate view of the discharge-nozzle of the steam-pipe.

This invention relates to the use of hydrocarbon oils as fuel in furnaces or steam-boilers, or furnaces of glass-houses or other places where heat is to be produced; and consists of a pipe for discharging the oil into a furnace or other place where heat is to be produced, terminating over the end of a steam-pipe which also discharges into the furnace. The oil and steam-pipes are governed by suitable stop-cocks, and the end of the steam-pipe is provided with a hollow button through which the steam passes, and from which it is discharged through a small orifice at the end, the arrangement being such that the steam is compelled to issue therefrom through a small opening, so that it will spread and strike the falling oil and break it into fine particles, and disperse the same in the furnace so that their combustion will be facilitated. Atmospheric air to aid combustion is admitted into the furnace in any convenient manner.

I do not restrict myself to any particular kind of hydrocarbon oil in using my apparatus, as I can use dead or refuse oil as well as crude and refined.

The letter A designates a tank for holding the oil or fuel, and B is a pipe which conducts the oil into the furnace C of a steam-boiler. The pipe B is provided with a stop-cock, D, to regulate the discharge of oil, and when I use dead or heavy oil I employ a scraper or cleaner, *a*, which works through the end E of the oil-pipe in the furnace, so as to cleanse it from adhering matter which might clog it. Below the discharge end E of the oil-pipe in the furnace, I arrange a steam-pipe, F, which leads from the steam-space of the boiler, and is provided at its end in the furnace with a discharge-nozzle or button, G, having only a fine opening at its extremity, through which the steam issues and spreads beneath the oil-pipe, the end of the oil-pipe being arranged so as to project a little distance beyond the extremity of the steam-pipe, so that the steam will strike the falling oil as it descends from the end of the oil-pipe, as illustrated in the drawing. The steam, on issuing from the nozzle or button G, strikes the oil and breaks it into fine particles, which are carried forward and scattered by the spreading steam into the inner parts of the furnace. The furnace is supplied with the necessary quantity of atmospheric air or oxygen by perforations through the doors H of the furnace, or through the ash-pit, as may be preferred.

It will be observed that the oil, as it falls down from its pipe upon the current of steam below it, will be broken up into fine particles by the mechanical action of the steam, and carried and dispersed by it through the furnace so as to be exposed on all sides to the fire.

The modification in Fig. 2 shows an arrangement for employing my invention in glass furnaces. In this view the letter B designates the oil-pipe, which is arranged in the form of a ring, from the inner side of which oil is discharged at as many points as may be desired, according to the number of glass pots contained in the furnace; radial nozzles *b* being arranged on the inner side of the ring, as indicated in the drawing. Steam is supplied by means of a concentric steam-pipe, F, arranged in a lower plane than the oil-pipe B, the steam-pipe being provided with radial discharge-nozzles *c* that extend in the same radial lines as the oil-nozzles *b* beneath the same, but not reaching so far inward, so that the oil dripping down from the ends of the oil-nozzles will fall upon the currents of steam from the respective steam-nozzles, and be acted on to be broken 'up' and minutely divided, as before explained. The ends of the steam-nozzles are constructed, as before explained, with a hollow button or nozzle, whose end has a small

opening for the emission of steam against the falling oil. The currents of steam, bearing the oil along with them, are, in this modification, directed toward a common center, between, against, and under the pots of glass, (not here shown,) and as many of the combined discharge-pipes can be used as shall be found necessary to produce the heat required.

The bottoms of the furnaces in which my invention is used, should be provided with a suitable grate or surface for receiving material wherewith to kindle or start a fire of sufficient extent and degree of heat to cause combustion of the oil, the steam itself assisting in the combustion when it becomes decomposed by the heat, its hydrogen being consumed, and its oxygen supporting the combustion. The steam-pipe in this modication may be horizontally-parallel or nearly so with the oil-pipe; but in such case the steam-nozzles must be bent down below the oil-pipe so as to discharge in a lower plane than the oil-pipe nozzles.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a furnace or place for carrying on combustion, a pipe, B, for discharging hydrocarbon oil therein, in combination with a steam-pipe having a button, G, arranged beneath and a little behind it in such a manner that the oil from the pipe will fall into the current of steam, substantially as described.

2. The hollow button G, provided with a small discharge orifice, as described, arranged on the end of the steam-pipe F, substantially as set forth.

3. The circular oil-pipe B with radial discharge nozzles *b* on its inner side, in combination with the concentric steam-pipe F, provided with radial discharge-nozzles *c* below the plane of the oil-nozzles, in such a manner that the oil and steam are directed toward a common center, substantially as described, for use in furnaces for glass houses.

This specification signed by me this 27th day of May, 1872.

WM. H. RUSSELL.

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.