

A. SEIGLE.

APPARATUS FOR TREATING LIQUIDS.

No. 567,751.

Patented Sept. 15, 1896.

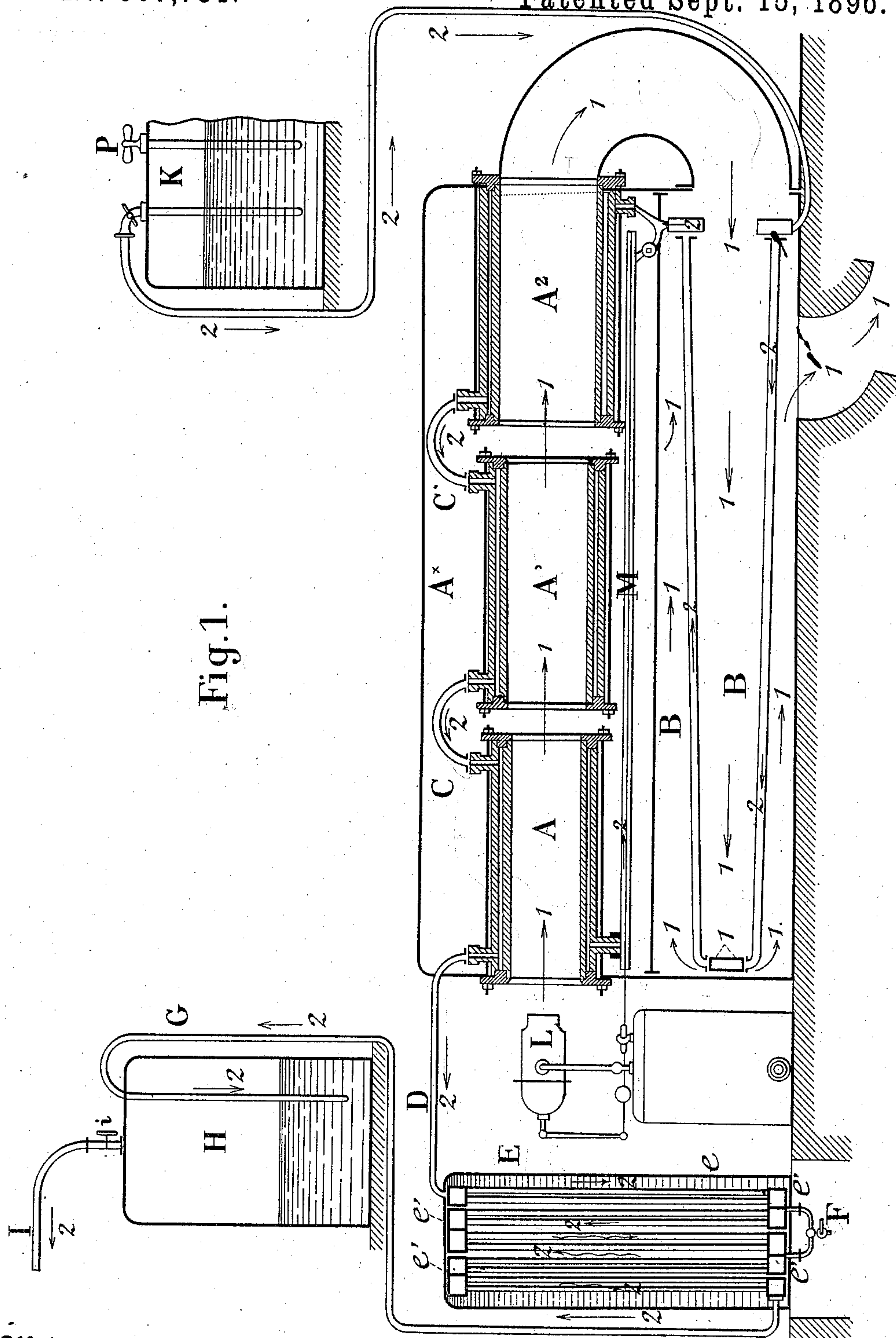


Fig. 1.

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Richard C. Maxwell

Inventor:  
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By Walter Douglas  
Attorney.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

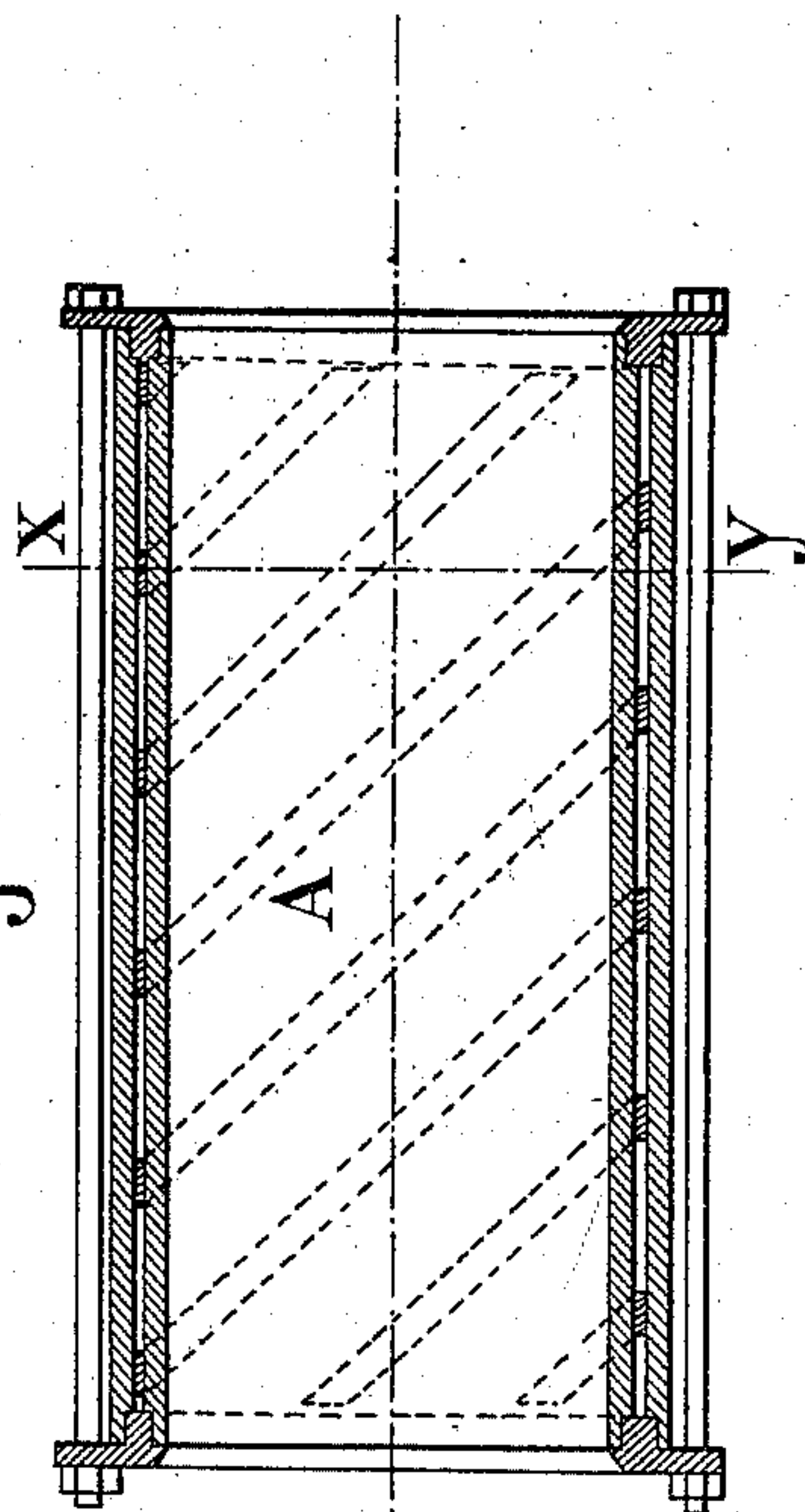
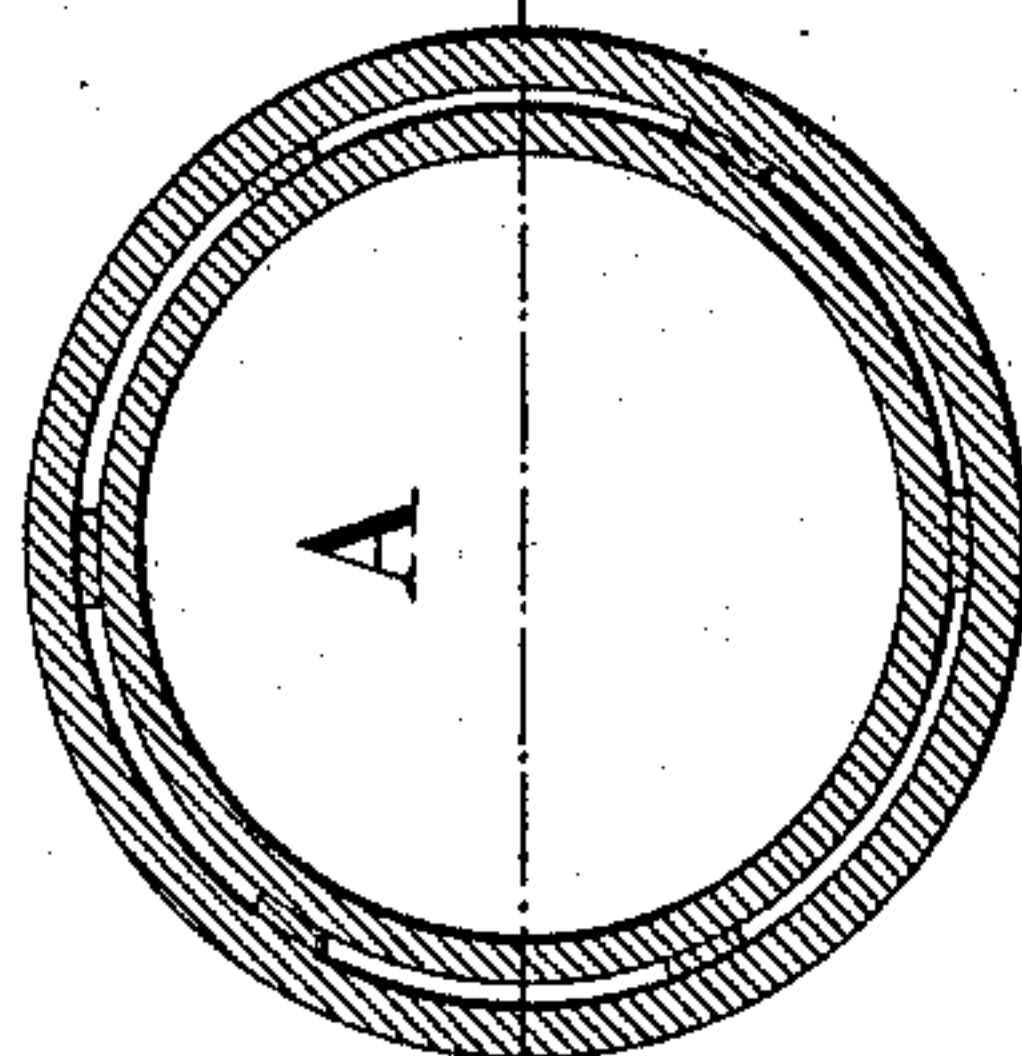


Fig. 3.



Witnesses:

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# UNITED STATES PATENT OFFICE.

ADOLPHE SEIGLE, OF PARIS, FRANCE, ASSIGNOR TO THE COMPAGNIE INTERNATIONALE DES PROCÉDÉS ADOLPHE SEIGLE, OF SAME PLACE.

## APPARATUS FOR TREATING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 567,751, dated September 15, 1896.

Application filed January 15, 1896. Serial No. 575,615. (No model.) Patented in France August 13, 1895, No. 249,583; in England October 3, 1895, No. 18,518; in Belgium October 18, 1895, No. 117,938; in Hungary November 5, 1895, No. 4,276; in Austria January 24, 1896, No. 46/301; in Luxemburg February 10, 1896, No. 2,452; in Tunis February 15, 1896, No. 170; in Turkey February 19, 1896, No. 496; in Brazil March 23, 1896, No. 2,031, and in Italy March 31, 1896, LXXX, 53.

*To all whom it may concern:*

Be it known that I, ADOLPHE SEIGLE, a citizen of France, residing at 147 Rue de Courcelles, Paris, in the Republic of France, have  
5 invented certain new and useful Improvements in Apparatus for Treating Liquids, (for which I have obtained British Letters Patent No. 18,518, dated October 3, 1895; French Letters Patent, No. 249,583, dated August 13,  
10 1895; Belgian Letters Patent, No. 117,938, dated October 18, 1895; Austrian Letters Patent, No. 46/301, dated January 24, 1896; Hungarian Letters Patent, No. 4,276, dated November 5, 1895; Italian Letters Patent,  
15 LXXX, 53, dated March 31, 1896; Letters Patent in Luxemburg, No. 2,452, dated February 10, 1896; Turkish Letters Patent, No. 496, dated February 19, 1896; Letters Patent in Brazil, No. 2,031, dated March 23, 1896,  
20 and Letters Patent in Tunis, No. 170, dated February 15, 1896;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it  
25 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.

My invention has for its objects, first, to  
30 provide an apparatus, heated preferably by a jet of incandescent vapor produced by a gas generator or sprayer, for the treatment of liquid hydrocarbon to gasify the same; second, to provide an apparatus in which the  
35 liquid is subjected to a series of reactions brought about by the heat at a more or less elevated temperature and in such manner as to give rise to a new liquid or gaseous product, for example, an oil-gas; third, to provide  
40 an apparatus which in application is especially adapted to transform a heavy hydrocarbon into a light petroleum, and fourth, to provide an apparatus adapted for refrigeration as well as effecting the fractional distil-  
45 lation of hydrocarbon oils or petroleums.

My invention, stated in general terms, consists of an apparatus constructed, arranged, and adapted for operation in substantially the manner hereinafter described and claimed.

The nature, scope, and general features of  
50 my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is an elevational view, partly sec-  
55 tioned, of an apparatus embodying features of my invention. Fig. 2 is a vertical section of one of the members of the apparatus, and Fig. 3 is a section on the line  $xy$  of Fig. 2.

Referring to the drawings,  $A^x$  represents  
60 the "heating apparatus," so called, consisting of a series of shells or cylindrical sections  $A$ ,  $A'$ , and  $A^2$ , of cast-iron, steel, or other suitable material, and constituting the combustion-  
65 flue thereof.

$B$  represents two series of metallic tubes.  $C$  and  $C'$  are arched or junction tubes connect-  
70 ing the hollows of the walls of the said shells or sections of the combustion-flue, as hereinbefore explained.

$D$  is a tube leading to the surface refriger-  
75 ating appliance  $E$ , at the bottom of which is a draw-off cock  $F$ .

$e e$  are the vertical tubes of the refrigerat-  
80 ing appliance, and  $e' e'$  are boxes or collectors connecting these tubes, located at the top and bottom thereof, as clearly illustrated in Fig. 1 of the drawings. A pipe  $G$  connects the re-  
85 frigerating appliance  $E$  with a reservoir  $H$ , provided at the top with an outlet-tube  $I$ , in which is provided a cock  $i$ .

$K$  is a feed-reservoir.

$L$  is a gas-producer of any suitable type  
85 adapted to gasify or spray liquid hydrocarbons, the delivery of which is regulated by means of a pyrometer  $M$ , located beneath the shells or cylindrical sections  $A$ ,  $A'$ , and  $A^2$  of the apparatus.

$P$  is a hand-pump extending into the feed-  
90 reservoir  $K$ . The apparatus  $A^x$  is arranged in such manner as to be heated by means of an incandescent jet issuing from the gas-producer  $L$ . The shells or sections  $A$ ,  $A'$ , and  $A^2$ , constituting the combustion-chamber of the  
95 apparatus, are double-walled, as clearly illustrated in Fig. 1 of the drawings, and, as indicated in full and dotted lines in Fig. 2, have provided in them longitudinal partitions



forming channels between them, in which the liquids pass in serpentine course backward and forward about the cylindrical shells of the apparatus, the construction of which heating-channels is clearly illustrated in Figs. 2 and 3. The ends of the hollows between the sections of the combustion-flue are closed by flanges secured by means of bolts or other means against corresponding seats at the ends of the shells or sections A, A', and A<sup>2</sup>, and tight joints are established by metalloplastic joints of suitable size, shape, or condition. The said channels may have along part of their length suitable refractory material or metallic chips or shot, which have not been shown, but will be readily understood without such illustration. The shells or sections A, A', and A<sup>2</sup>, forming the combustion-flue, instead of being constructed, as illustrated, of two concentric tubes connected together by longitudinal partitions, may be formed of a central cylindrical combustion-flue located in a triangular, square, or hexagonal prism, upon the faces of which longitudinal or transverse grooves may be formed. The tubes B, leading from the reservoir K to the channels of section A<sup>2</sup>, are heated by the gases of combustion passing from the combustion-flue, these gases following the path indicated by the arrow 1 in Fig. 1 of the drawings. The liquid to be treated is contained in the reservoir K, in which the required pressure is produced by means of the pump P or in any other suitable manner. The liquid may also be delivered into the apparatus by means of a compression-pump, if found desirable to use such an appliance. The tubes through which the liquid is forced may be provided with a meter or other feed-regulating apparatus. The liquid follows the path indicated by the arrows 2, first entering the pipe B, then passing into the channels of section A<sup>2</sup>, then by the tubes C' into the section A', and finally through pipe C and section A. After having traversed this path at a greater or less speed, according to the pressure-maintained in the reservoir K, the liquid is either dissociated and transformed into a fixed gas or into a lighter liquid, or simply vaporized, according to the objects to be attained. The vapors or gases then pass by the tube D into the surface cooler E, formed of a series of vertical tubes *e*, connected at both ends with boxes or collectors *e'*. The products condensed in these collectors may be removed by opening the cock F, or collected separately by as many cocks as there are collectors employed. This arrangement is necessary in cases where it is intended to fractionally distil or treat liquids. The non-condensable products pass in a serpentine course from top to bottom and vice versa through the whole series of tubes of the refrigerating appliance and escape by the pipe G into the receiver or gasometer H of any suitable type provided with a body of water, as clearly illustrated in Fig. 1. The gases

in passing through the water are washed and completely cooled. In cases in which in the treatment the liquid only produces a gas the surface cooler may be omitted. The delivery of the gas-producer L or of the sprayer is regulated by hand or automatically by means of the pyrometer M, heated by the gases or vapors from the exit ends of the apparatus, which are allowed to pass through it, then to the condenser.

B<sup>3</sup> is a drain-cock, which is closed when the apparatus is at work.

As shown, the pyrometer M consists of a tube mounted at one end upon a suitable support, the other end of which tube is provided with a rod, and under the influence of the temperature of the apparatus it is adapted to regulate the admission of the hydrocarbon or other fluid into the gas-producer by the closing of its feed-orifice to a greater or less extent, according to the movement of the said rod. The gas-producer may be fed either by a specially-constructed reservoir or by the reservoir K, as shown, when the liquid to be treated is a hydrocarbon or is a mixture of liquid hydrocarbons. The jet or flame may also be furnished by the gaseous products in the apparatus, especially as these gases may be under very high pressure. For this purpose it is only necessary to afford the feed liquid a pressure commensurate with that of the gases and good results will be obtained.

It will be manifestly obvious that as to details of my invention, with special reference to the particular arrangement of the apparatus hereinbefore described, modifications other than those indicated may be made without departing from the spirit of the invention, and hence I do not wish to be understood as limiting myself to the precise construction and arrangement of all the parts of the apparatus as illustrated; but,

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

In an apparatus of the character described, a series of double-walled sections, the interior of which form a continuous combustion-flue, the walls of the sections being separated to form a liquid-chamber concentric with the flue and closed at either end of the section, a series of spiral partitions dividing the liquid-chamber into a series of serpentine channels, a series of pipes each forming a means of communication between the liquid-chambers of adjacent sections, and means for forcing oil through successive sections in a direction opposite to that in which the products of combustion pass through said sections, substantially as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

ADOLPHE SEIGLE.

Witnesses:

G. DE MESTRAL.

CLYDE SHROPSHIRE.