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Patented May 20, 1902.

J. S. ROAKE.
DISTILLING APPARATUS.

(Application filed June 4, 1901.)

(No Model.)

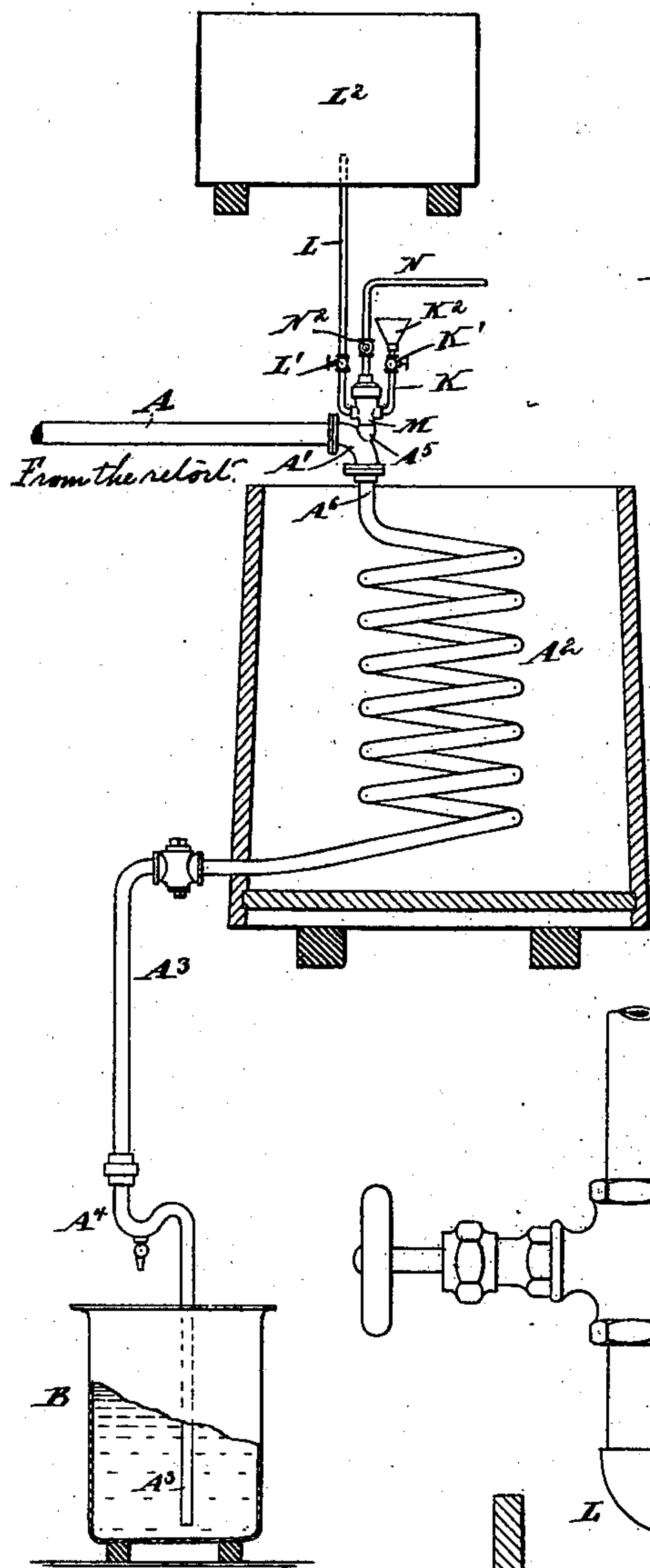


Fig. 1.

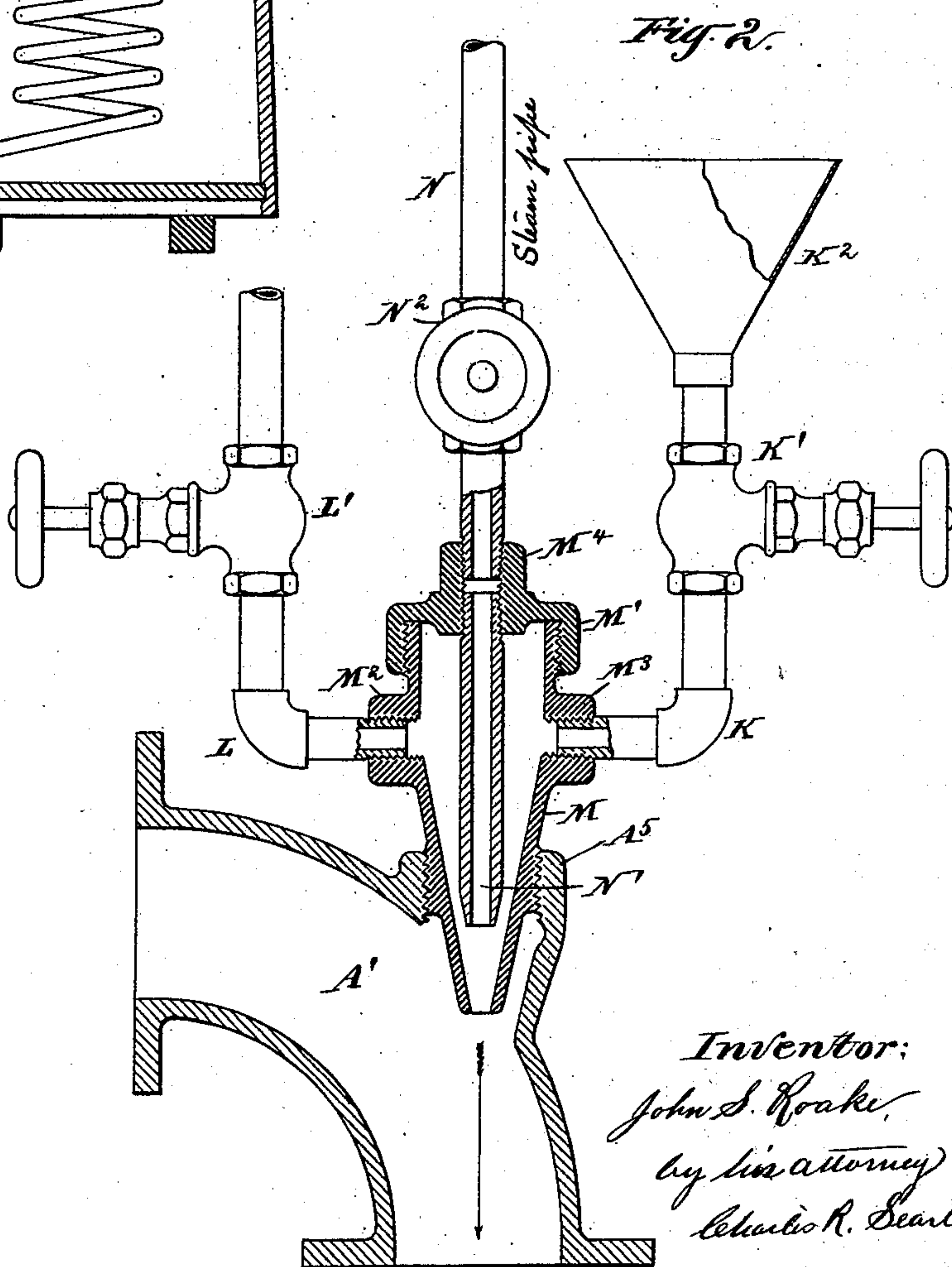


Fig. 2.

Witnesses:
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John S. Roake,
by his attorney
Charles R. Searle.

UNITED STATES PATENT OFFICE.

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DISTILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 700,373, dated May 20, 1902.

Application filed June 4, 1901. Serial No. 63,065. (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
5 and State of New York, have invented a certain new and useful Improvement in Distilling Apparatus, of which the following is a specification.

The invention relates to the distillation of
10 wood in the production of turpentine and other distillates, and more particularly to means for introducing alkali for the purpose of facilitating the removal of phenols, pyro-
15 ligenous acid, and other products carried over in the turpentine-vapor from the retort.

The object of the invention is to provide means whereby the alkali may be so introduced as to mingle very intimately with the products of distillation under conditions fa-
20 vorable to the combination of the undesirable products, and thus produce turpentine of a high grade of purity.

The invention consists of an atomizer comprising a steam-jet inclosed in a suitably-
25 formed chamber to which the alkaline solution is admitted and by the action of the jet is driven in the form of spray directly into the vapor before the latter reaches the condenser. The atomizer is applied to the vapor-pipe at
30 any convenient point, but preferably to a portion in which the direction of the jet of spray shall be in the direction of the flow of vapor through the pipe, thus increasing the rapidity of the flow toward the condenser. In the most
35 complete form of the invention I provide a second inlet to the atomizer, through which air or other material in gaseous or liquid form may be admitted as may be found necessary or desirable.

40 The accompanying drawings form a part of this specification and show the invention as I have carried it out.

Figure 1 is a side elevation showing the atomizer with so much of the distilling apparatus as is necessary in showing its operation.
45 Fig. 2 is a vertical section, partly in side elevation, showing the atomizer and its immediately-connected parts on a larger scale.

Similar letters of reference indicate the
50 same parts in both figures.

A is a pipe leading from a retort (not shown) and adapted to convey the turpentine-vapor to a worm A², in which it is condensed. The resulting liquid flows through a pipe A³, equipped with suitable valves, to a trap A⁴,
55 from which it flows to the receptacle B.

The atomizer consists of a casing M, screw-threaded at M' to match the internal threads in a boss A⁵, cast on the elbow A', connecting the horizontal vapor-pipe A to the vertical ex-
60 tension A⁶ of the worm A². The lower end of the casing M is tapered and when in position projects within the elbow and stands with its axial line coinciding with the axial line of the extension A⁶. On opposite sides of the casing
65 at about the mid-height are two hollow bosses M² M³, and the upper end is covered by a screw-threaded cap M', having a central boss M⁴, through which extends a pipe N, controlled by a valve N² and bringing steam under pres-
70 sure from a boiler. (Not represented.) The lower end of the pipe is tapered to form a jet-nozzle N', so proportioned and located relatively to the tapered end of the casing M as to serve in a manner analogous to an injector. 75
In the boss M² is screwed a pipe L, controlled by a valve L' and connected to an elevated tank L², containing an alkaline solution, preferably lime-water, and adapted to supply the
80 latter by gravity to the interior of the casing M in any desired quantities to be struck by the steam issuing from the jet N' and atomized. A pipe K, controlled by a valve K', is connected to the opposite boss M³ and is provided
85 with an open funnel K², adapted to allow air to enter the casing M and mix with the vapor when required or to allow the introduction of material in liquid form poured into the open funnel and flowing by gravity to the casing, as will be understood. The atomized
90 solution is projected downward in the extension A⁶ in a spray at high temperature due to the steam and by the action of the blast is thoroughly mixed with the vapor. The al-
95 kali is thus favorably presented to allow any portions of the vapor having an affinity for alkali to combine easily therewith. In traveling through the worm A² the whole is condensed and escapes through the pipe A³ and trap A⁴ to the receptacle B, in which the tur- 100

pentine and the water of condensation, with any contained impurities combined with the lime, are received and allowed to separate by gravity, as usual. The water in the receptacle B is strongly impregnated with lime, and as the pipe A³ extends below the level the liquid turpentine rises through it, and is thus again given an opportunity to free itself of any remaining pyroligneous acid or other undesirable constituent having an affinity for the lime. Strong alkaline solution may be supplied from time to time to the receptacle in addition to that flowing from the worm.

15 The supply of steam injected by the atomizer must be carefully regulated not to exceed the capacity of the worm to condense it rapidly, and thus to avoid pressure in the apparatus, which would tend to retard the flow of

20 vapor from the retort. The addition of the lime-water in the required small quantities in the form of a hot spray projected in the direction of the flow serves to increase the latter and hasten the distilling operation in

25 addition to improving the quality of the product by reason of the favorable conditions offered for the combination with the alkali of any undesirable products carried over with the turpentine-vapor.

30 Modifications may be made in the forms and proportions within wide limits, and parts of the invention may be used without the whole. I can omit the pipe K and its provisions for introducing air or other material

to the vapor-pipe. The position of the atomizer may be changed to introduce the solution at any desired portion of the vapor-pipe.

Although I have described the material as an alkaline solution and the product sought as turpentine, it will be understood that any solution may be similarly introduced in the distillation of any product to which such addition may be found to be advantageous.

It will be understood that those portions and equipments of the distilling apparatus not shown or described may be of any ordinary or approved construction and arrangement.

I claim—

In an apparatus of the character described, a condenser-coil, a pipe leading from a retort, an elbow connecting said pipe and the coil, a boss on said elbow, a tapered casing detachably mounted on said boss, a jet-nozzle extending into said casing and connected with a source of steam-supply, a pipe connecting said casing with an elevated tank, and a pipe also connected to said casing and with an open funnel, all substantially as and for the purposes 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,
JOHN GAREY.