

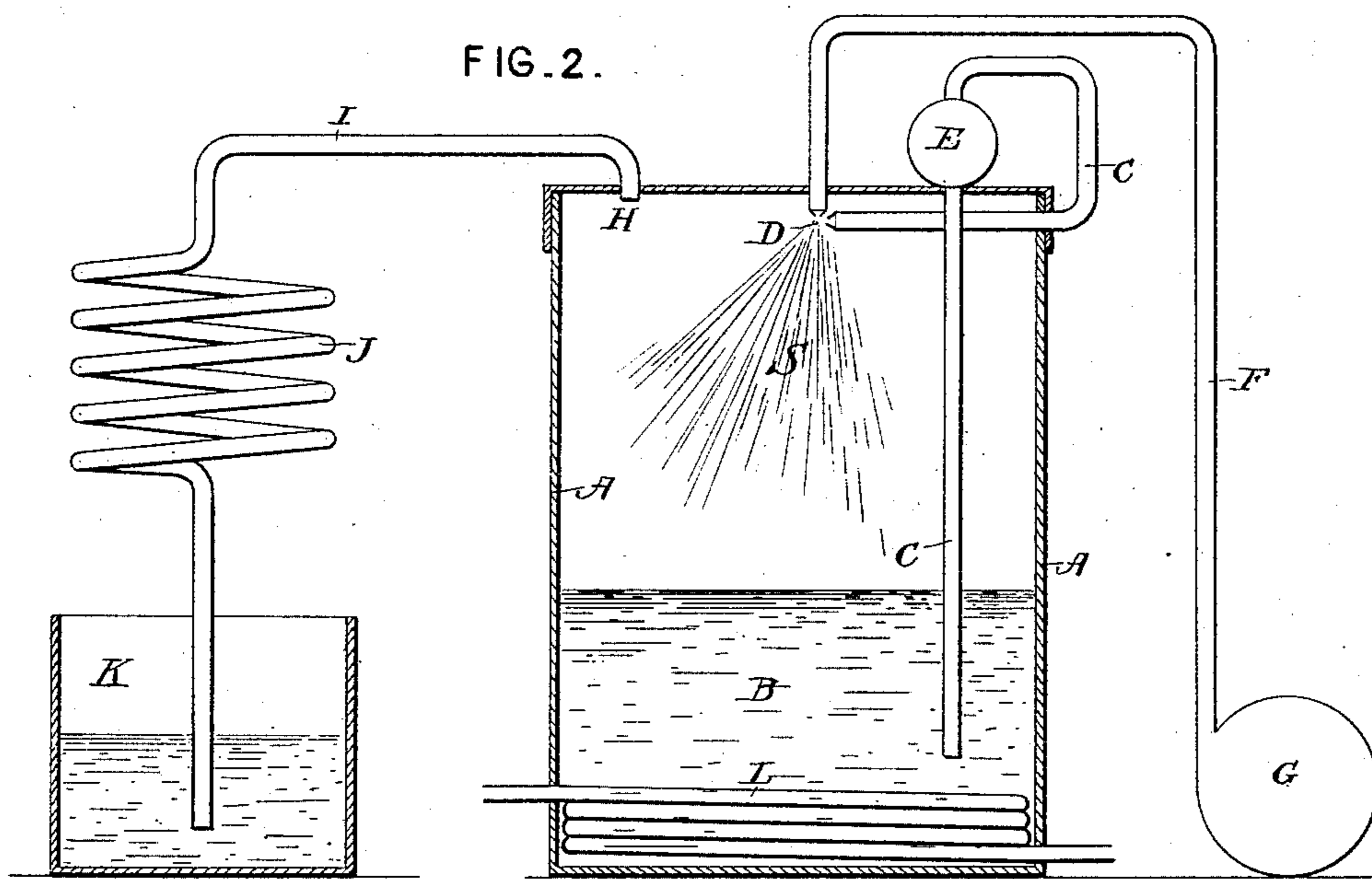
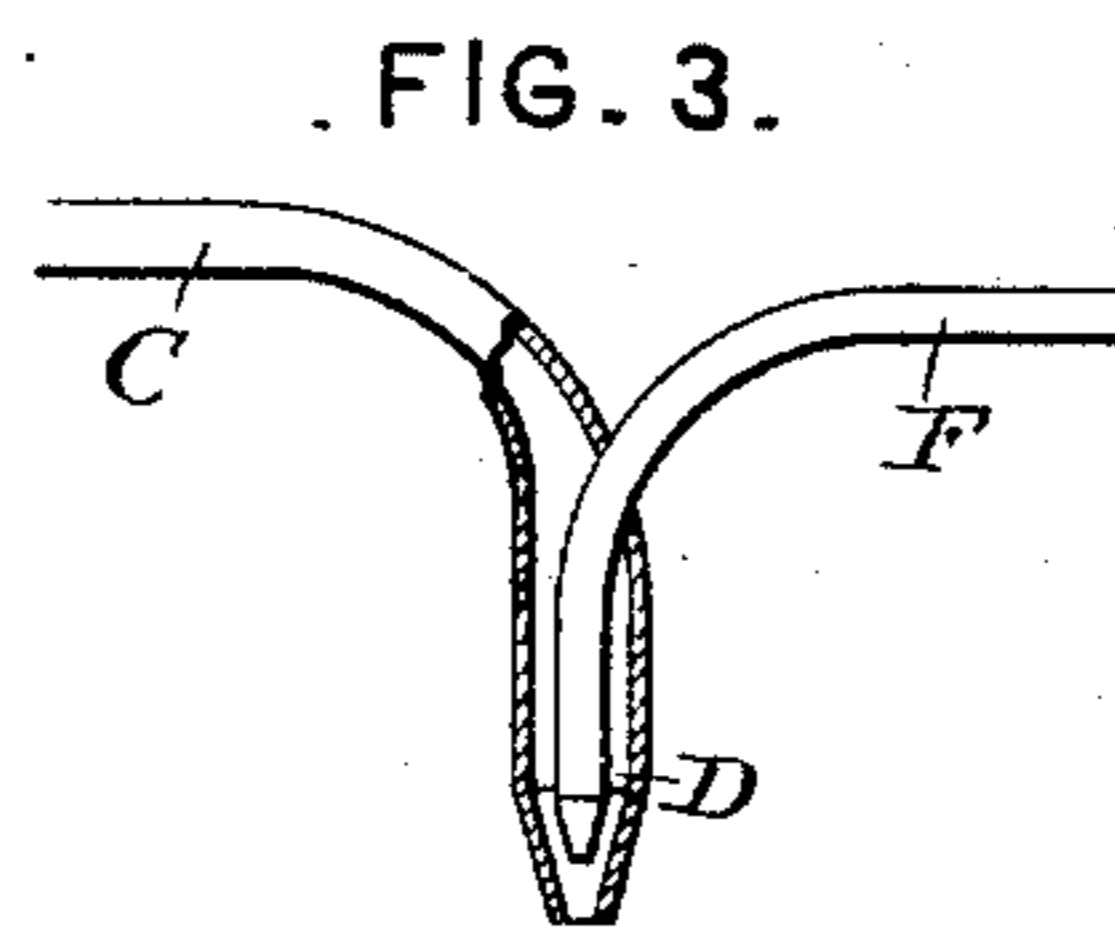
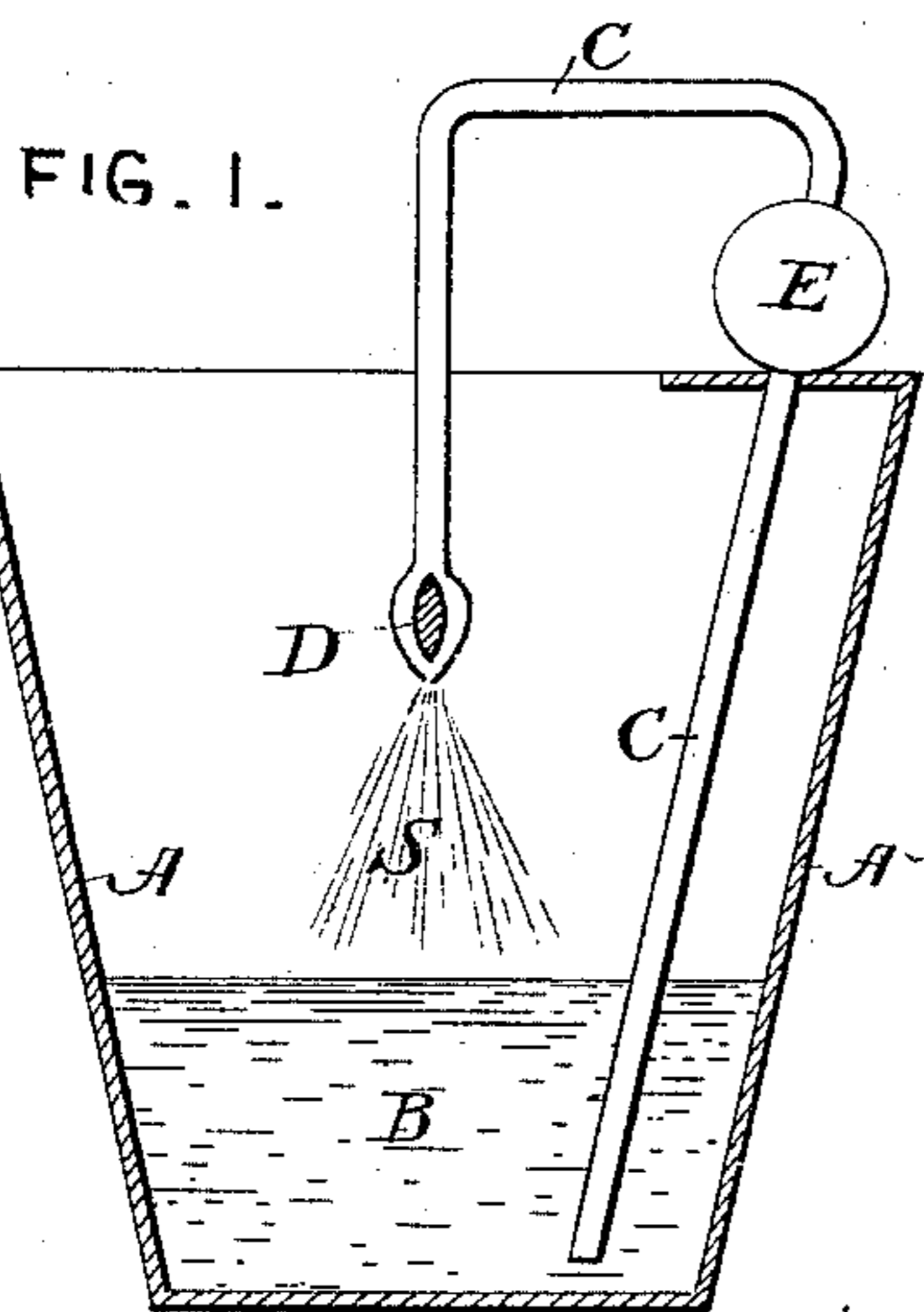
(No Model.)

J. W. & F. R. HOARD.

APPARATUS FOR OXIDIZING DRYING OILS AND OTHER LIQUIDS.

No. 353,358.

Patented Nov. 30, 1886.



Attest:

Geo. T. Smallwood.
Jas. K. McCallahan.

Inventor

John W. Hoard.
Frederick R. Hoard

By John J. Halsted & Son attys

UNITED STATES PATENT OFFICE.

JOHN W. HOARD AND FREDERICK R. HOARD, OF PROVIDENCE, R. I.

APPARATUS FOR OXIDIZING DRYING-OILS AND OTHER LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 353,358, dated November 30, 1886.

Application filed August 21, 1885. Serial No. 175,027. (No model.)

To all whom it may concern:

Be it known that we, JOHN W. HOARD and FREDERICK R. HOARD, both of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Apparatus for Oxidizing Drying-Oils and other Liquids; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

In our patent numbered 312,351, and dated February 17, 1885, we have described a process of oxidizing oil and other liquids.

Our present invention relates to improvements in apparatus for oxidizing drying-oils or other liquids; and the objects of our improvements are, first, to admix the liquid under treatment with atmospheric air as intimately, rapidly, and uniformly as possible, and, secondly, to afford facilities for continuously repeating this operation over and over again until the degree of oxidization desired is obtained. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical section of a very simple form of the apparatus; Fig. 2, a vertical section of the form which we prefer; Fig. 3, an enlarged section of a modification of a portion of Fig. 2.

Similar letters refer to similar parts throughout the several figures.

In the simplest form of the apparatus, as represented in Fig. 1, A is a tank or vessel containing the oil or other liquid, B, under treatment. C is a pipe leading from the liquid to an atomizer or spray apparatus, D, by which a stream of the liquid forced through it may be broken up into a finely-divided spray, S. In order to accomplish this result, a pump, E, or equivalent device, must in this form of the apparatus be employed to force the liquid through the pipe C and its atomizing apparatus D. The atomizer should be so situated that the liquid having been atomized or sprayed in the air shall then fall, run, or be conveyed by a pipe, conductor, or other means

back in or into the tank or vessel A, so that the liquid may be passed through the atomizer again and again, continuously, until the degree of oxidization desired is obtained.

The form of the atomizer D is not essential. Any known form capable of breaking the stream of liquid into a spray may be used.

Means must be taken to have the air subject to a continual change, as otherwise its oxygen will soon be exhausted and the process of oxidation cease.

It is preferable to supply the air through a pipe or conductor, F, as in Fig. 2. By the use of suitable and well-known forms of atomizing apparatus the stream of liquid may, if desired, be utilized to produce a draft through the air-pipe F. In this case we prefer to employ the form of atomizer represented in Fig. 2, in which the supply-pipe C for the liquid and the air-pipe F each terminate in contracted nozzles near to and approximately at right angles with each other. Another desirable form is represented in Fig. 3, in which both pipes terminate with contracted mouth-pieces, one within the other, it is not essential which, though preferable that the fluid which is forcibly propelled should pass through the inner tube. Other similar forms may be used. We find, however, that the process is accelerated if the air is supplied in the form of a powerful blast. For this purpose the air is propelled through the pipe by an air-pump, fan, or blower, G.

By the employment of suitable atomizing apparatus—such as those above described and illustrated in Figs. 2 and 3, or others similar thereto—the blast of air may be utilized both to force the liquid through the supply-pipe C and to atomize or break it into spray S, dispensing with the use of the pump E. In this case, as in the preceding, we prefer the form of atomizer illustrated in Fig. 2, as it is simple and effective, does not easily clog up, and is easily cleaned and kept in order.

If the form of atomizer illustrated in Fig. 3 is used in modifications of the apparatus in which a blast of air is employed, it is preferable to have the termination of air-pipe F inclosed within the supply-pipe C. The best results, however, are obtained when both the pump E and the air-pump, fan, or blower G, or equivalents therefor, are employed, and the

two streams—the air and the liquid, each propelled by independent means—are brought forcibly into contact by those forms of atomizing apparatus above referred to, and illustrated in Figs. 2 and 3, or others similar thereto. Each stream then helps to accelerate the motion of the other, the liquid is more easily and rapidly treated, and is driven into a finer spray and more intimate admixture with the air and the oxygen therein contained.

Whenever a blast of air is employed it is preferable to arrange the air-pipe F with its mouth-piece pointing downward and toward the liquid under treatment, in order that any air not utilized in spraying the liquid conveyed through the pipe C may be driven upon and into the body of the liquid under treatment, and thus assist in the process of oxidation.

The precise forms of the pump E and of the air-pump, fan, or blower G are not essential, and therefore in the drawings the details of their structure are not indicated. It is preferable, however, that each should have a positive action, so that a back pressure or draft created by propelling a fluid through a contracted mouth-piece will not seriously retard their action, and also that their action should be steady and constant, so as not to propel the fluids in jets or puffs. Accordingly we prefer forms with double or multiple pistons.

We find it desirable to use atomizing apparatus of large size, not only in order that the liquid may be more rapidly handled, but also to prevent the apparatus from becoming clogged, particularly when treating drying-oils.

To dispose of the surplus air when a stream or blast of air is employed, the tank or vessel A must either be open or be provided with a valve, H, preferably opening into an escape-pipe, I, which, if desired, either with or without the worm J, may terminate in or be provided with a condensing-tank, K, or equivalent apparatus for collecting and preserving any liquid held in suspension by the escaping air.

In treating drying-oils or other liquids which in certain stages of oxidation become thick or solid at ordinary temperatures, it will, when it is desired to produce or exceed such stages of oxidation, become necessary to supply suitable means for raising the temperature and keeping the substance in a liquid or semi-liquid condition. For this purpose we in most cases prefer to use a coil of steam-pipes, as at L; but instead of this a steam-jacket, a bath of fusible metal, or any other suitable heating arrangement may be substituted.

This apparatus is especially desirable for the oxidation of drying-oils—such as linseed-oil—but may also be used for oxidizing any liquid which oxidizes by the absorption of oxygen from atmospheric air, for the aging of liquors, or, with suitable heating apparatus, for the oxidizing of metals when in a state of fusion.

We claim—

1. In an apparatus for oxidizing drying-oils or other liquids, the combination of a tank or vessel to contain the liquid under treatment and a pipe leading from said liquid, connecting with a pump or equivalent device for propelling the liquid through such pipe, and terminating in atomizing or spraying apparatus, so located that the liquid having been thereby atomized will fall, run, or be conveyed back in or into said containing-vessel for continuous treatment over and over again as often as desired, substantially as above set forth.

2. In an apparatus for oxidizing drying-oils or other liquids, the combination of a pipe leading from the liquid under treatment, connected with a pump or equivalent device for propelling the liquid through such pipe, and terminating in atomizing apparatus suitable to atomize or spray the oil and supply it with a current of air through an air-pipe connected therewith, substantially as above set forth.

3. In an apparatus for oxidizing drying-oils or other liquids, the combination of a pipe leading from the liquid under treatment, connected with a pump or equivalent device for propelling the liquid through such pipe, and terminating in a contracted mouth-piece situated close to and approximately at right angles with the contracted mouth-piece of an air-pipe, substantially as above set forth.

4. In an apparatus for oxidizing drying-oils or other liquids, the combination of a tank or vessel to contain the liquid under treatment, a pipe leading from such liquid connected with a pump or equivalent device for propelling the liquid through such pipe, and terminating in atomizing apparatus suitable to atomize or spray the oil and supply it with a current of air through an air-pump connected therewith, said atomizing apparatus being so situated that the liquid having been thereby atomized will fall, run, or be conveyed back in or into said containing-vessel for continuous treatment over and over again as often as desired, substantially as above set forth.

5. In an apparatus for oxidizing drying-oils or other liquids, the combination of a tank or vessel to contain the liquid under treatment, a pipe leading from such liquid connected with a pump or equivalent device for propelling the liquid through such pipe, and terminating in a contracted mouth-piece situated close to and approximately at right angles with the contracted mouth-piece of an air-pipe, and said mouth-pieces being so situated that the liquid having been atomized thereby will fall, run, or be conveyed back in or into said containing-vessel for continuous treatment over and over again as often as desired, substantially as above set forth.

6. In an apparatus for oxidizing drying-oils or other liquids, the combination of a pipe leading from the liquid under treatment, a pump or equivalent device for propelling the liquid through such pipe connected therewith, and an air-pipe connected with an air-pump,

fan, or blower, or equivalent device for propelling the air through such air-pipe, and said two pipes terminating in atomizing apparatus suitable for atomizing or spraying the liquid
5 by the agency of a blast of air through said air-pipe, substantially as above set forth.

7. In an apparatus for oxidizing drying-oils or other liquids, the combination of a pipe leading from the liquid under treatment, a
10 pump or equivalent device for propelling the liquid therewith, and an air-pipe connected with an air pump, fan, or blower, or equivalent device for propelling the air through such air-pipe, and said two pipes terminating
15 in contracted mouth-pieces close to and approximately at right angles with each other, substantially as above set forth.

8. In an apparatus for oxidizing drying-oils or other liquids, the combination of a tank or
20 vessel to contain the liquid under treatment, a pipe leading from such liquid, a pump or equivalent device for propelling the liquid through such pipe connected therewith, and an air-pipe connected with an air pump, fan, or
25 blower, or equivalent device for propelling the air through such air-pipe, said two pipes terminating in atomizing apparatus suitable for atomizing or spraying the liquid by the agency of a blast of air through said air-pipe, and said
30 atomizing apparatus being so situated that the liquid having been atomized thereby will fall, run, or be conveyed back in or into said containing-vessel for continuous treatment over and over again as often as desired, substan-
35 tially as above set forth.

9. In an apparatus for oxidizing drying-oils or other liquids, the combination of a tank or vessel to contain the liquid under treatment, a pipe leading from such liquid, a pump or
40 equivalent device for propelling the liquid through such pipe connected therewith, and an air-pipe connected with an air pump, fan, or blower, or equivalent device for propelling the air through such air-pipe, said two pipes termi-
45 nating in contracted mouth-pieces close to and approximately at right angles with each other,

and so situated that the liquid having been atomized thereby will fall, run, or be conveyed back in or into said containing-vessel for con-
tinuous treatment over and over again as often
50 as desired, substantially as above set forth.

10. In an apparatus for oxidizing drying-oils or other liquids, in which the liquid is atomized or sprayed by the agency of a blast of air through an air-pipe, the arrangement of the
55 air-pipe with its outlet in such position that the blast of air through it will be directed downward and upon the surface and into the body of the liquid under treatment, substan-
60 tially as above set forth.

11. In an apparatus for oxidizing drying-oils or other liquids, in which such oils or liquids are to be oxidized beyond the point at which they become thick or solid at ordinary tem-
peratures, the combination of a tank or vessel
65 to contain the liquid under treatment, a pipe leading from such liquid, connected with a pump or equivalent device for propelling the liquid through such pipe and terminating in atomizing apparatus, and a suitable device for
70 heating the oil or liquid when partially oxidized and maintaining it in a fluid condition, substantially as and for the purposes above set forth.

12. In an apparatus for oxidizing drying-oils
75 or other liquids, in which such oils or liquids are to be oxidized beyond the point at which they become thick or solid at ordinary temperatures, the combination of a tank or vessel to contain the liquid under treatment, a pipe
80 leading from such liquid, connected with a pump or equivalent device for propelling the liquid through such pipe and terminating in atomizing apparatus, and a coil of steam-pipe within such containing-vessel, substantially as
85 and for the purposes above set forth.

JOHN W. HOARD.

FREDERICK R. HOARD.

Witnesses:

WALTER H. BARNEY,
WALTER SPENCER.