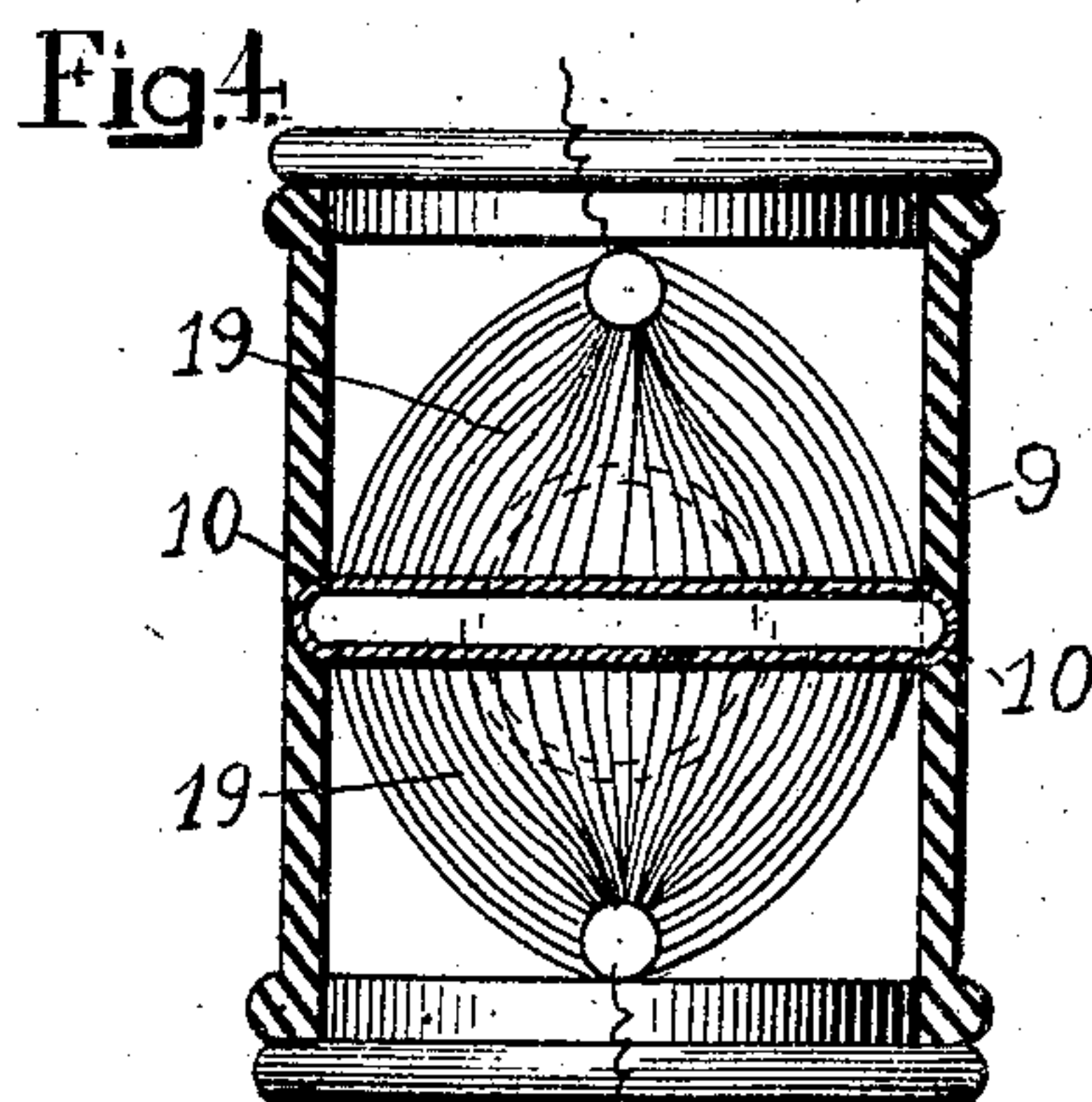
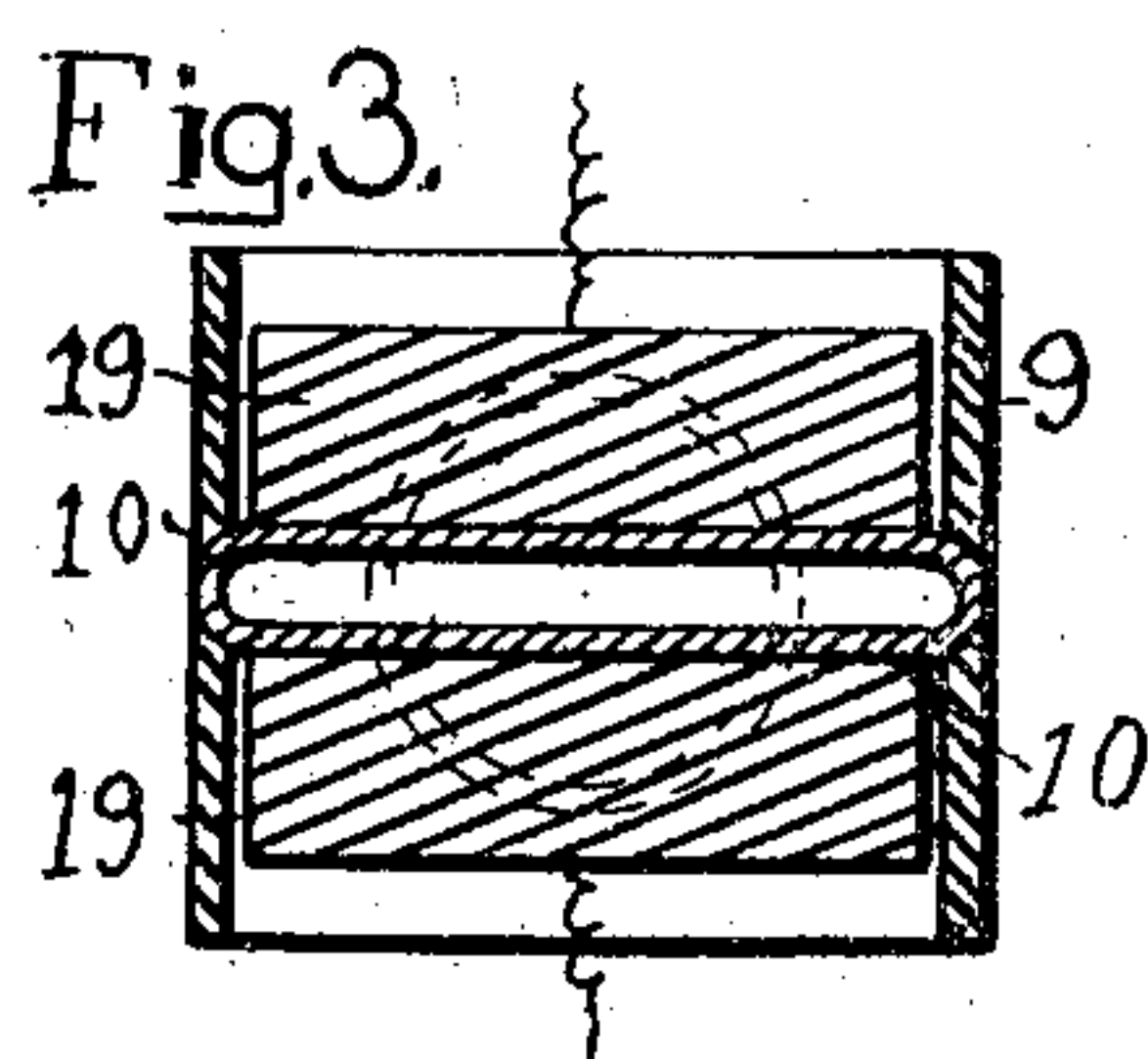
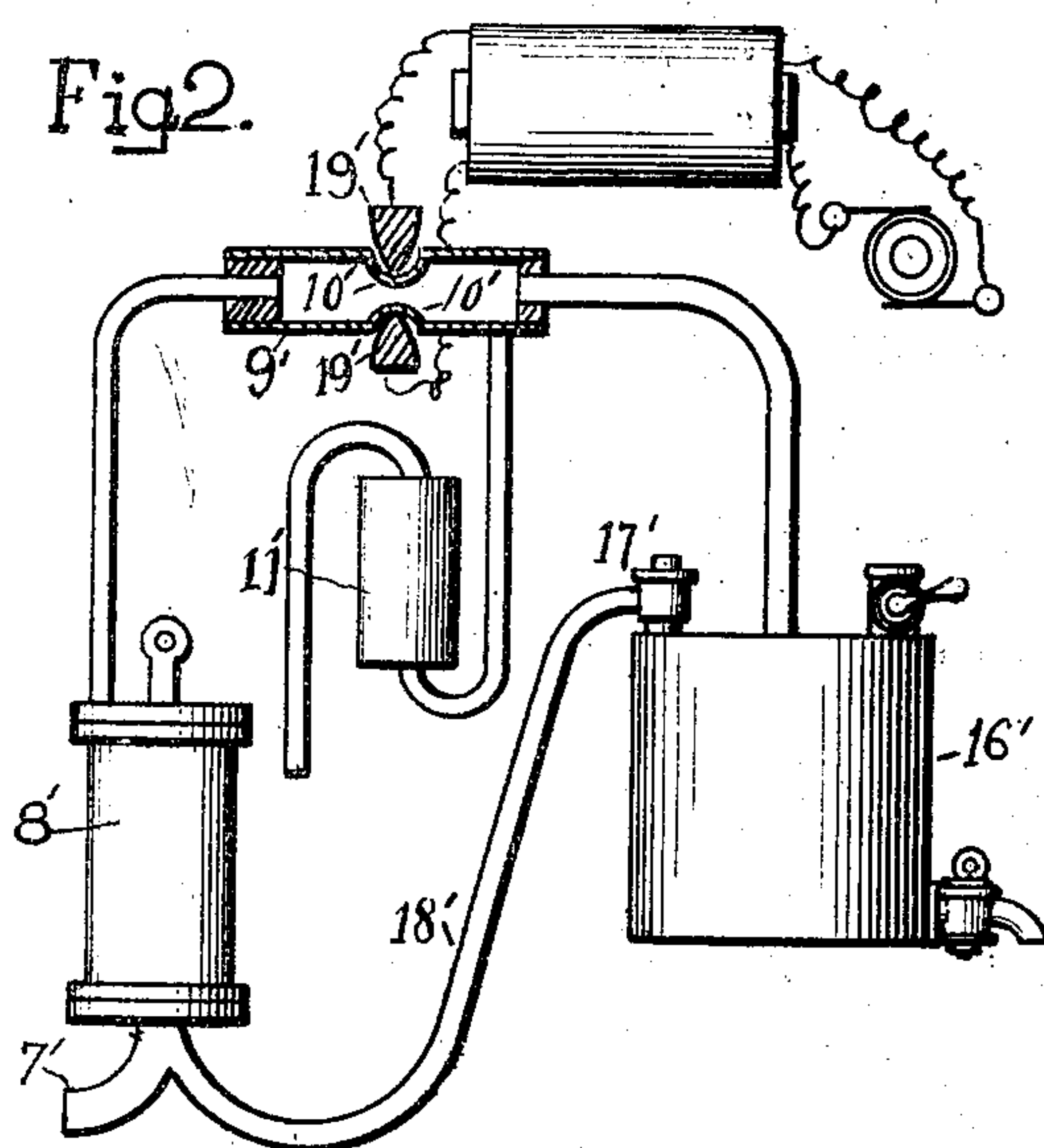
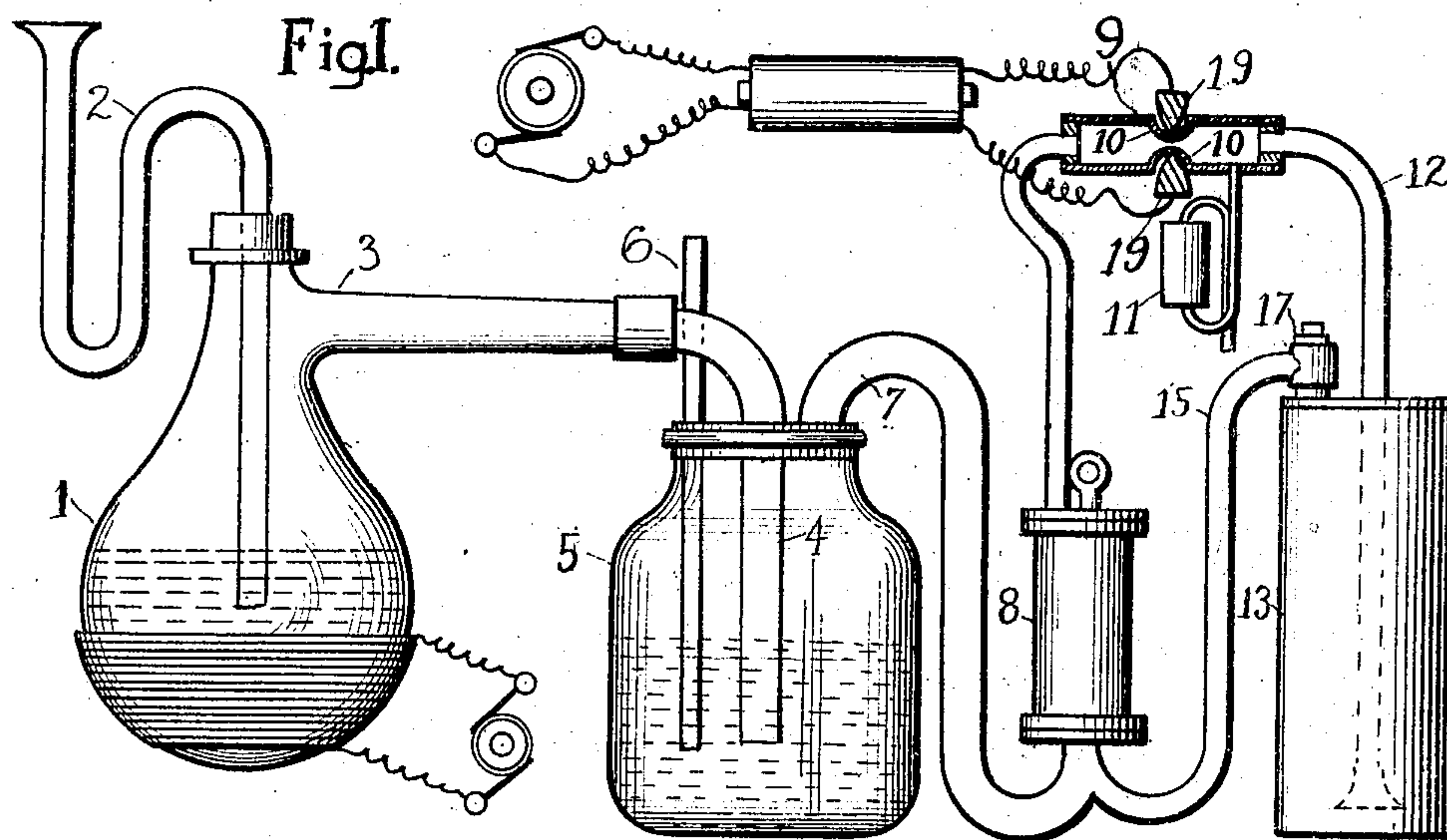


No. 786,595.

PATENTED APR. 4, 1905.

E. C. PARAMORE.
ART OF TREATING AND UTILIZING CHLORIN.
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WITNESSES:

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ART OF TREATING AND UTILIZING CHLORIN.

SPECIFICATION forming part of Letters Patent No. 786,595, dated April 4, 1905.

Application filed October 5, 1903. Renewed September 1, 1904. Serial No. 223,001.

To all whom it may concern:

Be it known that I, EDWARD C. PARAMORE, a citizen of the United States, residing at No. 111 Queen Lane, Germantown, in the city of Philadelphia, Pennsylvania, have invented a new and useful Improvement in the Art of Treating and Utilizing Chlorin Gas, of which the following is a specification.

The bleaching properties of chlorin gas are well known; but its useful applicability in the arts is restricted by its disagreeable odor and its deleterious effects upon animal life, as well as by the difficulty of divesting articles bleached thereby of the residual odor of the gas. The purpose of the present invention is to increase its bleaching properties and divest it and articles or commodities bleached thereby of the disagreeable odor.

To this end this invention consists in subjecting streams or currents of dry chlorin gas to electric discharges of high tension discharged through dielectric partitions with an exclusion of air and with the removal of all liquid precipitation incident to the process from the resulting product and the application of the gas thus treated to articles or commodities to be bleached either directly or by immersion in an aqueous solution of the gas and the returning of the gas after being used to again pass through the electrifying apparatus with additional freshly-generated gas.

The drawings show in Figure 1 the invention as applied in an apparatus to the bleaching of a solution. In Fig. 2 is shown the invention as applied in an apparatus to make an aqueous solution of the gas applicable to the bleaching of solids. Fig. 3 shows the electrodes and adjacent parts for electrifying the current of gas. Fig. 4 shows a modification thereof.

Referring to Fig. 1 of the drawings, 1 shows a retort containing black oxid of manganese having a funnel and siphon-tube 2, through which muriatic acid is introduced. The neck 3 of the retort is connected to the dip-tube 4 of a wash-bottle 5 containing a liquid, water, or water and sulfuric acid and having a safety-tube 6 extending from near the bottom upwardly with an open end (as a safeguard against excessive pressure) and the delivery-pipe 7 connecting the top of the bottle 5 with

a pump 8. The wash-bottle 5 is not essential in this process, and the retort-neck 3 may be connected directly to the pipe 7. The pump 8 delivers the gas received from the bottle 5 or retort 1 through a channel 9 having walls 10 of dielectric material approaching each other and causing the gas to flow in a broad and thin stream between the walls 10. Close to each wall 10 is placed an electrode 19 of an electric conducting-circuit having a current of high tension, which current is discharged in sparks through the dielectric walls 10 of the channel 9 through the current of gas passing through the channel, and any liquid precipitated in the channel 9 is arrested and removed from a trap 11, and the dry gas passes through the pipe 12 into the solution to be bleached in a close vessel 13 and rising above the liquid in the vessel 13 is discharged through a check-valve 17 and tube 15 into the pipe 7, where it reenters the pump, is again electrified, and used further with fresh gas supplied from the retort 1 through the washing-bottle 5.

The preferred material for the tanks, pump, wash-bottle, and pipes is glass. Vitrified earthenware may be used, and for the large-sized apparatus the tanks and wash-bottle may be made of wood coated and saturated with paraffin. The electrodes may be of carbon or of metal.

Referring to Fig. 2, the gas is delivered from pump 8' and channel 9' after being electrified into a closed tank 16', where it is absorbed by water, and any unabsorbed gas is discharged through a check-valve 17' and pipe 18' to the pump 8'.

Referring to Fig. 3 and Fig. 4, a cross-section of the channel 9 is shown and the electrodes 19. These may be carbon, as shown in Fig. 3. They may be of metallic brushes of wire, as shown in Fig. 4, and must be so located that the discharge of sparks or flashes is through the dielectric partition or walls 10 of the channel 9.

The current employed may be either high tension direct and intermittent or alternating of high frequency and is best derived from the secondary helices of a Ruhmkorff coil. The electrodes 19 may be protected from contact with the atmosphere; but that is not es-

essential to the operation of my invention. The well-known effect of generating any ozone from contacting with the air may be thus avoided.

5 Chlorin gas thus treated has greater bleaching properties, little or no odor, and bleaches permanently the articles to which it is applied and does not impair the strength of materials to which it is applied and appears to separate gummy matter from fibers to which it is applied and to precipitate foreign substances from solutions bleached with it.

The operation of the process in this apparatus is as follows: Black oxid of manganese (peroxid of manganese) is placed in the retort 1 and muriatic acid (an aqueous solution of hydrochloric acid) is introduced through the funnel and siphon-tube. Heat is applied to the retort either by electric coils or by steam or fire and all air expelled from the apparatus either by blowing it out with the steam or by pumping it out, for which purpose the delivery-pipe of the pump 8 is temporarily opened to the atmosphere, or the check-valve 17 may be opened to the atmosphere temporarily, or the air may be exhausted by means of a trompe. When the chlorin gas has filled the channel 9, the electric circuit is closed and current discharged in flashes through the dielectric walls of the channel 9 and through the stream of gas flowing through the channel, the pump 8 is put in operation, and the gas is continuously circulated through the liquid in the vessel 13 and the unabsorbed gas returns to the pump and is thus maintained in continuous circulation through the electrifying apparatus.

Having described my invention and the operation thereof, what I claim is—

1. The improvement in the art of treating chlorin gas, consisting first, in emptying the air from a chlorin-generator and connected vessels, second, generating chlorin gas, third, passing the gas through an electrifying-channel between dielectric walls or surfaces, fourth, electrifying the gas in said channel by electric flashes passed through the dielectric walls or surfaces, fifth, withdrawing liquid precipitation from the electrifying-channel, sixth, circulating the gas through vessels used in treatment of liquids or commodities to be bleached and returning the surplus gas again through the electrifying-channel to be again electrically treated with further supplies of gas as and for the purposes set forth.

2. The improvement in the art of treating chlorin gas, consisting first, in emptying the air from a chlorin-generator and connected vessels, second, generating chlorin gas, third, passing the gas through an electrifying-channel having dielectric walls, fourth, electrifying the gas in said channel by electric flashes passing through the dielectric walls, fifth, withdrawing liquid precipitation from the electrifying-channel, sixth, circulating the gas through water in a closed vessel and returning any unabsorbed gas to the electrifying-channel for treatment electrically with further supplies of gas.

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Witnesses:

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