F. M. YOUNG.

CONDENSERS FOR FRACTIONAL DISTILLATION.

No. 194,856. Patented Sept. 4, 1877.

Fig. 1.

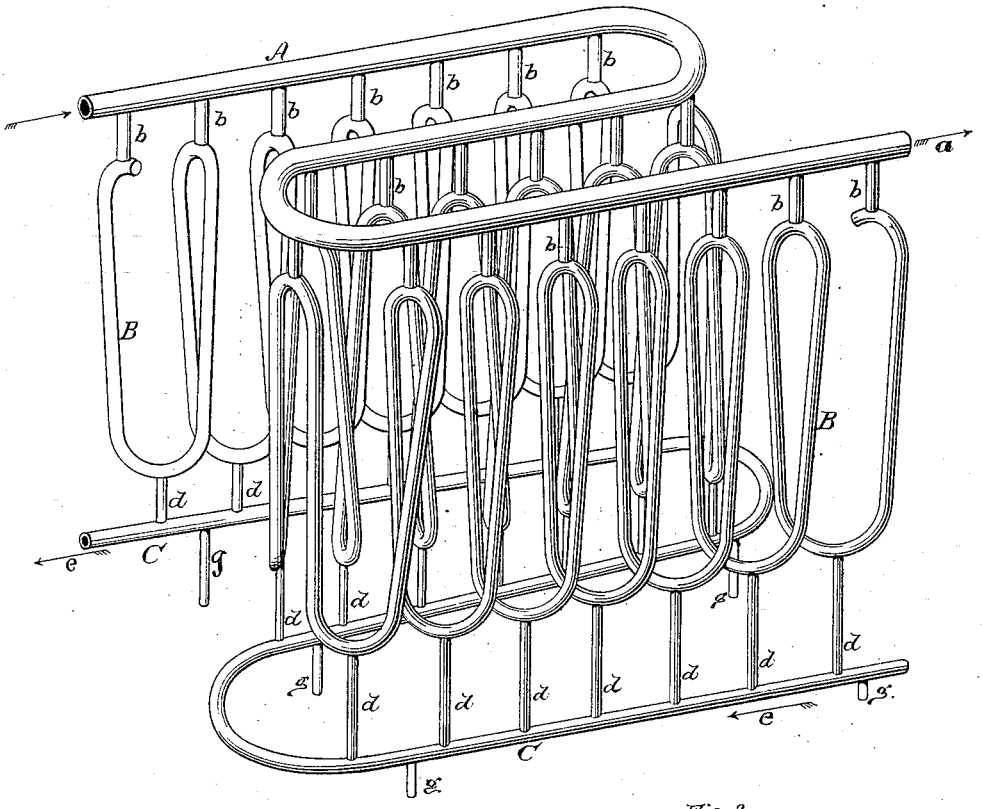


Fig. 2.

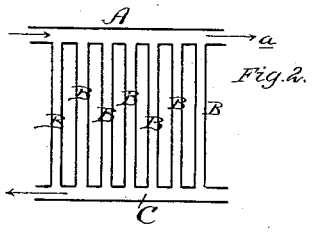


Fig. 3.

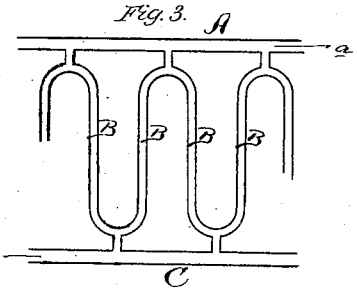


Fig. 4.

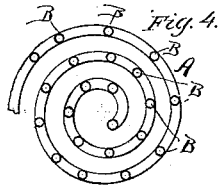
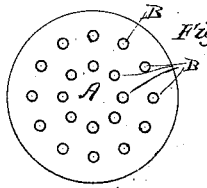


Fig. 5.



WITNESSES

C. Clarence Poole

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FRANCIS M. YOUNG, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN CONDENSERS FOR FRACTIONAL DISTILLATION.

Specification forming part of Letters Patent No. **194,856**, dated September 4, 1877; application filed May 12, 1877.

To all whom it may concern:

Be it known that I, FRANCIS M. YOUNG, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Condensers for Fractional Distillation; and that the following is a full and clear description of the same.

I am aware that a coiled condenser-tube set upon edge, or with its coils in vertical planes, has heretofore been used; but in such condensers, so far as I am aware, the hot vapors were compelled to pass from end to end of said coils, the condensed fluid being permitted to escape from the bottom of each coil to a return-pipe, and thereby back to the still; but such is not my invention. In condensers of that description the lower bends of the coils frequently become filled with liquid so as to seal the passage. The hot vapors are then compelled to force the way through said liquid, and a portion will be condensed by contact with the cooler liquid; while, on the other hand, the vapor which passes through will revaporize a portion of the liquid previously condensed, and the effect is detrimental to the process.

My condenser does not admit of any such objection. It is not a worm, except for convenience in manufacture. The hot vapors pass along the feed-pipe, and are drawn down into the vertical tubes partly by gravity and partly by the partial vacuum produced by the partial condensation in said tubes, while the condensed fluid passes into the lower return-pipe and is conveyed back to the still. I am therefore enabled to keep my condenser-pipes at the proper temperature and in uniform operation, so that, while passing the condenser, all or nearly all the vapor condensable below the vapor-point of alcohol will have been condensed, and the vapor which finally reaches the thorough-condensation worm will be pure, or nearly so.

That others may fully understand my invention I will particularly describe it, having reference to the accompanying drawing, wherein—

Figure 1 is a perspective view of my condenser in the form preferred by me. Figs. 2, 3, 4, and 5 represent modifications in structure, but involve no change in principle or mode of action.

A is the vapor-pipe, taking vapor in the direction of the arrows from the still, and delivering it in the direction of the arrow *a* to the worm, where thorough condensation is effected.

The still and thorough-condensation worm are not shown, because their operation is well understood, and does not enter into this case in any special way.

For convenience, the structure shown in Fig. 1 only will be specially described. The corresponding parts in Figs. 2, 3, 4, 5 are, however, similarly lettered for identification.

The condenser is a coiled pipe, B, with the coils placed in planes perpendicular to the horizon. The upper bend of each separate coil is connected to the pipe A by communicating-pipe *b*, of such lengths as may be found most advantageous, and the lower bend of each coil is similarly connected with the return-pipe C by pipes *d d*. It should be understood, however, that if said pipes A and C were connected directly to the coils of the tube B, so as to reduce the pipes *b* and *d* to mere orifices, the invention, or its results, would not thereby be changed. The liquid of condensation flows in the direction of the arrows *e e* back to the still.

This whole structure is designed to stand immersed in water to the top of the coils, or to any less depth that may be found preferable.

g g are feet, to support the condenser, and adjusted to give the return-pipe C the proper inclination while standing upon a level floor.

The vapor-pipe and the return-pipe are, therefore, separate, and the hot vapors which pass into the condenser-pipes are there condensed so far as possible at the temperature maintained, and the liquid of condensation flows away through the return-pipe without coming in contact with the vapor in the vapor-pipe at all.

By these means light vapors are permitted to pass off to be treated elsewhere, while those portions which are heavier and more easily condensed pass into the pipes B.

The quality of condensed liquid may be reg-

ulated by adjusting the temperature of the water surrounding the condenser.

After operation on an extensive scale for a sufficient period to thoroughly test this improvement, it is found that the product is noticeably softer and superior to liquor condensed in the usual way.

Having described my invention, what I claim as new is—

An analyzing-condenser composed of a vapor-pipe, A, above, and a return-pipe, C, below, as set forth, combined with condenser-pipes B, extending between and uniting said vapor and return pipes, substantially as and to operate as described.

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Witnesses:
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