F. O. MATTHIESSEN.

APPARATUS FOR COLLECTING AND SAVING PARTICLES OF SUGAR LIQUOR RISING WITH THE STEAM FROM VACUUM-PANS.

No. 191,163. Patented May 22, 1877.

Figure 1.

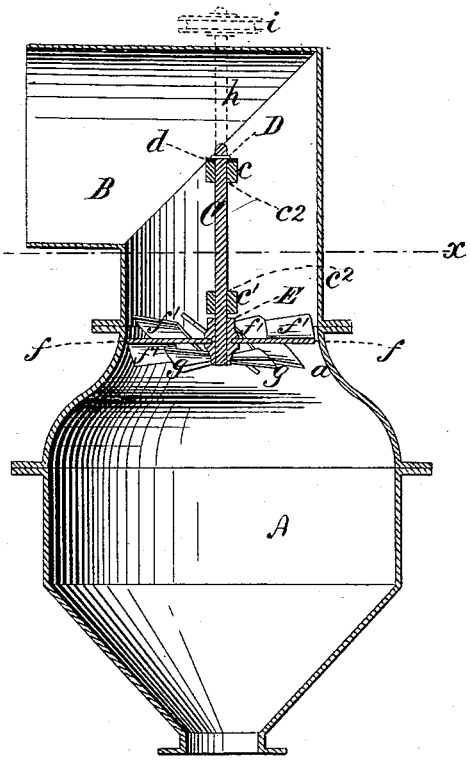
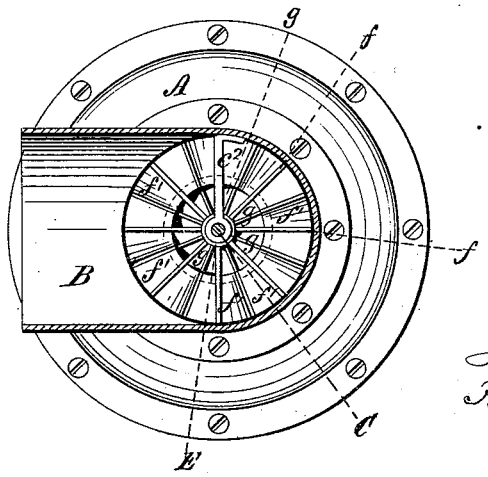


Figure 2.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN APPARATUS FOR COLLECTING AND SAVING PARTICLES OF SUGAR-LIQUOR RISING WITH THE STEAM FROM VACUUM-PANS.

Specification forming part of Letters Patent No. **191,163**, dated May 22, 1877; application filed March 3, 1877.

To all whom it may concern:

Be it known that I, FRANZ O. MATTHIESSEN, of Irvington, New York, have invented an Improvement in Apparatus for Collecting and Saving Fine Particles and Drops of Sugar-Liquor, ordinarily carried off in the steam discharged from vacuum-pans, of which the following is a specification:

The object of my invention is to prevent the loss of sugar-liquor by its being carried from the vacuum-pan into the condenser in the form of spray by the steam rapidly evolved and violently discharged from sugar-liquor which is boiling *in vacuo*.

My invention consists in erecting in the neck of the vacuum-pan a wheel composed of a system or systems of inclined or curved blades, vanes, or fans capable of being rotated upon a common vertical axis, either by power externally applied or by the force of the current of steam. By means of this device minute particles or drops of sugar-liquor carried along in the current of steam are caught upon the surfaces of the blades, while the steam is deflected, and makes its way onward through the spaces between the blades. The drops of liquor remain adherent to the surfaces of the blades until, by the action of the centrifugal force generated by the revolution of the wheel, they are thrown from the blades against the shell of the chamber in which the wheel is placed. They then collect on the shell of the chamber, and, finally, under the influence of their own gravity, they run down into the bottom of the chamber, or back into the body of liquor in the vacuum-pan.

The wheel may be affixed to a shaft which projects through the shell of the chamber in which the wheel is placed, and is provided on its outer end with a pulley, by means of which the wheel can, if desired, be rotated by power externally applied; but I prefer to utilize the current of steam for effecting the rotation of the wheel. The wheel, of course, may have a great variety of forms. It may be made, like a smoke-jack or chimney-ventilator, with spiral blades, and its blades may, if desired, be made self-adjusting, like the fans of windmills.

A convenient mode of applying my invention consists in mounting a fan-wheel upon a vertical shaft, in the center of the circular neck of the vacuum-pan, in which case the wheel occupies nearly the entire cross-area of the opening in the neck, there being just room enough for the clearance of the outer ends of the inclined blades as the wheel revolves.

The steam discharged from the sugar-liquor in the vacuum-pan beneath the fan-wheel strikes against the inclined blades, and, being slightly deflected thereby, makes its way upward through the interstices between the fans or blades. On the contrary, particles of sugar-liquor carried upward by the upward current of steam strike against the blades and adhere to them, and are then driven by centrifugal force outward to the outer ends of the blades, and from thence are thrown tangentially against the wall of the neck of the vacuum-pan. The fine drops or particles of sugar-liquor are thus eliminated by centrifugal force from the upward current of steam, and collect upon the wall of the neck, until, finally, by their own gravity, they run down the wall and get back into the sugar-liquor in the lower part of the pan.

The accompanying drawings are as follows:

Figure 1 is a central vertical section of the upper portion of a vacuum-pan, showing my fan-wheel affixed to a vertical shaft in the center of the neck of the vacuum-pan; also showing a portion of the goose-neck or lateral chamber through which the steam passes on its way to the condenser. Fig. 2 is a horizontal section through the line $x\,x$ on Fig. 1, affording a top view of the fan-wheel.

I have not deemed it necessary to show any devices for heating the sugar-liquor in the vacuum-pan, as devices for this purpose are well known, and in common use.

The drawings represents a vacuum-pan, A, and a portion of the goose-neck or lateral chamber B, through which the steam from the vacuum-pan passes on its way to the condenser. In the upper part of the structure is a vertical shaft, C, mounted in bearings c and c^1 upon the ends of the bars c^2 c^2, which are bolted to the shell of the vacuum-pan, and which project horizontally therefrom.

The shaft C is provided with a pin or key,

D, extending transversely through its upper end, and bearing upon the loose collar *d*, which rests upon the upper end of the bearing *c*, the object of the key D being to hold up the shaft C. The upper end of the shaft C may be provided with a fixed collar, which will bear upon the top of the upper bearing *c* and answer the same purpose as the pin D in holding up the shaft. To the lower end of the shaft C is affixed the hub E. A series of spokes, *f*, are affixed to, and project radially from, the periphery of the hub E. The outer portions of the spokes *f* are secured to, and afford support for, the inclined blades *f'*. Beneath the system of spokes *f* and inclined blades *f'* is another series of shorter inclined blades, *g*, affixed to the lower portion of the hub, and projecting radially therefrom immediately beneath the spaces between the spokes *f*. The blades *f'* and *g* are inclined at an angle of about forty-five degrees from the perpendicular, and constitute, with the hub, &c., the fan-wheel, to which I have referred.

The operation of my apparatus is as follows: When the sugar-liquor in the vacuum-pan reaches the boiling-point steam is rapidly evolved, and, being discharged upward with great force, strikes against the inclined blades, and causes the fan-wheel to rapidly revolve. Particles of sugar-liquor, carried up with the steam, strike against, and adhere to, the under surfaces of the blades, and are forced outward by centrifugal action to the outer ends of the blades, from which they are thrown tangentially against the wall of the neck *a* of the vacuum-pan.

By this means fine particles or drops of liquor violently thrown upward from liquor boiling *in vacuo* are caught and separated from the upward current of steam, and are thrown against the wall of the neck of the vacuum-pan, down which they make their way by their own gravity into the bottom of the pan.

By my apparatus I avoid the loss which has heretofore accrued from the boiling over of the sugar-liquor, and the carrying away of certain portions of it into the condenser.

The mode of rotating the fan-wheel by power externally applied is exhibited in Fig. 1, whereon the extension *h* of the shaft C and the stationary pulley *i* are shown in dotted lines.

I claim as my invention—

The combination, with a vacuum-pan, of a wheel composed of a system or systems of inclined or curved blades, vanes, or fans affixed to a central shaft, mounted in vertical bearings within the neck of the pan, and made to rotate by the force of the current of steam generated in the pan, whereby fine particles and drops of sugar-liquor carried upward with the steam are caught upon the rotating blades and thrown therefrom by centrifugal force against the wall of the neck in favorable position to make their way back under the influence of their own gravity into the body of sugar-liquor in the bottom of the pan.

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