J. FAIRBURN.

VACUUM-PAN.

No. 177,109. Patented May 9, 1876.

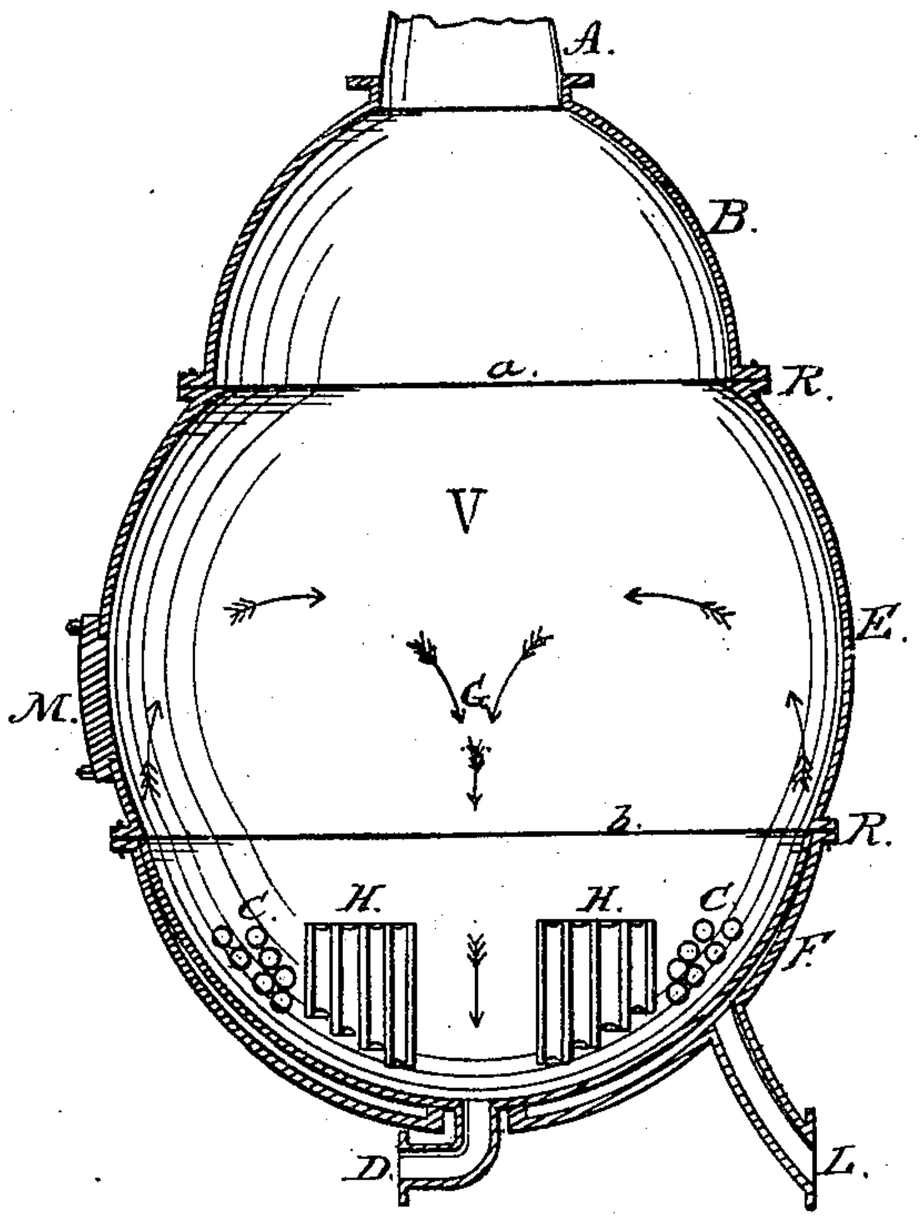

Fig. 1.

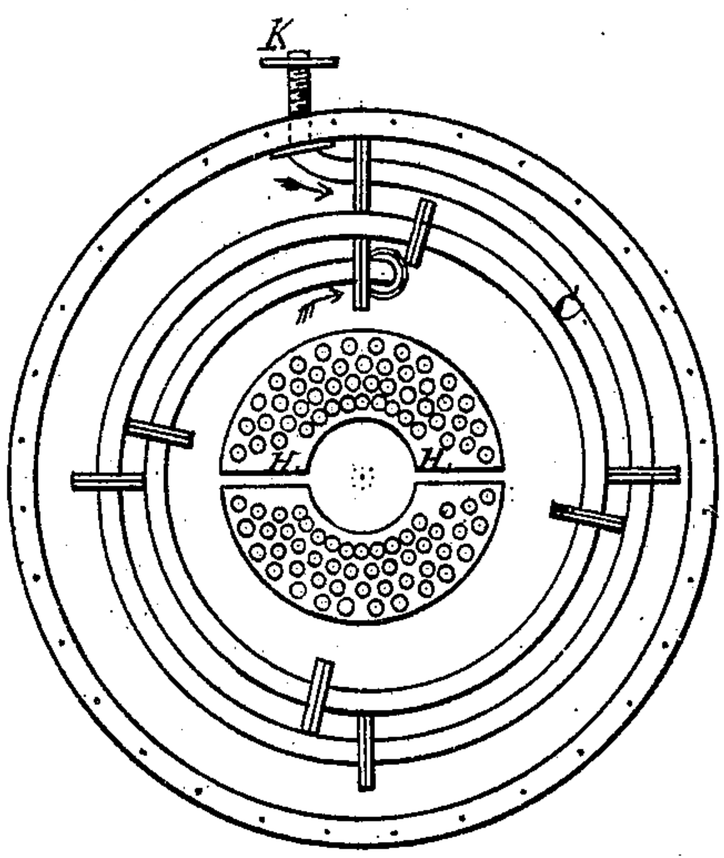

Fig. 2.

Witnesses:
F. W. Howard
E. M. Steam

Inventor:
John Fairburn
by George A. Sawyer.
Atty.

UNITED STATES PATENT OFFICE.

JOHN FAIRBURN, OF UPTON STATION, ASSIGNOR OF ONE-HALF HIS RIGHT TO ISAAC PLUMB WILSON, OF MONTREAL, CANADA.

IMPROVEMENT IN VACUUM-PANS.

Specification forming part of Letters Patent No. **177,109**, dated May 9, 1876; application filed March 9, 1876.

To all whom it may concern:

Be it known that I, JOHN FAIRBURN, of Upton Station, in the county of Bagot, Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements in Vacuum-Pans, of which I hereby declare the following specification, when taken in combination with the accompanying drawing, to be a full, clear, and exact description.

The objects of my improved vacuum-pan are, first, to overcome excessive foaming, which is so usual in globular vacuum-pans, and which retards the evaporation of liquids being boiled; and, second, to increase and benefit the circulating of the liquids being evaporated. As is well known, liquor from barks, while being boiled down for the extract, occasions a great deal of trouble and loss by foaming, which is due, in a great measure, to the imperfect manner of forming the pans in which they are boiled.

My vacuum-pan, like that of ordinary pans, is constructed in three sections, bolted together, as will be seen in the accompanying drawing, in which—

Figure 1 represents a sectional view of the pan embodying my invention; and Fig. 2 represents a ground plan of the heating-surface, showing the relative position of the drums and steam-coil.

The three separate sections of my pan are indicated by the letters B, E, and F, they being joined where the lines *a* and *b* intersect. These different sections are bolted together. The steam-coil is indicated at C, and, the drums H having an increasing vertical depth from the circumference to the center, and which are located in the lower section F, the same as in ordinary globular vacuum-pans, the coils C are supplied with live steam, which enters at the side of the pan, and the steam, after passing through these coils, exhausts at the bottom. The steam-drums H take in live steam at the bottom, and exhaust at the same. The steam drum or drums are circular boxes inserted with vertical tubes, the transverse section of which shows a rectilinear figure. It has a superiority over all other applications for heating-surfaces, for in a hollow helical band or coil, with or without increasing vertical depth, the liquor is very apt to foam when the live steam is first let into the coil, as the liquor boils in a great rolling body, and will often foam out of the pan, when evaporation commences, on account of the sudden vacuum formed at the first condensation of the vapor; but where a steam-drum is employed the liquor spouts through each individual vertical tube into as many respective jets as there are tubes, and then falls down in numerous liquid atoms, thus preventing the possibility of foaming.

It will be seen by reference to the accompanying drawing that I construct my pan in such a way that I get a much greater height than that of ordinary vacuum-pans—an advantage which cannot be fully appreciated except by one engaged in superintending a vacuum-pan where so much loss is occasioned by the liquid foaming up and escaping into the vapor-pipe A.

The most important portion of my improvement relates to the construction of the middle belt or section E, which, instead of being contracted, so as to form perfectly perpendicular sides, similar to an ordinary vacuum-pan, is made to bulge out at its center, and more contracted at the top than at the bottom. At the top of section E I provide a projecting lip, which is curved inward to prevent priming, so that the liquor, instead of priming up through the pipe A, will be thrown inward. I also contract the top section or dome B to the size of the bottom portion of the vapor-pipe A, which is secured to it at this point.

It will readily be seen that, as the curves of the sections B and E are struck from a different radius, and that they are both contracted at the top, they, together with the bottom or lower section F of the pan, form, as it were, a pan of an ununiform ellipse-like shape, which I claim to be very favorable to the circulation, and, consequently, rapid evaporation.

Now, as rapid evaporation is the essential virtue of a vacuum-pan, and to produce which it is necessary to have a good circulation, which can only be effected by having the liquid bash down in the center when boiling, the most natural way for liquid to boil is upon the sides and down in the center. Now, by reference to the drawings, it will be seen that by constructing the pan as I propose to

do, the sides, being continuous almost with the bottom, instead of rising abruptly, assist in bashing the liquid toward the center of the pan, causing it to take the course indicated by the arrows G. It is believed that the arrangement and shape of this pan so facilitate the heating and circulation of its fluid contents that foaming or priming is almost impossible, and the liquid will boil at the very lowest possible temperature.

By referring to the drawing, it will be seen that the middle section E is provided with a man-hole, M, the cover to which is so arranged that its inner side will be flush with that of the pan, thereby not interfering with the bashing of the liquid being boiled. This man-hole cover is secured in place by means of bolts.

The discharge-pipe D and live-steam and exhaust-steam pipes K and L enter in the same relative positions as those of ordinary vacuum-pans, so I will not go into details, as my improvements do not relate to the arrangement of the parts and necessary appendages of the pan as to its form.

My improved pan may also be used for condensing milk, in which case the drums will not require to be so deep, and the vacuum-pan will require to be somewhat smaller than that used for making extract.

The great object in condensing milk is to do it at a low temperature, so as to keep a scum or skin from forming on the surface; hence, it will be found that my improved pan will condense milk far better than any other, as it will evaporate milk tolerably quick at 100° Fahrenheit.

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

1. A vacuum-pan constructed with a dome, B, middle section or belt E, curving inward from a point near its vertical center toward its ends, in combination with the lower section F, the whole forming a pan in shape similar to an ellipse whose larger axis is vertical.

2. The inwardly-curved projecting lip, situated on the inside top edge of the middle belt or section E, to prevent priming, substantially as specified.

3. The circular and vertically tubular steam drum or drums H H, having an increasing vertical depth from circumference to center.

In testimony that I claim the foregoing as my invention I have affixed my signature in the presence of two witnesses.

JOHN FAIRBURN.

Witnesses:

HENRY FRANCIS QUELCH,

ARTHUR HITCHINGS CHAMBERS.