H. C. ROSE.

APPARATUS FOR DISTILLING OIL.

No. 182,775. Patented Oct. 3, 1876.

Fig. 1

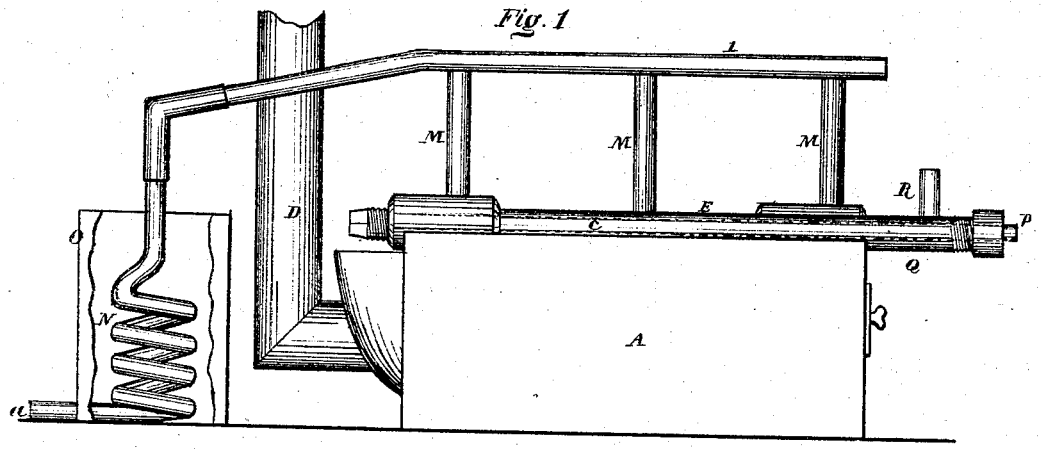

Fig. 2

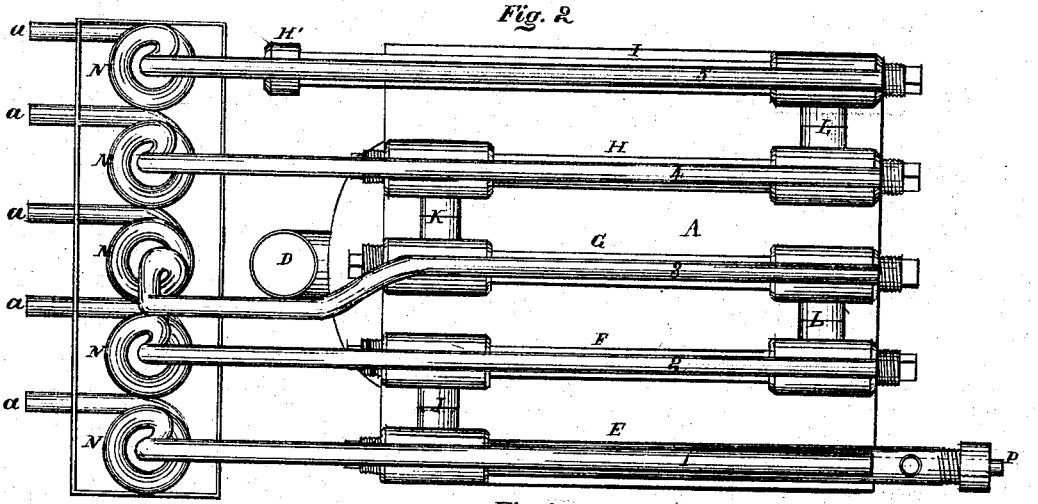

Fig. 3.

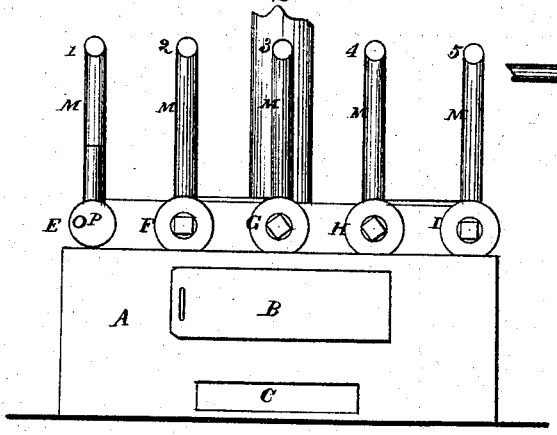

Fig. 4

Witnesses

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IMPROVEMENT IN APPARATUS FOR DISTILLING OIL.

Specification forming part of Letters Patent No. **182,775**, dated October 3, 1876; application filed May 3, 1876.

To all whom it may concern:

Be it known that I, H. C. ROSE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in an Apparatus for Distilling Oils; and I do hereby declare that the following is a full and complete description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation of the apparatus. Fig. 2 is a plan view. Fig. 3 is a front elevation. Fig. 4 is a detached section.

Like letters refer to like parts in the several views.

This invention is an apparatus for distilling hydrocarbon oils; and it consists of a system of pipes arranged in a serpentine-like manner over a furnace either longitudinally or transversely therewith. In connection with said system of pipes is arranged above them, and either parallel or transversely therewith, a system of vapor-pipes, terminating in condensing-coils or still-worms. Said lower pipes are provided with perforated steam-pipes, all of which are constructed substantially as follows:

In the drawing, A represents a furnace; B, Fig. 3, the door thereof; C, the ash-pit, and D the smoke-stack, all of which are, or may be, such as are in ordinary use for similar purposes. Above and lengthwise of the furnace is arranged a series or system of pipes, E, F, G, H, and I, the number of which may be more or less, according to the required capacity of the apparatus. The two pipes E and F are connected to each other at their rear ends by a conjunctive pipe, J; also, the pipes G and H are connected to each other by a similar pipe, K. The pipes F and G, and the pipes H and I, are respectively connected to each other at their front end by conjunctive pipes L.

By these several connections of the pipes they form a continuous serpentine course over the top of the furnace. The spaces between them are filled with cement compound of fine clay, or with other suitable material, which, together with the pipes, constitutes the arch or crown of the furnace.

Immediately over the pipes E F G, &c., and parallel therewith, are arranged a series or system of vapor-pipes, 1, 2, 3, 4, and 5, Fig. 2. Said vapor-pipes are supported above the lower ones and put in communication therewith by vertical pipes M. The vapor-pipes extend back beyond the furnace, and each one, respectively, terminates in a coil or still-worm, N, as will be seen in Figs. 1 and 2. Said coils are contained in a tank, O, and have their termination outside of the tank at *a*, or otherwise. Extending longitudinally through each of the pipes E F G, &c., is a small steam-pipe, P, terminating at the end of each of the pipes, or they may be conducted continuously through the pipes and terminate therewith. Said pipe or pipes are perforated for the emission of steam therefrom into the pipes through which they pass. A detached section of one of the steam-pipes is shown in Fig. 4. The dotted lines *c* in Fig. 1 indicate the steam-pipe inclosed in the pipe E. The purpose of said steam-pipes will hereinafter be shown.

Having described the construction and arrangement of the apparatus, the practical operation of the same is as follows:

As above said, this invention is for the distillation of hydrocarbon oil. To this end I introduce crude petroleum into the pipe E at the end Q, through the nozzle R, Fig. 1. The oil as it runs through the system of pipes E F G, &c., becomes vaporized by the heat of the pipes, induced by the furnace. The lightest of the elements of the oil, in the form of gasoline vapor, ascends the vertical tubes M from the pipe E, into the vapor-pipe 1. The next lightest ascends from the pipe F through its respective vertical tubes M, into the vapor-pipe 2. A further vaporization takes place in the pipe G, which ascends into the vapor-pipe 3, and so on throughout the entire series of the pipes composing the system. A continuous and simultaneous vaporization of the oil goes on, each elimination of vapor becoming less and less volatile until the heavy or unvaporized residuum or oil is discharged from the end H′ of the range of pipes E F G, &c.

The vapors as fast as they are collected in the vapor-pipes, flow therefrom into the coils N, respectively, wherein they are condensed in the usual way, and flow therefrom through their respective outlets *a*, each section or pipe of the entire system producing a different quality of distillate, while, as above said, the

unvaporized oil or residuum continues discharging from the end H′ of the series of pipes E F G, &c. To further facilitate the vaporization of the oil is the purpose of the perforated steam-pipes P. Steam on being charged into said pipes escapes therefrom through the perforations into the pipes E F G, &c., thereby facilitating the vaporization of the oil.

It will be obvious that, by the use of the above-described apparatus, a continuous and simultaneous distillation of the oil is obtained, the distillates varying in number according to the number of pipes employed in the apparatus, and as various in quality, varying from the lightest gasoline to the heaviest distillate obtainable, and that by one continuous and simultaneous distillation, as hereinbefore said.

In the preparation of certain oils, it is desirable to use the series of pipes E F G, &c., and the vertical pipes M without the vapor-pipes—as, for instance, when a simple elimination of the most volatile elements of the oil only is to be driven off, and no care or wish to collect it. To this end, steam or air is employed for the purpose of expelling it from the pipes.

It will be observed that the ends of said pipes E F G, &c., are closed by screw-plugs, which, when the pipes become foul, can be unscrewed therefrom in order to clean them, or for other needful purposes.

I am aware that pipes arranged in an angular position in connection with boilers, and that vertical pipes in connection with a pipe ascending vertically in a zigzag form, have been used for the purpose of distilling; I do not claim, broadly, the use of pipes for that purpose; but what I do claim, and that which distinguishes my invention from others, is the system of continuous horizontal pipes arranged over a furnace in the manner herein described, whereby I obtain a steady and uninterrupted flow of oil through the still, from the points where the crude oil is introduced to the points where the residuum is discharged, and by which I also obtain a more perfect separation of the various products of distillation than is obtained by other means now known in this branch of the arts.

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

1. In oil-stills, the serpentine system of continuous horizontal pipes E F G, &c., arranged over a furnace, and having pipes M, in combination with the pipes 1 2 3, &c., for retaining and conducting the various qualities of vapor generated from the uninterrupted flow of oil through the pipes E F G, &c., subjected to a uniform heat, or nearly so, substantially as set forth.

2. The pipes E F G, &c., with the connecting-pipes J K L, &c., arranged horizontally over a furnace, in combination with the vertical pipes M, substantially as and for the purpose set forth.

3. The combination of the system of pipes E F G, &c., steam-pipes P, and vertical pipes M, vapor-pipes 1 2 3, &c., with their respective coils, N, tank O, and furnace A, in the manner substantially as herein described, and for the purpose specified.

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Witnesses:
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