

G. KAISER.  
Still for Spirits.

No. 78,596.

Patented June 2, 1868.

Fig. 1

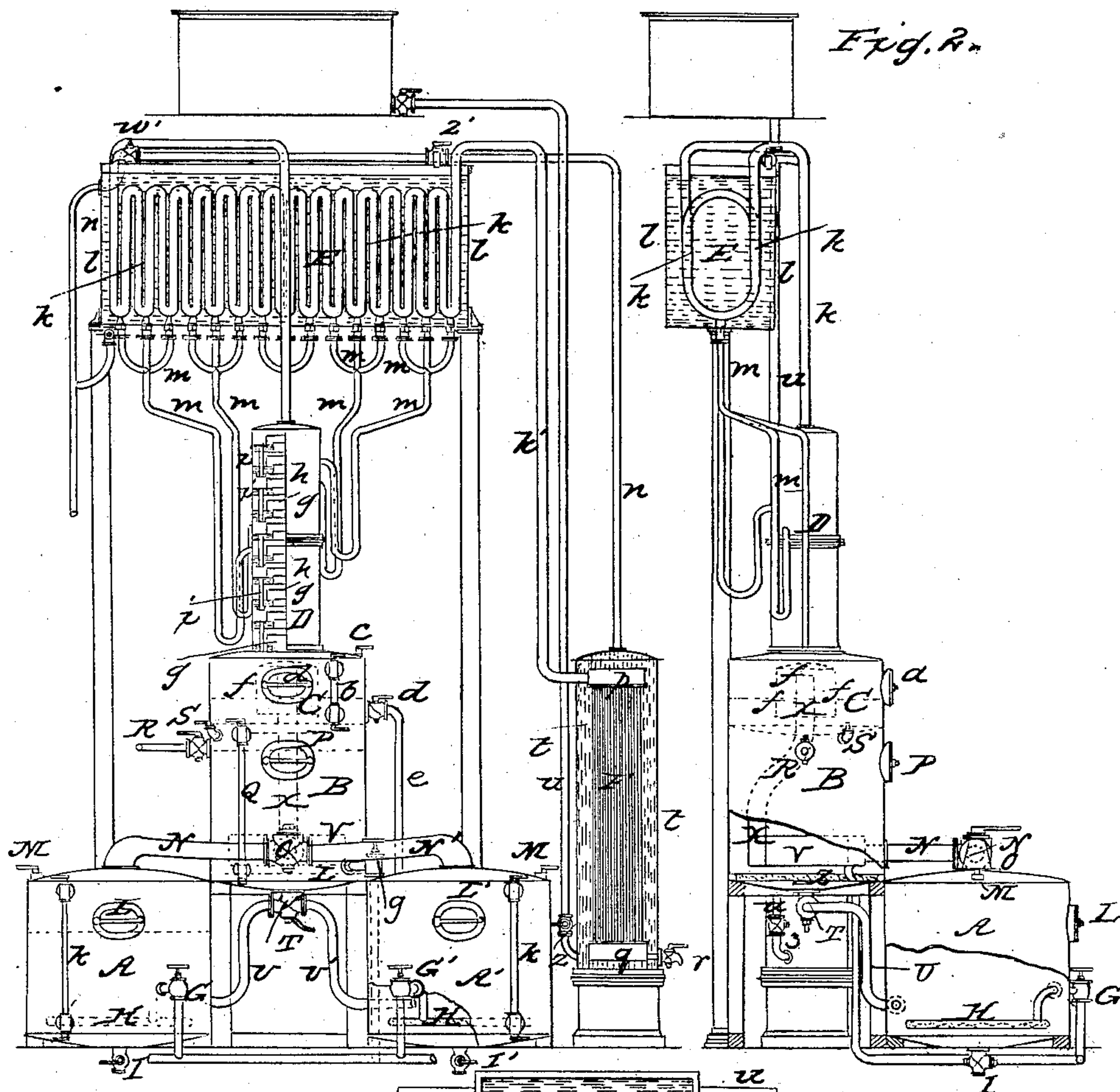


Fig. 2

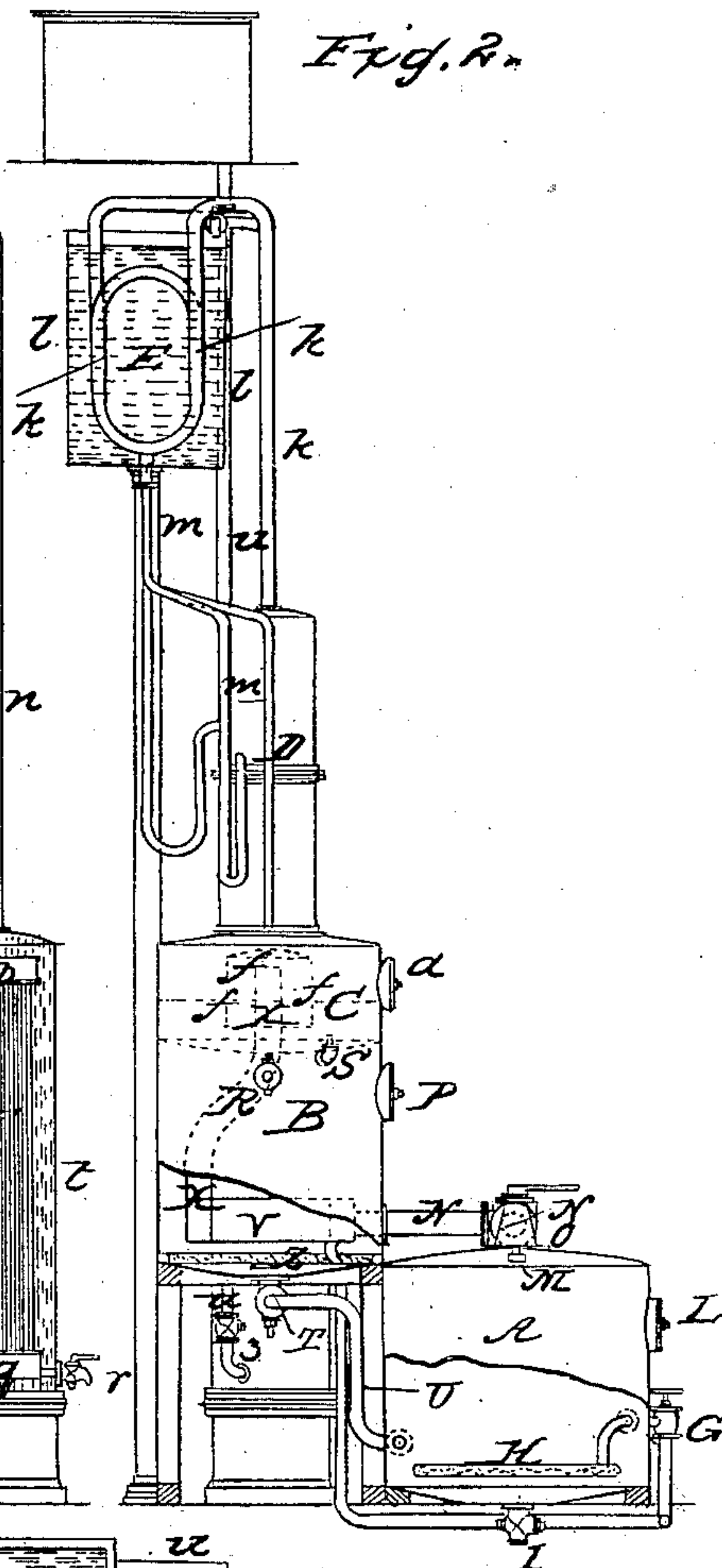
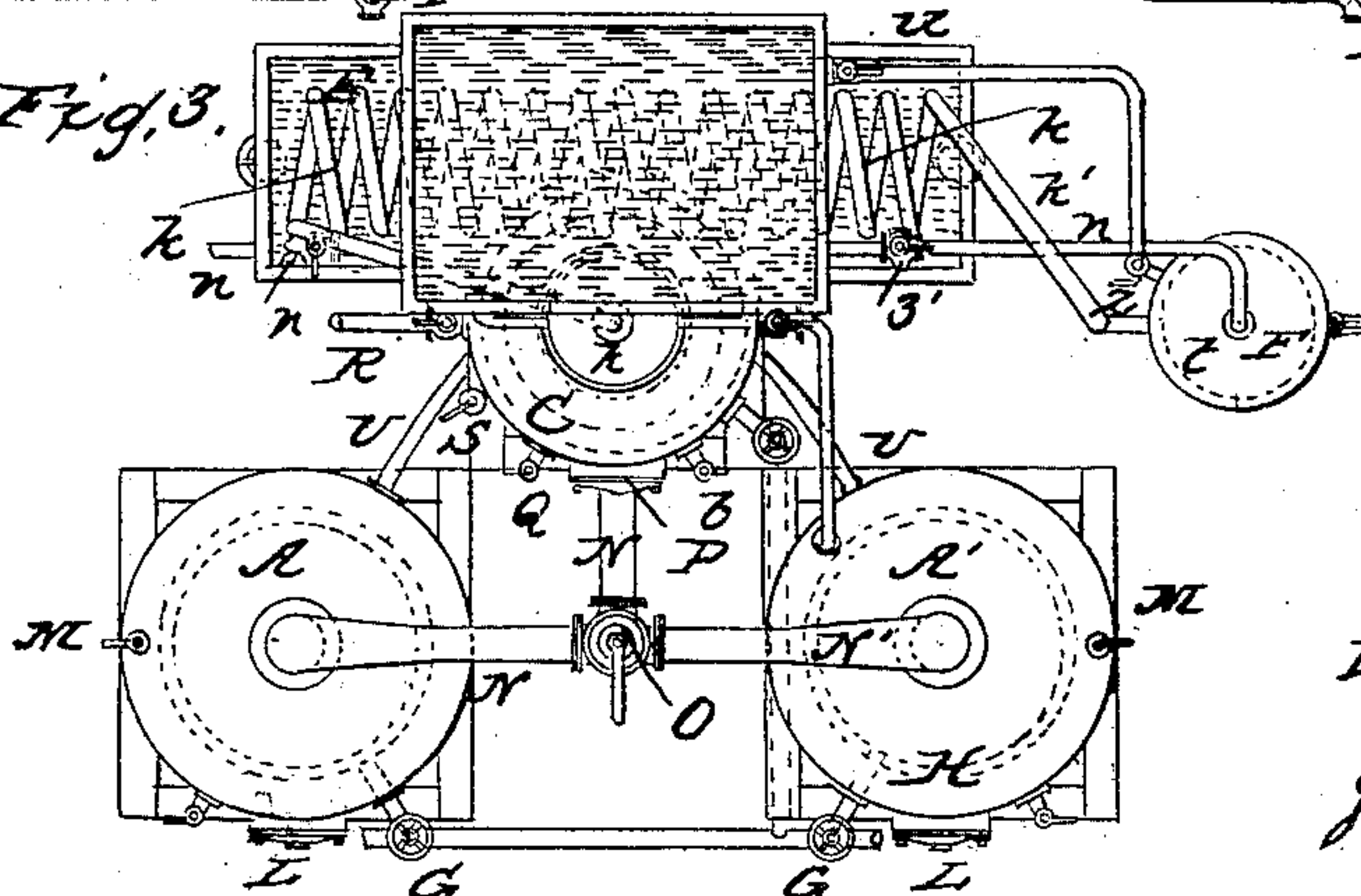


Fig. 3



Witnesses  
J. Hermann  
Jord Storkeder.

Inventor:  
Gottlob Kaiser.



# United States Patent Office.

GOTTLOB KAISER, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND  
VOSSNACK AND STEINS, OF SAME PLACE.

*Letters Patent No. 78,596, dated June 2, 1868.*

## IMPROVEMENT IN STILLS FOR SPIRITS.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL TO WHOM IT MAY CONCERN:

Be it known that I, GOTTLOB KAISER, of the city of New York, county and State of New York, have made a certain new and useful invention, consisting in an Apparatus for Producing Refined Spirits directly from Mash; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing being part of this specification, in which—

Figure 1 represents a front elevation, the condenser, dephlegmator, and rectifying-column being shown partly in section, to exhibit the construction of the same more clearly.

Figure 2 is a side elevation of the same, partly in section.

Figure 3 is a plan view.

Similar letters of reference indicate like parts in the several figures.

In the usual manner of manufacturing refined spirits from mash, spirits of low gravity are first produced in the ordinary distilling-apparatus, then transferred to a rectifying-apparatus, in which they are refined, freed from fusel-oil, and become of a high gravity.

The object of my invention is to produce rectified refined spirits directly from mash in but one apparatus, and thereby economizing in the cost of building a second apparatus, using fewer employees, less fuel, barrels, vats, &c., and waste in materials, and dispensing entirely with the necessary transportation.

The nature of my invention consists—

First, in the use of two or more stills, by which a continuous operation is produced, by one being in full operation, meanwhile the other is being discharged and refilled, instead of the old way, in which one charge is stilled off, and an interruption is produced by the discharge and refilling of the single still.

Second, it consists in an apparatus, in which a mash-heater, two or more stills, a rectifying-column, a dephlegmator, and a condenser are all combined and operate together on the mash, so as to produce rectified refined spirits direct from mash.

Thirdly, it consists in the construction and arrangement of the rectifying-column, constructed with rectifying-boxes and receptacles, for the collection of fusel-oil and other refuse, of such size that the continuous operation of the apparatus can be carried on for five, six, or more days, after which time the apparatus is cleaned of the fusel-oil, refuse, and low-wine, by blowing through steam. By this continuous action for so long a time a great saving is produced.

Fourthly, it consists in the construction and operation of the dephlegmator, which receives the vapors from the rectifier and delivers them, free from fusel-oil and other refuse, over to the condenser. It consists of a horizontal worm-pipe, placed in a vessel filled with water of a certain temperature. The lowest points of this worm are provided with return-pipes, leading to different stations or compartments in the rectifying-column, the less refined spirits and the fusel-oil are returned to lower the more refined, and the fusel-oil to higher compartments. By these means the fusel-oil is completely extracted, and most superior and high-gravity spirit is obtained.

Fifthly, it consists in the employment of certain perforated steam-pipes in the mash-heater, whereby the mash can be stirred up and mixed, and prevented from adhering to the sides and bottom of the same.

To enable others skilled in the art to make use of my invention, I will proceed to describe its construction and operation.

A A<sup>1</sup> represent two stills, B the mash-heater, C the rectifier, D the rectifying-column, and E the dephlegmator, all one above the other, operating together to produce and refine the spirits, which are hereon conducted from the dephlegmator E over to the condenser F, where they are liquefied, and from which they are delivered through the faucet *r* ready for use.

The stills A A<sup>1</sup> are of like capacity, and are constructed cylindrical in form, of copper, wood, or any other suitable material. Each is provided with a man-hole, L, a glass gauge-tube, K, and with a vacuum-valve, M.

On a level immediately above is placed the mash-heater B, similar in form with the stills A A<sup>1</sup>, and provided, also, with a man-hole, P, a glass gauge, Q, and a vacuum-valve, S.



Into this heater, B, the mash is gradually introduced, either by pumping, or otherwise, through a pipe, R. To conduct the mash from the heater to the stills, a two-way cock, T, is placed on the bottom of the former, which connects, by means of pipes U U<sup>1</sup>, with both stills.

The heating of the mash in the stills is done by steam. A circular perforated pipe, H, is placed on the bottom of each still, and steam is admitted to them through the valves G G<sup>1</sup>.

I I<sup>1</sup> are valves, by means of which the refuse mash is discharged from the stills.

The vapors arising from the boiling mash pass off through the goose-neck pipes N N<sup>1</sup>, into a circular pipe, V, in the mash-heater B, which latter gives the means for heating the mash.

The three-way cock O is placed between the stills and the mash-heater. By means of this the vapors are allowed to pass through the mash-heater, either from one still alone, or from both.

The vapors are passed from the circular pipe V into the rectifier C, by means of a pipe, X.

Z is a small circular perforated pipe, on the bottom of the heater. Steam is admitted to the same by a valve, g', for the purpose of blowing out the mash, and preventing the same from adhering to the sides and bottom of the mash-heater.

The rectifier C is formed in the upper part of heater B, is furnished, like the latter, with a man-hole, a, a glass gauge, b, a vacuum-valve, c, and a discharge-cock, d, with a pipe, e, through which latter the surplus low-wine is returned to the stills. The rectifier is constructed of the pipe X, and the vapors arising through X, and being deflected by the bowl f, receive the first washing, by passing through low-wine, which stands always higher than the lower rim of the bowl.

Immediately over the outlet of the rectifier is placed the rectifying-column, which is divided by horizontal partitions into ten, or more or less, equal compartments, one above the other.

Short central tubes g in each partition lead the vapors from each lower compartment to the one above. A deflecting-bowl, h, of a large diameter, located over each of the tubes g, and projecting down into the low-wine, collected in each of said compartments to a certain height, obliges the vapors, after striking the bowl h, to wash and pass through the low-wine, to reach the next compartment above.

The height of the low-wine in each of the compartments is regulated by a small pipe, i, which protrudes through each of the partitions to the height the low-wine is desired, a little higher than the lower rim of the bowl, and a little lower than the central pipe g, so that the low-wine flows off through the pipe i, to the compartment below, leaving the lower rim of the bowl dipped in the same, but preventing the low-wine ever from flowing over the edge of the central pipe g.

These pipes i are placed diametrically opposite each other in each two succeeding compartments.

From the lower compartment the low-wine falls back to the rectifier C, where its height is observed by the glass gauge b. It flows from here back into the stills, regulated by the cock d.

The rectifying-column is constructed of a large diameter, to hold a quantity of fusel-oil.

From the rectifying-column the vapors are passed upwards to the worm-pipe k of the dephlegmator E.

The worm-pipe k of the dephlegmator is arranged horizontally, and placed in a reservoir, l, filled with water of a certain temperature.

The lower parts of each two or three succeeding turns of the worm are connected with a return-pipe, m, which connects them with the rectifying-column in such a manner that the low-wine and fusel-oil of the first two or three turns are led into a lower compartment of said column, and the next to the following compartments above, so that the gross low-wine is returned to a lower compartment, and the more refined to a higher one.

The reservoir l is provided with an overflow-pipe, n, also with a faucet, o, at the bottom, which connects to n, for drawing off the entire contents of the same.

From the worm, the vapors are conducted, by a pipe, k', to a circular receiving-chamber, p, in the upper part of condenser F.

The chamber p is connected to a lower one of similar construction, q, by a number of small tubes, like a surface-condenser, through which the vapors have to pass, and in which the same are condensed to a liquid state, and drawn off at the bottom through a faucet, r, which is connected with the lower chamber q.

The condensing medium is cold water.

The chambers p q, and the connecting-tubes are surrounded for this purpose with a casing, t, which is supplied with cold water through a pipe, u, leading to a basin, located above the dephlegmator E.

By means of a faucet, z, on pipe u, the amount of cold water to pass through the condenser is regulated.

The water passes through the condenser F, through the pipe w, which latter leads the same above the tank of the dephlegmator E.

By two faucets, z' and y in pipe w, the amount of heated water to be admitted to the dephlegmator is regulated.

The water in the dephlegmator is kept at a temperature of about 190° Fahrenheit, which I find to be the most advantageous temperature at which the fusel-oil is separated from the spirits.

The operation is now as follows:

The main advantage of my apparatus consists in the use of two or more stills, by means of which a continuous action of the distilling-process is maintained.

When, from one of the stills, the refuse mash has to be discharged, the other is in full operation, the three-way cock O is placed so that but the one in operation is connected with the mash-heater and the rest of the apparatus, and steam turned off.

The refuse-mash-delivery valve i is opened, and the contents of that still discharged. When this done, the heated mash in the mash-heater is allowed to flow into this still by opening the faucet T, till the same is about two-thirds full.



Steam is turned on again, and the three-way cock O placed in such a position that the vapors of both stills pass off into the other parts of the apparatus.

Now, both stills work together, till the other still is stilled down to the point that its contents have to be discharged, when the before-described operation is performed on the latter.

The vapors from the stills pass through the goose-neck pipes N, through cock O, to the circular heating-pipe in the mash-heater B. The contents of the same are kept at a constant temperature, by the gradual filling of the heater, by pumping, or otherwise, of the cold mash into the same.

The vapors arise next into the rectifier C, where they are deflected down by the bowl *f*, where they have to wash through the low-wine contained in the same, and are freed from the grosser and aqueous constituents which collect therein, and are returned to the stills by faucet *d* and pipe *e*.

Next, the vapors enter the rectifying-column D, entering in the lower compartment through the pipe *g*, and pass from one to the other, being washed in each, throwing off their low-wine and other constituents, which latter collect to a certain height in each compartment, the surplus falling, by means of pipes *i i*, back to the rectifier C, from where, if found necessary, it is returned to the stills, as before described.

The vapors are partly freed from fusel-oil in passing through the rectifying-column, but a complete separation of the same is obtained in the dephlegmator E. To this latter the vapors are conducted by the pipe *j*, into the worm *k*. The water surrounding the worm is kept at the temperature of about 190°, which I found, as afore stated, the most effective to condense the fusel-oil, which flows back with the low-wine to the rectifying-column, as above described.

By these means perfect pure spirits are passed off from the dephlegmator E. They are conducted by a pipe, *k*<sup>1</sup>, to the condenser, where they are liquefied, and drawn off by the faucet *r*.

After several days of operating, the apparatus becomes so much charged with fusel-oil and other impurities collecting in the low-wine in the rectifying-column and the rectifier, that no longer pure spirits are produced.

To clean the apparatus, the mash-heater is no longer filled, the stills are stilled off, the refuse mash discharged, the tank of the dephlegmator emptied, and now only steam is admitted to the apparatus.

At first the total amount of low-wine appears at the faucet *r* of the condenser, and next all of the fusel-oil which can here be collected.

By this operation the apparatus is completely cleaned, and is ready for new operation.

Having now fully described my invention, what I claim as new therein, and desire to secure by Letters Patent is as follows:

1. I claim the within-described combination of two stills, with the mash-heater, and rectifier, and column, and defecator, and a condenser, connected and arranged for joint operation substantially as and for the purposes herein set forth.

2. I claim, in connection with the above, introducing the mash into the mash-heater gradually or by small increments, so as to maintain a uniform, or nearly uniform, temperature in the heating-vessel, substantially as and for the purpose herein specified.

3. I claim, in a mash-heating vessel B, constructed and arranged substantially as herein specified, the within-described provision for agitating the contents, by the injection of steam into the same, in the manner and with the advantages herein set forth.

4. Cooling the dephlegmator with water from the condenser, by means of connections and cocks, arranged as shown, so that the cold water is economized, and the cooling of the dephlegmator is gradual and uniform, all as and for the purposes herein set forth.

In testimony whereof, I have hereto set my hand in the presence of two subscribing witnesses.

GOTTLOB KAISER.

Witnesses:

A. HOERMANN,  
FERD. STOCKDER.