

(No Model.)

3 Sheets—Sheet 1.

W. F. FEY.

COMBINED COOLING, CONDENSING, AND STERILIZING APPARATUS.

No. 569,750.

Patented Oct. 20, 1896.

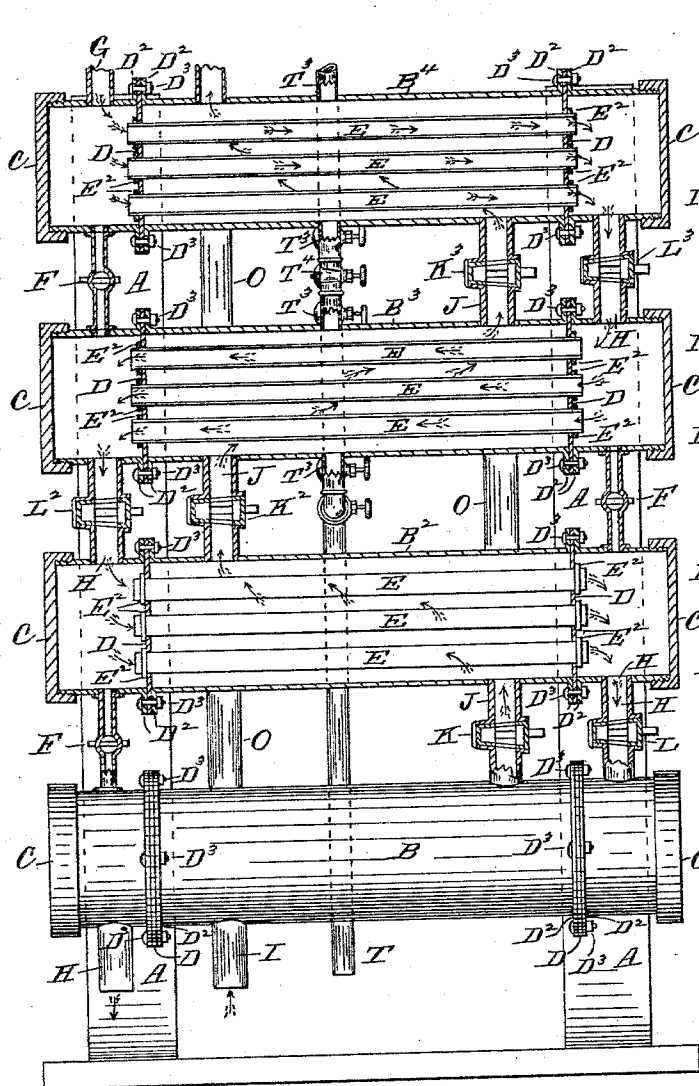


Fig. 1.

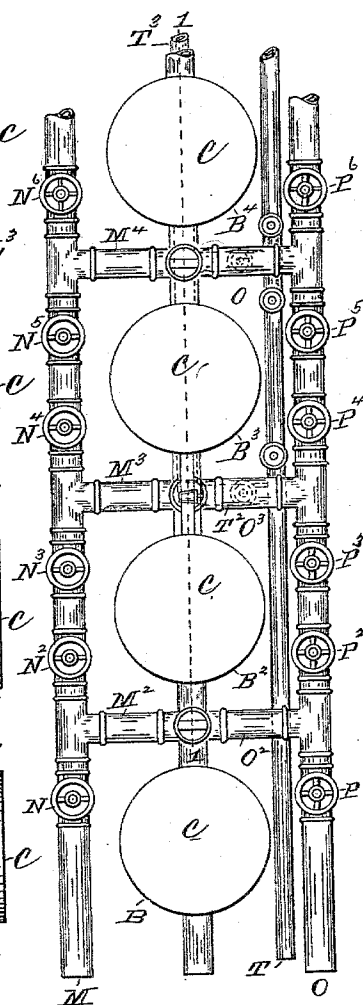


Fig. 2.

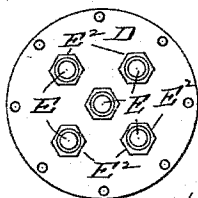


Fig. 3.

Witnesses

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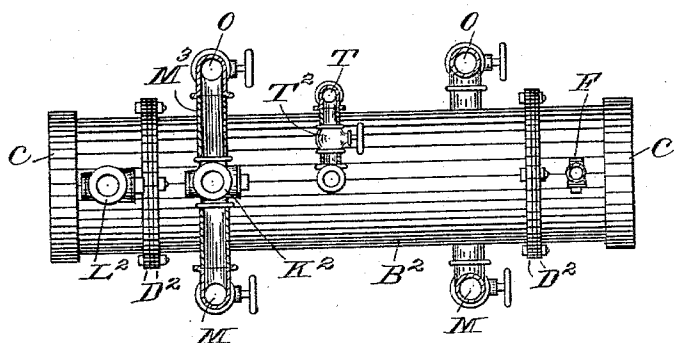


Fig. 4.

Witnesses

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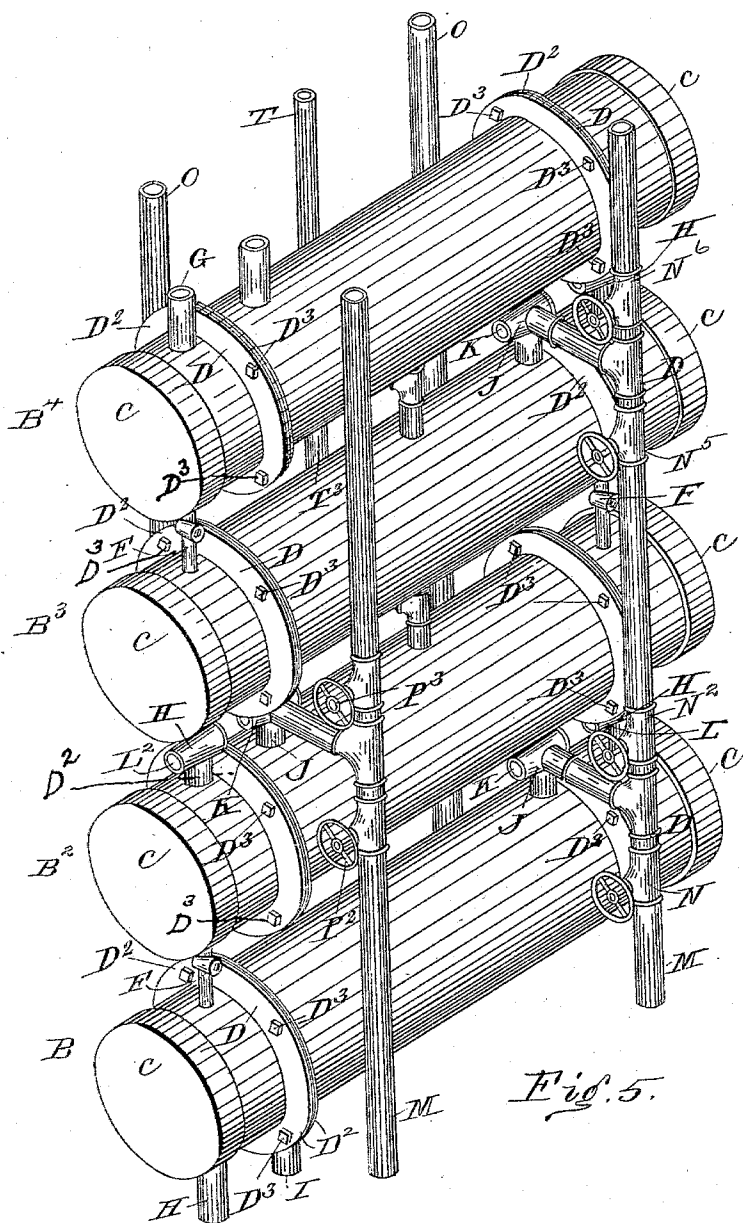


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM F. FEY, OF CINCINNATI, OHIO.

COMBINED COOLING, CONDENSING, AND STERILIZING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 569,750, dated October 20, 1896.

Application filed May 8, 1895. Serial No. 548,555. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. FEY, a citizen of the United States, and a resident of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in a Combined Cooling, Condensing, and Sterilizing Apparatus, of which the following is a specification.

My invention relates to that class of devices through or over which a liquid is permitted to run for the purpose of cooling, condensing, and sterilizing, as the case may be.

The object of my invention is to obtain a great amount of cooling-surface without exposing the liquid to the atmosphere when used as a cooler. When used as a sterilizer a great amount of heating-surface is obtained without exposing the liquid to the atmosphere.

My invention consists of a series of cylinders placed in a vertical or horizontal array, connected at both ends to each other and having chambers at each end, each cylinder being provided with a series of connecting-pipes secured in the inside heads of the chambers in a peculiar manner, which permits easy attachment of the parts for cleaning, &c. The operation is such that the liquid is permitted to flow into the chamber at one end of the upper cylinder through the pipes thereof and into the opposite chamber of the next succeeding cylinder, and the water or other cooling medium is permitted to surround the conducting-pipes and pass from one cylinder to the other.

The operation of the apparatus when used as a condenser is the same as for liquids, the vapors to be condensed entering the same pipe as the liquid and passes through the cylinders in the same manner as the liquid.

When my apparatus is to be used as a sterilizer, the substance to be operated upon enters at one end of the upper cylinder through the pipes thereof and into the opposite chamber of the next succeeding cylinder and the steam or other heating medium is permitted to surround the conducting-pipes and pass from one cylinder to the other.

In the accompanying drawings, Figure 1 is a vertical section, partly in elevation, the section being taken on the line 11 of Fig. 2. Fig. 2 is an end elevation showing pipe connections

with supports removed. Fig. 3 is a view of the inside head of the chamber, showing the ends of the pipes. Fig. 4 is a horizontal section taken through the pipe M³. Fig. 5 is a perspective view of the apparatus.

A represents a frame supporting a series of cylinders B B² B³ B⁴. Each cylinder, which may be either circular, square, or of any other form in cross-section, is provided with flanges at the end, to which may be attached the detachable heads C, and inside these heads heads D are formed, in which are secured conducting-pipes E. Each of the heads D is of sufficient diameter to extend outside of the diameter of the cylinder, so as to enter between and become flush with the periphery of two flanges D², the whole being secured by a series of bolts D³. The tubes E are secured in these heads at each end by nuts E². It will be seen that by the removal of the chambers from one end and the nuts from the pipes at the opposite end the heads D may be drawn out, carrying all the tubes with them, and convenience be thus afforded for perfect cleaning. At the end of each cylinder at which the liquid is received a cock F is provided, so that the liquid collected below the lowest pipe can be drawn off through the chambers.

When the apparatus is used as a cooling device, liquid is received at pipe G and after passing through the first series of pipes E is conducted into the second cylinder through pipe H, and so on through all the cylinders of the series through pipes H, in the manner shown by the arrows. The water or other cooling medium is received at pipe I from any source of supply and is conducted into the space around the pipes and between the heads D D. From thence it rises through similar pipes J throughout the entire series.

My apparatus, when used as a condenser, is operated in the same manner as when used for cooling liquids. The vapors from the still are received at pipe G—the same pipe at which the liquid is received—and pass through pipes E, and are conducted through pipes H from one cylinder to the other until thoroughly condensed. The water is received at pipe I and conducted throughout the entire series of cylinders through pipes J in the same manner as described for cooling liquids.

When my apparatus is to be used as a ster-

ilizer, the material to be sterilized is received at pipe G, and, after passing through the first series of pipes E in cylinder B⁴, passes to cylinder B³, and, being thoroughly sterilized, passes to the cooling-cylinders B² and B without being exposed to the atmosphere, thus retaining its aroma and original quality, nothing having passed away through evaporation.

In any of the operations herein mentioned, either cooling, sterilizing, or condensing, I do not confine myself to any particular number of cylinders, using as many as are necessary to obtain satisfactory results in either operation.

The steam or other sterilizing medium is received at pipe T through pipe T², then pipe T³ to the cylinder B³ into the space around the pipes E and between the heads D D, through pipe T³, three-way stop-cock T⁴, pipe T³ to cylinder B⁴, and so on through all the cylinders.

In my drawings I show steam-line for sterilizing in the center of large cylinder, but I do not confine myself to this particular mode of construction. It might be desirable to have the steam or heating material pass in at one end of the side of the cylinder and pass out at the opposite side of the other end of the cylinder.

It will be seen that by my apparatus, when used as a condenser, the volume of vapor is compelled to enter a number of pipes, and hence it is condensed in great volume and with great rapidity. It will be seen also that this form of cooling or condenser gives a great amount of cooling or condensing surface within a small space and without expensive construction in the apparatus.

My improvement, moreover, permits the using of one cylinder at a time or all or any combination of cylinders either in cooling or condensing or sterilizing.

The following will be a description of the means by which the aforesaid results are obtained: In the pipe J is located a three-way stop-cock K. In the pipe H is located a three-way stop-cock L. In the pipe-line M are located valves N² N³ N⁴ N⁵ N⁶. In the pipe O are located valves P² P³ P⁴ P⁵ P⁶. (See

Fig. 2.) The following example will show the use of the pipe-lines M and O: If it is desired from any cause to shut out the second cylinder from the bottom B², the material to be operated on passes through the upper cylinders in the usual way until it arrives at cylinder B³, when the three-way stop-cock L² is turned so as to cause the material to pass through pipe M³, and valves N⁴ and N being closed the material will pass down pipe-line M through valves N³ N², pipe M², and three-way stop-cock L to cylinder B. The cooling material will enter pipe I, envelop the pipes E in cylinder B, pass out through three-way stop-cock K through pipe O³, pipe O, valves P² P³, pipe O³, and three-way cock K² to cylinder B³. By means of pipe-lines M O and valves any cylinder may be cut out for repairs and still not interfere with the working of my device. There are similar pipe-lines O and M at each end of the cylinders.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination of conducting-pipes E, and source of heat as T, the cylinders and chambers at the end portions of the cylinders, and the intervening tubes connected thereto, line of piping M, connected to the end chambers of the cylinders, and the central portion of the cylinders being separated from the end portions, and lines of piping O, connected thereto, and the three-way cocks located as described, substantially as and for the purposes specified.

2. The combination of conducting-pipes E, and source of heat as T, the cylinders and end chambers thereof, intervening tubes connected thereto, lines of piping M and O, and connection thereof with said intervening tubes substantially as described and the central portion of the cylinders being separated from the ends and connected to the inner lines of tubing, substantially as and for the purposes specified.

WM. F. FEY.

Attest:

C. J. McDIARMID,
K. SMITH.