No. 690,611. Patented Jan. 7, 1902.

J. S. ROAKE.

DISTILLING APPARATUS.

(Application filed May 18, 1901.)

(No Model.)

Fig. 1.

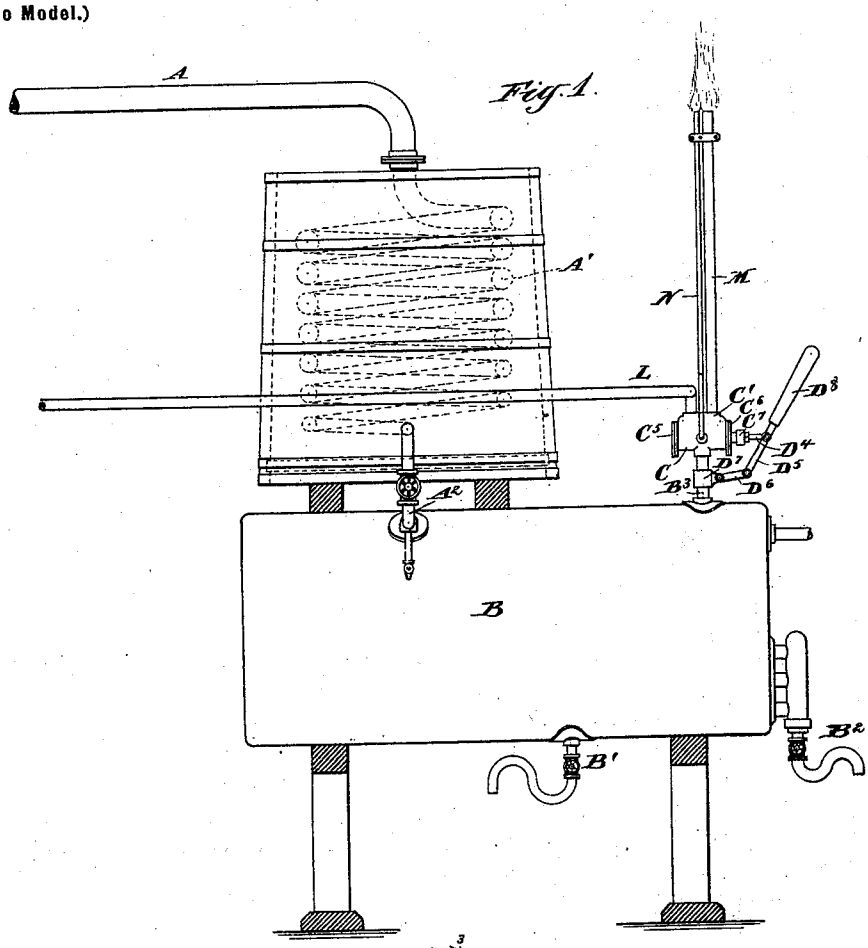


Fig. 3.

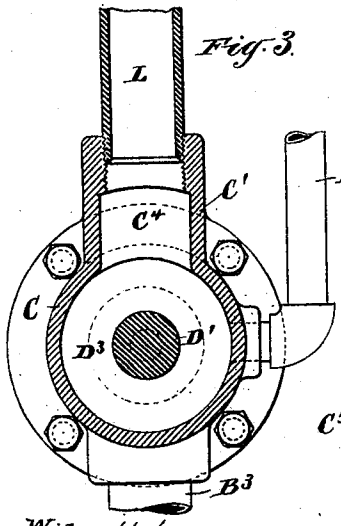
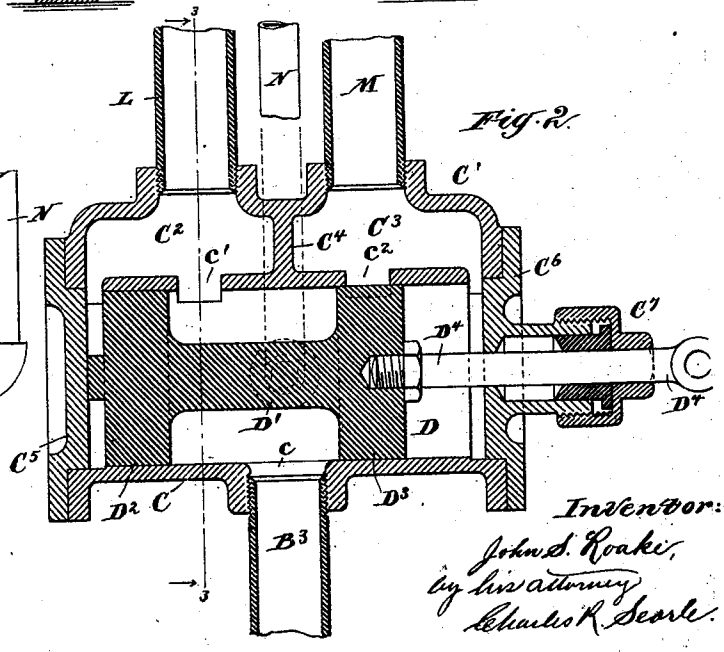


Fig. 2.



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DISTILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 690,611, dated January 7, 1902.

Application filed May 18, 1901. Serial No. 60,816. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. ROAKE, a citizen of the United States, residing in the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Distilling Apparatus, of which the following is a specification.

In certain processes of distillation, notably in the destructive distillation of wood to obtain turpentine, resin, and other products, considerable volumes of inflammable hydrocarbon gas are carried over from the retort with the other products to the receiver. This gas is a constant source of danger by fire and explosion, and great care must be exercised to insure its safe escape or disposition.

My invention relates to means for disposing of the gas in such manner that it may at all times escape freely and safely from the receiver and the danger of accident by fire reduced to a minimum or entirely avoided.

The invention consists in providing the receiver with two escape-pipes for the gas, each of sufficient capacity to allow all the gas to pass freely therethrough, one leading to a heating-burner or other apparatus, in which the gas may be economically utilized or stored, if desired, and the other leading to the open air and terminating at a point at which the gas flowing therethrough may be safely ignited and burned, and a single controlling device so constructed and arranged that the flow of gas may be directed through either of the pipes or divided between them, as desired; but under all conditions and positions of the controlling device the passages shall be open to allow the gas to escape freely, and thus avoid accumulation and pressure in the receiver and other portions of the apparatus.

In the most complete form of the invention I provide a third pipe, preferably smaller than the others, communicating with the interior of the receiver and terminating at a point adjacent to the end of the open-air pipe. Gas flowing through the small pipe is lighted and burns continuously so long as there is gas escaping from the receiver. The flame thus produced serves as a torch to ignite and insure the safe burning of any gas escaping through the open-air pipe. Thus arranged a small portion of the gas is used continuously in supplying the torch, while the main portion passes either to the heating-burner in the furnace or other apparatus and is utilized, or escapes through the open-air pipe and is burned, or a portion, determined by the position of the controlling device, flows through both passages.

The preferable form of controlling device comprises a casing inclosing a piston-valve operated by a lever or otherwise and having an inlet-port for the gas and outlet-ports leading to the escape-pipes, the outlet-ports being so arranged that at each extreme position of the valve one is fully open and at all intermediate positions the combined area of the openings equals or exceeds the fully-open area of one.

The invention also consists in certain details of construction and arrangement of parts to be hereinafter described.

It is important that the gas escape freely from the receiver for the reason that if it be allowed to accumulate it tends to "back up" through the worm and other portions of the distilling apparatus and by its pressure obstruct the flow of vapors from the retort, and also by reason of the pressure thus produced tends to force its way through any faulty joints or other slight crevices in the apparatus and is liable to become ignited, and thus lead to disaster by fire.

The accompanying drawings form a part of this specification and show the invention with so much of a distilling apparatus as is necessary in clearly describing it.

Figure 1 is a general side elevation of a condenser and receiving-tank equipped with the invention. Fig. 2 is a central longitudinal section through the controlling-valve and casing on a larger scale, and Fig. 3 is a corresponding transverse section taken on the line 3 3 in Fig. 2.

Similar letters of reference indicate the same parts in all the figures.

A is a pipe leading from a still or retort (not shown) and connected to a condensing coil or worm A′, from which the products of distillation are led through the pipe A^2 into the receiver B, from which they may be drawn through the pipes B′ B^2, as usual. All these

parts and the other portions of the distilling apparatus (not shown) may be understood to be of any ordinary or approved construction.

C is a cylindrical casing inclosing a cylindrical valve D, having its central portion reduced at D′ to form a double piston D^2 D^3.

C′ is an upward extension of the casing divided into two compartments or chambers C^2 C^3 by the vertical partition C^4, and C^5 C^6 are cylinder-heads closing the ends of the casing, one being provided with a stuffing-box C^7, through which extends the valve-rod D^4, by which the valve D may be moved axially as required.

B^3 is a pipe of sufficient capacity to allow the free escape of gas and leads from the upper part of the receiver B to the inlet-port *c* at the mid-length of the casing, between the pistons D^2 D^3. The two outlet-ports C′ C^2 are located one on each side of the partition C^4 and communicate directly to the chambers C^2 C^3, respectively. From the chamber C^2 extends a pipe L, leading to a burner in the retort-furnace or to a gas-holder or other apparatus, (not shown,) in which the gas may be utilized or stored. From the other chamber C^3 a pipe M extends vertically a sufficient distance and opens directly to the air.

N is a small escape-pipe connected directly to the casing C between the pistons D^2 D^3, and therefore in unobstructed communication with the interior of the receiver at all times. It extends upward and terminates adjacent to the open end of the pipe M.

The outlet-ports c' c^2 and their controlling-pistons D^2 D^3 are so proportioned and arranged that when the valve is thrown to the limit of its motion in one direction, as shown in Fig. 2, the outlet-port c' is fully open and gas may flow unobstructedly through the pipe B^3, outlet-port c', and pipe L to the burner or other device (not shown) and the other outlet-port c^2 is closed, and when the valve is at the extreme in the opposite direction the outlet-port c' is closed and the port c^2 fully open to allow the gas to escape freely through the open-air pipe M. In any intermediate position of the valve the covered or closed area of one outlet-port is equaled by a corresponding uncovered or open area of the other port, so that under all conditions there is an area equal to one outlet-port always open for the escape of gas through either or both the pipes L M.

The valve D is operated by a lever D^5, pivotally connected to the valve-rod D^4 and fulcrumed to a link D^6, attached at one end to a yoke D^7 on the pipe B^3, and is provided with a handle D^8, by which the valve may be placed at any desired position.

It will be observed that there are no valves or other obstructions in any of the escape-pipes. Gas accumulating in the receiver passes freely through the pipe B^3 to the interior of the casing and a small portion escapes through the pipe N and is ignited and burns continuously as long as there is sufficient gas received to supply the flame. Gas to be burned to produce heat or light passes freely through the pipe L, and if there be a surplus or if for any reason such supply is not required the valve D is thrown to allow a portion or the whole to flow unobstructedly through the pipe M and be harmlessly burned.

Modifications may be made in the forms and proportions without departing from the principle of the invention. Other forms of valves may be substituted for the piston-valve D. The escape-pipe or torch N may lead directly from the receiver B instead of from the casing C. I prefer the whole as shown.

I claim—

1. In an apparatus of the character set forth, a receiver, a casing communicating with the interior thereof, two escape-pipes leading from said casing, and a single valve controlling both pipes and arranged to permit gas from the receiver to flow unobstructedly through one or both under all conditions, and a torch receiving its supply of gas through an open pipe from said receiver and adapted to ignite gas issuing from one of said escape-pipes, all combined and arranged to serve substantially as and for the purposes herein specified.

2. The casing C, inlet-pipe B^3 and port *c* therefor, valve D in said casing having the pistons D^2 D^3, outlet-ports c' c^2 communicating with chambers C^2 C^3 in said casing, escape-pipes L and M leading from said chambers respectively, and means for moving said valve, the said ports and pistons so proportioned and arranged that gas entering the casing through said inlet-pipe may flow unobstructedly through one or both of said escape-pipes in all positions of said valve, all combined and arranged to serve with the receiver of a distilling apparatus, substantially as herein specified.

3. The casing C, inlet-pipe B^3 and port *c* therefor, valve D in said casing having the pistons D^2 D^3, outlet-ports c' c^2 communicating with the chambers C^2 C^3 in said casing, escape-pipes L and M leading from said chambers, and means for moving said valve, the said ports and pistons so proportioned and arranged that gas entering the casing through said inlet-pipe may flow unobstructedly through one or both of said escape-pipes in all positions of said valve, and pipe N leading from the casing between said pistons to the open end of one of said escape-pipes and adapted to serve as a torch to ignite gas issuing therefrom, all combined and arranged to serve with the receiver of a distilling apparatus, substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

JOHN S. ROAKE.

Witnesses:
CHARLES R. SEARLE,
M. E. GRACE.