

(No Model.)

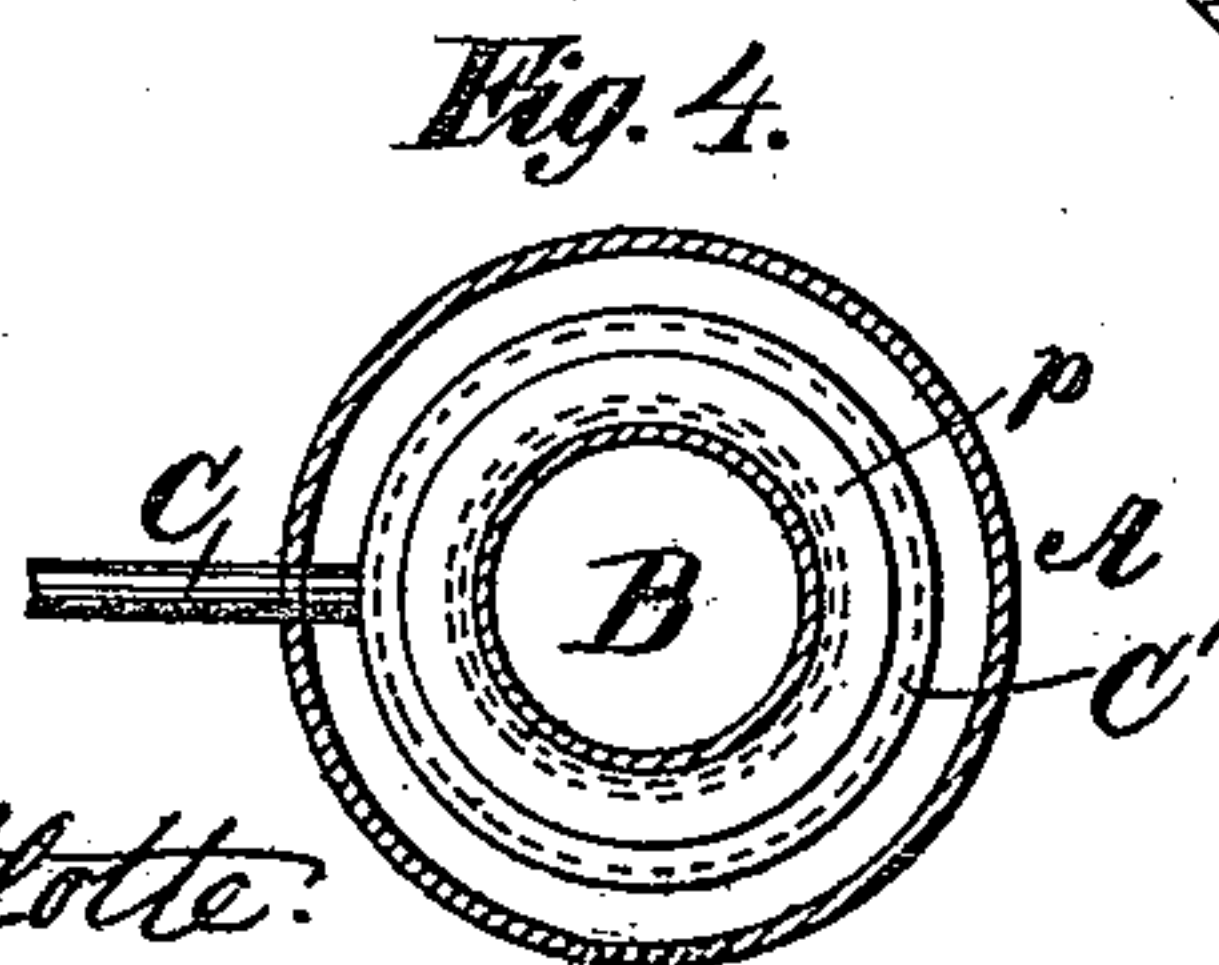
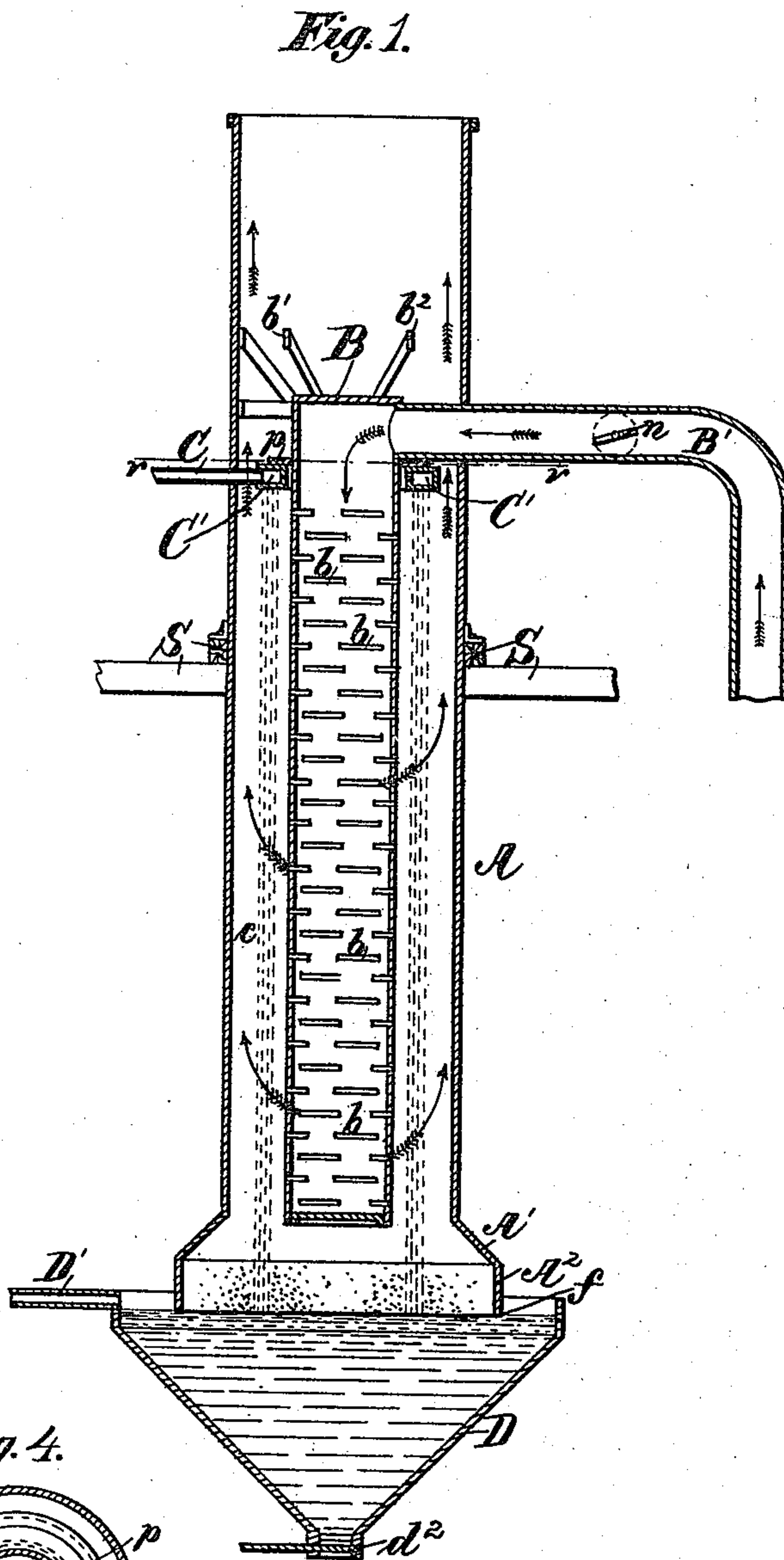
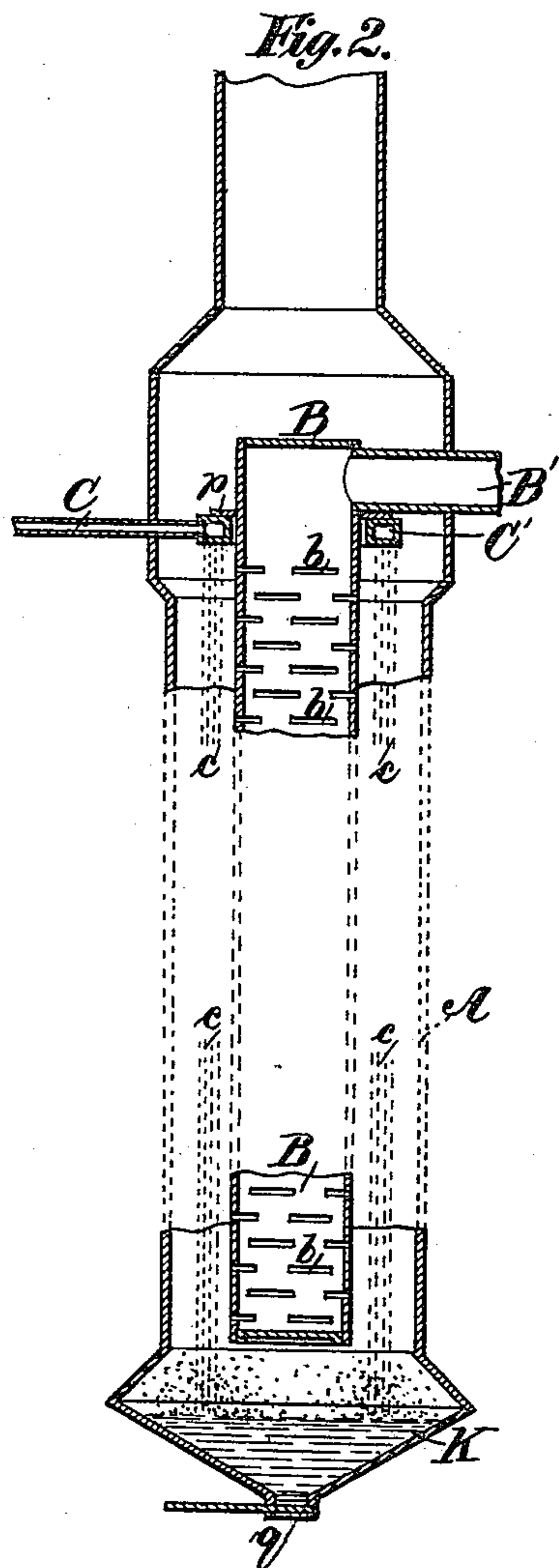
2 Sheets—Sheet 1.

M. M. MONSANTO.

APPARATUS FOR THE VAPORIZATION OF LIQUIDS.

No. 441,106.

Patented Nov. 18, 1890.



WITNESSES:
Edmond H. Martellotte.
Edward A. Baldwin

INVENTOR
Mauricio M. Monsanto,
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Isaac S. Lopez,
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(No Model.)

2 Sheets—Sheet 2.

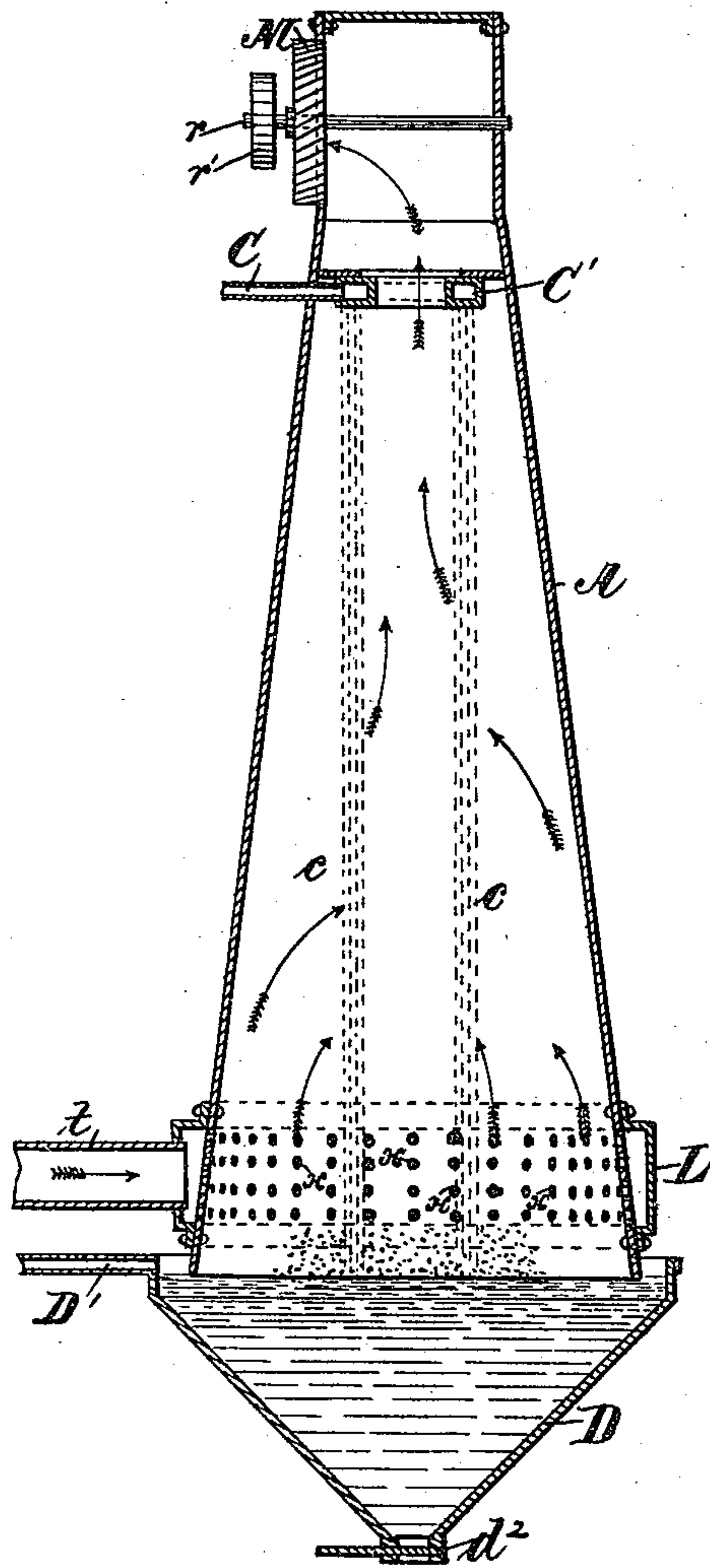
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Fig. 3.



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UNITED STATES PATENT OFFICE.

MAURICIO M. MONSANTO, OF HOBOKEN, NEW JERSEY, ASSIGNOR TO THE
NATIONAL SALT AND CHEMICAL COMPANY.

APPARATUS FOR THE VAPORIZATION OF LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 441,106, dated November 18, 1890.

Application filed October 25, 1888. Serial No. 289,150. (No model.)

To all whom it may concern:

Be it known that I, MAURICIO M. MONSANTO, of Hoboken, county of Hudson, and State of New Jersey, have invented certain
5 new and useful Improvements in Apparatus for the Vaporization of Liquids, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference
10 marked thereon.

My invention relates to apparatus designed for the vaporization of alkaline or saccharine liquids, in which a current of air or gases, preferably heated, is forced in intimate contact with a descending current of the liquid
15 in a finely-subdivided condition, also preferably heated, whereby the air is made to absorb moisture from the liquid, saturating itself therewith, thereby concentrating or reducing the volume of the liquid to or near to
20 the point of the crystallization of the contained solids. The air or gases for the purpose may be atmospheric or the purified products of combustion, as described in an application for another United States Patent
25 filed October 25, 1888, Serial No. 289,151. The latter gases may be advantageously applied in the apparatus for the vaporization of saccharine and such other liquids which are deleteriously affected by the oxygen of the air,
30 while the carbonic acid contained in the products of combustion will act favorably in carbonating any excess of free lime the liquids may contain or which in the course of manufacture may have been introduced for
35 clarification. The sulphurous oxide may also act advantageously in bleaching the saccharine matter, it being now applied for that purpose.

40 The apparatus is very inexpensive, effective, and economical in its operation.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate
45 corresponding parts in all the figures.

Figure 1 represents a vertical section of my improved apparatus. Fig. 2 represents a modification thereof. Fig. 3 represents still another form of the same. Fig. 4 is a cross section on line V V, Fig. 1.

50 In the drawings, A represents a vertical

outer shell or chamber, herein indicated as cylindrical, (but it may be rectangular or any other suitable form,) surrounding, in Figs. 1 and 2, a central perforated shell or chamber
55 B, which is closed at both ends. Into this central chamber B the evaporating air or gases are designed to be forced by means of a fan or other suitable device (not shown) through the conduit B', which is provided
60 with a regulating damper or valve *n*, and escape through the perforations or slots *b* and impinge on the liquid, which falls in the form of rain *c c* from the perforated distributing pipe or chamber C', which is annular and
65 fixed between the cylinders A B near the top of the latter. This distributing-pipe C' is fed by the conduit C, and the space between the pipe C' and the chamber B is closed by a baffle plate or flange *p*, so that the air or gases
70 shall not move upward through this space, but be forced to pass up through and in contact with the falling drops of liquid.

The central shell or chamber B is secured in place centrally within the outer shell A,
75 preferably by stays *b' b'*, which are fixed above the annular pipe C', so that the shower of the liquid may find no impediment in its descent upon which to make deposit.

The shells A and B are placed axially above
80 a receiving-vessel D, of greater diameter than the bottom of the shell A, and open at the top and having a bottom discharge-gate *d'* and an overflow-pipe D', the latter being at the level of the liquid in vessel D.
85

The shell A is expanded toward the bottom, as shown at A' A', Fig. 1, and preferably just touches the liquid in vessel D at *f*, or it may be arranged a little above or below the surface of the liquid. This expansion or
90 enlargement of cylinder A at the bottom is for the object of preventing the contact of the liquid upon the inside of the shell A when said liquid falls into the liquid contained in the vessel D. The crystals resulting from
95 vaporization of the liquid will fall to the bottom of the vessel D, whence they may be removed through the gate *d'*, when desired, and the overflowing liquid passing off through the pipe D'. The outlet from D is designed to
100 be repumped into and through conduit C, with the addition of fresh liquid to compen-

sate for that previously evaporated, or the liquid overflowing from the vessel D may be conducted to a heating-vessel, (not shown,) from which it will be fed again through conduit C.

The vessel D may have heat directly applied to it to further heat and vaporize and concentrate the liquid contained therein.

In case the liquid is not to be concentrated as far as or beyond the crystallizing-point, the lower part of the shell A may terminate in an attached liquid-reservoir, as shown at K, Fig. 2, having a discharge-valve *q* at the bottom, so that the liquid may be kept in constant circulation, being repumped and discharged through pipe C', after passing through a heater or otherwise; but in either form of construction the liquid falling down the cylinder A always falls without contact with any obstruction into the liquid in the reservoir below the cylinder.

Suitable doors may be provided in the shell A for inspection and cleaning or repairing.

The shell A may be supported in place in any suitable manner, as by timbers, (shown at S S,) and may be enlarged, as shown in Fig. 2, at a point opposite the distributing pipe or chamber C, to obtain a greater area of uptake at this point, and it may also be reduced higher up above the cylinder B, as shown in Fig. 2. Several of these devices may be placed alongside of one another in battery and may all be supplied by one blower for air, one pump for liquid, and one pan or one vessel D.

I do not confine myself to the precise construction of parts as herein shown, for these constructions may be varied in many ways to produce like results without departing from the spirit of my invention—as, for instance, as shown in Fig. 3, the sides of the shell A may be provided with perforations X X near the bottom thereof, and the air or gases be forced through them from an annular drum L, that is secured about the lower portion of said shell, and has an inlet-pipe *t* to make contact with the falling finely-divided liquid, or the air and gases so admitted may be exhausted upward by a fan or other suitable device applied to the upper part of the cylinder A, in which case the cylinder B and its direct attachments may be dispensed with and the distributing-pipe C be enlarged, as shown in Fig. 3; and in Fig. 3 the cylinder of shell A is, as a further development of the enlargement A' A², (shown in Fig. 1,) made to expand from a point a little above the distributing pipe or chamber C' to the bottom, in order to prevent, absolutely, the contact

of the falling liquid with the inner surface of the said cylinder; also, in Fig. 3, an exhaust-fan M, provided with shaft and pulley *r r'*, respectively, is fixed in a side of the shell A, above the distributing-pipe C, to draw the air or gases through the perforations *xx* to bring them in contact with the falling liquid and then eject them from the said cylinder. It will be seen that in this my improved apparatus there is no impediment, no object for the liquid to make contact with and become incrustated upon in falling through the cylinder, but that it falls directly into the liquid in the bottom receiver.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An apparatus for vaporizing liquids, constructed substantially as herein shown and described, consisting of outer shell A, open at top and bottom, shell B, closed at top and bottom, having openings or perforations in its sides and centrally fixed within the shell A, so that an annular chamber is formed between them, liquid discharging and distributing chamber or pipe C', with conduit C attached, conduit B', connected with shell B, for introducing air or gases therein, and receiver D, set beneath shells A and B, all arranged substantially as herein shown and described.

2. In an apparatus for concentrating or evaporating liquids, the combination of an upright outer shell or cylinder expanding toward the bottom, provided with openings for the admission of air or gases, with an annular interior liquid-distributing chamber or pipe, an annular baffle-plate fixed on or about on a level with said pipe, and a fan for creating an upward current of air or gases within said cylinder, substantially as and for the purpose set forth.

3. In an apparatus for concentrating or evaporating liquids, the combination, with an upright outer shell or cylinder having an opening at the top and expanded at the bottom, and provided with an interior and concentric annular liquid-distributing chamber or pipe, and a central perforated air-distributing cylinder, of a liquid-receiver of a greater diameter than the lower end of said cylinder, fixed axially immediately beneath the same, substantially as herein shown and described.

In testimony that I claim the foregoing I have hereunto set my hand, in the presence of two witnesses, this 24th day of October, 1888.

MAURICIO M. MONSANTO.

Witnesses:

JACOB J. STORER,
CHAS. H. LOTT.