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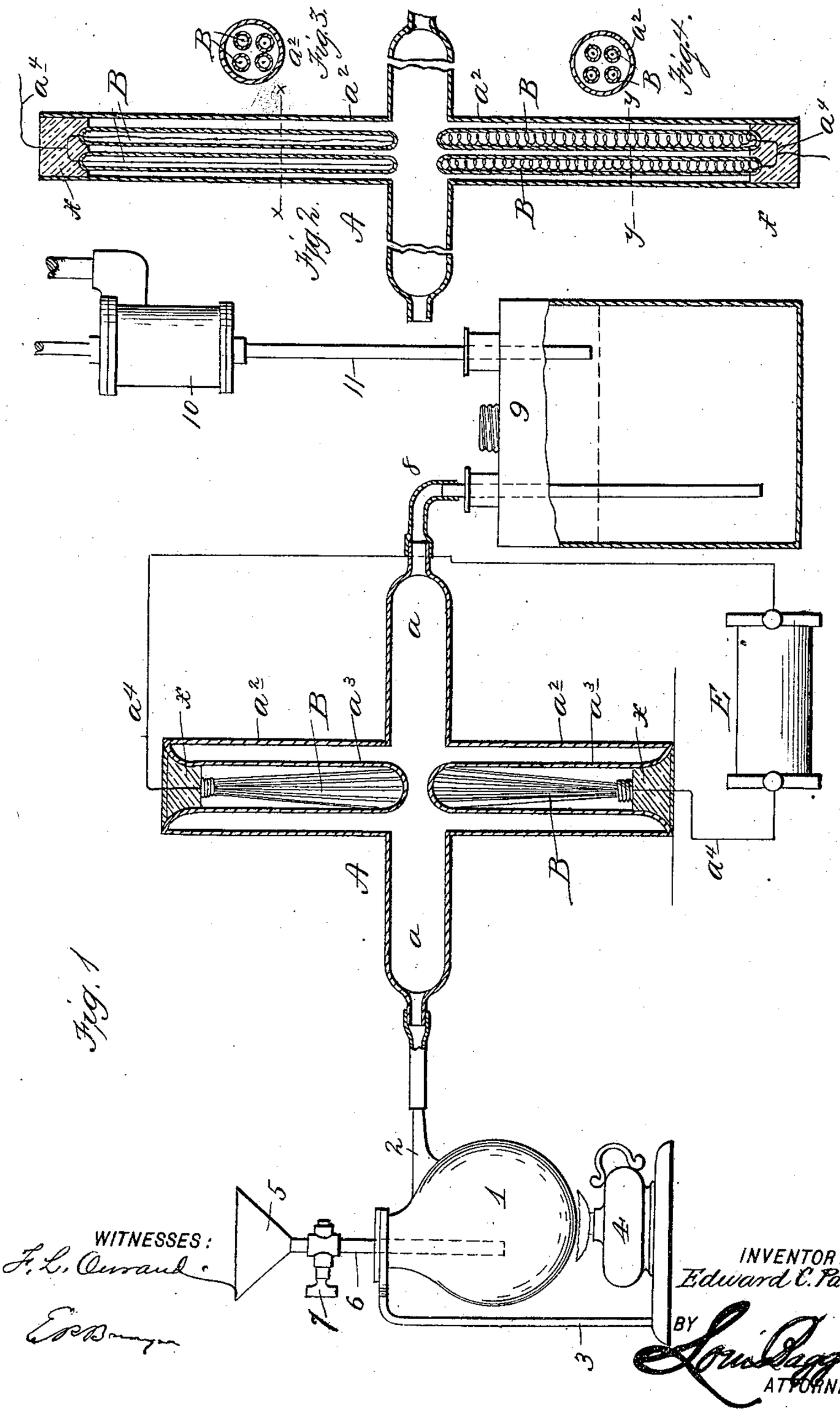
E. C. PARAMORE.

METHOD OF TREATING AND UTILIZING CHLORIN GAS.

(Application filed Feb. 21, 1900. Renewed Sept. 26, 1900.)

(No Model.)



UNITED STATES PATENT OFFICE.

EDWARD C. PARAMORE, OF PHILADELPHIA, PENNSYLVANIA.

METHOD OF TREATING AND UTILIZING CHLORIN GAS.

SPECIFICATION forming part of Letters Patent No. 667,099, dated January 29, 1901.

Application filed February 21, 1900. Renewed September 28, 1900. Serial No. 31,133. (No specimens.)

To all whom it may concern:

Be it known that I, EDWARD C. PARAMORE, a citizen of the United States, residing at Philadelphia, (Germantown,) in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in the Art of Treating and Utilizing Chlorin Gas, of which the following is a specification.

The bleaching qualities of chlorin gas are well known; but owing to its intensely disagreeable odor, the objections attending its use, owing to its peculiar action upon the human system, and the retaining qualities of the odor its use is necessarily restricted in scope to bleaching fabrics and the like.

It is the object of the present invention to treat chlorin gas in such manner that its bleaching qualities will be enhanced and the disagreeable odor eliminated.

The invention consists, broadly, in treating chlorin gas in such manner that the objectionable odor thereof shall be eliminated, its color changed, and its bleaching action enhanced without resultant injury to the materials subjected to its influence.

In the accompanying drawings, forming part of this specification, and in which like characters of reference indicate corresponding parts, I have illustrated two of the many forms of apparatus that may be employed in carrying my invention into effect, it being understood that I do not limit myself specifically to these particular forms of apparatus, and in the drawings—

Figure 1 illustrates one form of apparatus which I may use. Fig. 2 is a detail view of one form of chamber in which the gas is treated in the above-mentioned form of apparatus. Fig. 3 is a cross-section on line $x\,x$, Fig. 2. Fig. 4 is a cross-section on line $y\,y$, Fig. 2.

Referring to the drawings and to Fig. 1 thereof, A designates the electrolytic apparatus, the same comprising a four-armed structure, whereof two tubes or arms $a\,a$ constitute a passage-way for the gas as generated and the other two arms $a^2\,a^2$ the housing for the electrodes B. The members a^2, as shown, each consist of an inner and outer glass tube, the inner tube $a^3\,a^3$ of each member being extended nearly to the center of the structure, whereby the electrodes will be brought sufficiently close together to permit passage of the current between the two. The electrodes are in this instance shown as a plurality of wires, of iron or any suitable material, bunched or otherwise suitably arranged and connected to a wire a^4, common to all the electrodes, this wire being extended outward beyond each member to permit of attachment with the conducting-wires from the source of electricity. The numeral 1 designates a generator for the chlorin gas, and 2 a tube which extends from the generator to the electric apparatus. The generator is supported by a stand 3. A spirit-lamp 4 may be placed under said generator, and a funnel 5 is connected to the inlet-pipe 6, provided with a stop-cock 7.

As shown in Fig. 1, the generator is connected to one of the tubes a, and the opposite tube a is connected at 8 to a receiver 9 for containing pulp or other material to be treated, all the joints in the apparatus being air and gas tight. A pump 10 of any suitable construction may be applied to pipe 11, leading from the receiver.

The electricity may be from any preferred source—in this instance from a Ruhmkorff coil E, to which the terminals are suitably connected.

The generator 1 for the gas may be an ordinary retort, such as commonly used, into which manganese dioxid and an aqueous solution of hydrochloric acid are introduced, as usual.

In the form of apparatus shown the space between the inner and outer arms $a^2\,a^3$ constitutes a trap into which any condensed acid may accumulate in the operation of the device, thus preventing contamination of the purified gas.

The operation of the apparatus described is as follows: Manganese dioxid and an aqueous solution of hydrochloric acid are placed in the generator, and the stop-cock 7 is then turned to exclude the air. The air is then expelled from all parts of the apparatus—viz., the receiver 9, the tubes $a\,a^2$, and the generator 1. The lamp 4 may then be lighted and the gas will be generated. The pump is then put into operation, and the gas is drawn through the electric chamber and through the material in the receiver 9. When the

plunger of the pump descends, the gas is forced back through the material in the receiver and through the electric chamber, being subjected to the electric discharges as it passes back and forth at each alternate operation of the pump-plunger. It will be understood that just a sufficient quantity of the manganese dioxid and hydrochloric acid is placed in the generator to produce the required amount of gas to nearly fill the apparatus. As a stream of chlorin gas without mixture with air passes from the generator back and forth through the tubes *a* at every reciprocation of the pump-plunger, every molecule of the gas is intimately subjected to the action of the electric currents or sparks from the electrodes B, and it is to this treatment I attribute the peculiar change in color and odor of the gas produced by my apparatus.

It is to be noted that the space between the inner and outer tubes in the apparatus A is comparatively small, and as a result every molecule of gas receives treatment in a confined or restricted space, the electrodes, however, never coming in direct contact with the gas, the sparks passing through the dielectric material of which the inner tubes are formed.

In Figs. 2, 3, and 4 I have shown a modified form of electrolytic apparatus in which the electrodes instead of being bunched, as in Fig. 1, are separately inclosed in glass tubes and hermetically sealed. Any suitable number of electrodes may be used, and they may be arranged in various ways to perform their function. As shown at the bottom of Fig. 2 and in Fig. 4, the electrodes are in the form of spiral coils. The single wire a^4 may pass through a cork *x*, fitted in the top and bottom of the inner tube a^3, and it is to be understood that this closure need not be air-tight, as shown in Fig. 1, as it does not admit air to the interior of the apparatus; but in Fig. 2 the closure must be hermetic, because in this construction the inner and outer tubes are not in one piece, as in Fig. 1.

Having thus fully described my invention, what I claim is—

1. The art of treating and utilizing chlorin gas which consists in first expelling the air from a chlorin-generator, second, generating gas in said generator, third, drawing said gas into an electric chamber, fourth, electrifying said gas in said chamber, and fifth, forcing the treated gas back and forth through the material to be treated, substantially as described.

2. The art of treating and utilizing chlorin gas which consists in first, expelling the air from a chlorin-generator, from an electric chamber, and from a receiver containing the material to be treated, second, generating sufficient gas in the generator to partially fill the apparatus; third, drawing the gas through the electric chamber and submitting it to the action of the electric discharges, and fourth, forcing said treated gas back and forth through the material and through the electric chamber, substantially as described.

In testimony whereof I have hereunto set hand in presence of two subscribing witnesses.

EDWARD C. PARAMORE.

Witnesses:
DAYTON BALL,
WM. H. F. KEHRWIEDER