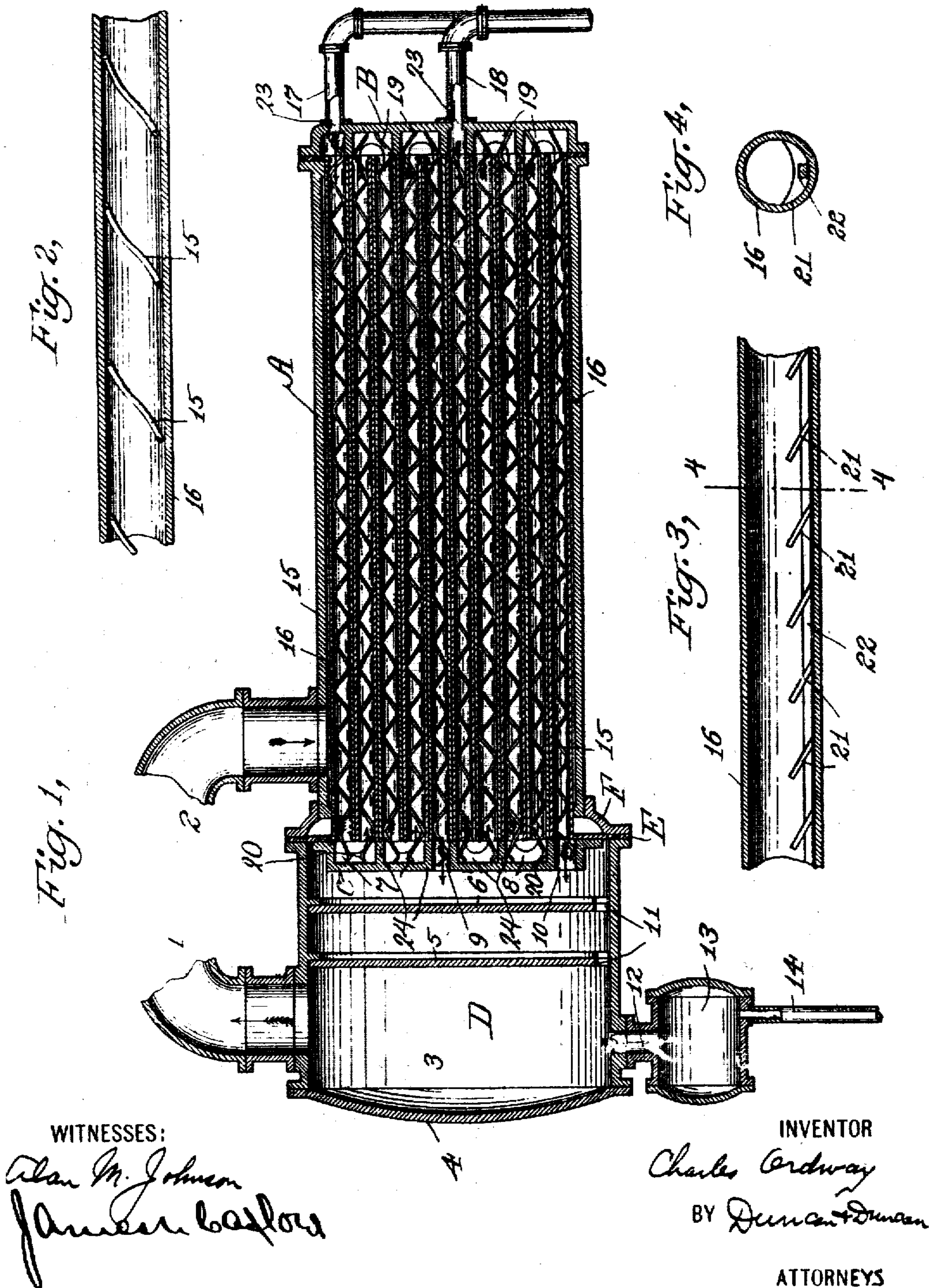


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C. ORDWAY.  
FILM EVAPORATING HEATING COIL.  
APPLICATION FILED JAN. 4, 1908.



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FILM-EVAPORATING HEATING-COIL.

10, 33, 5, 12.

Specification of Letters Patent.

Patented Dec. 4, 1908.

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*To all whom it may concern:*

Be it known that I, CHARLES ORDWAY, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a certain new and useful Improvement in Film-Evaporating Heating-Coils, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

This invention relates to film-evaporators, and more particularly relates to means to prevent an even flow of liquor along the bottom of the heating-coils, but still leave a free passage in the middle of each separate tube or coil for the circulation of the vapor.

In the accompanying drawings, showing illustrative embodiments of this invention, and in which the same reference characters refer to similar parts in the several figures, Figure 1 is a longitudinal vertical section of a film-evaporator. Fig. 2 is an enlarged sectional view of one of the tubes of the heating-coils, showing the wire coil in section. Fig. 3 is a longitudinal section of a modified form of construction. Fig. 4 is a transverse vertical section of Fig. 3 on the lines 4-4.

In the illustrative embodiments of this invention shown in the drawings, A is a cylindrical jacket which surrounds the heating coils or tubes 16 16. The ends of the cylinder A are closed by means of heads B and C, respectively. As shown in this figure, there are ten tubes arranged to form two sets of heating-coils. The liquid to be evaporated is fed through the feed-pipes 17 and 18, passing through the openings 23 23 in the head B and flows through the upper tube of each coil until the opposite head C is reached, when the flow is diverted into the second tube of each coil by means of flanges 24 24 upon the head C, forming connecting-passages 7 and 8, and this alternating passage back and forth of the liquid through different tubes is repeated until the liquid passes out of openings 9 and 10, respectively, in the head C, when it comes in contact with the dash-plates 5 and 6 and flows through the openings 11 into the chamber 3, where the vapor passes off through the outlet 1 to be condensed in the next effect, and the liquid passes down through the opening 12 into the collecting-chamber 13, from which it is drawn off by means of the pipe 14. The dash-plates, chamber 3, and outlets 1 and 12 are located in a second cylinder D, one end of which is

closed by the head C of the cylinder A and the other by head 4. To insure an air-tight fit between the two cylinders A and D, I use plates E, which are placed between the ring F, which is fast to the cylinder A, and the cylinder D. Live steam is fed through the port 2 into the interior of the cylinder A to heat the different tubes 16 16 in the usual manner.

Suitable obstructions may be employed in the heating-tubes to throw the liquor upward and insure its contact with substantially the entire inner surface of the tubes. As illustrated, the obstruction in each tube is preferably in the form of a wire coil 15, wound spirally and having elasticity enough to expand firmly against the inner wall of the tube in which it is located. By making each coil somewhat longer than the tube the ends pass out of the tubes 16 and bear against the heads B and C of the cylinder A. When the head B is placed in position and secured to the casing A, pressure will be applied to the ends 19 of the coils, which will also cause the opposite ends 20 of the coils to bear firmly against the inner surface of the head C, so that each convolution of the coils may in this manner, if desired, be made to press tightly against the inner surface of the tube 16, as shown in Figs. 1 and 2.

Instead of a wire-coil obstruction I may use another form, such as shown in Figs. 3 and 4, wherein bars 22, having inclined dash-plates 21 21 located upon the same, are placed in the bottom of the tubes 16 16, the plates 21 being inclined in the direction of flow of the liquor. In both constructions the liquor, regardless of its concentration, will be dashed up by the wire obstructions 15 or the plates 21 toward the top and upper portion of the tube, thus bringing the liquor into contact with the entire heated surface of the coils or tubes. The tendency to stratification and imperfect action may thus be prevented when the evaporator is run under ordinary conditions with a small feed-opening supplying the liquor to the tubes of comparatively large diameter. By this construction also the central and larger portion of the tube is left open and free for the passage of the vapor, so that it has a free passage through the coil to the outlet, and hence does not lessen the rapidity of motion of the liquor through the coil.

Having thus described this invention in connection with several illustrative embodiments thereof, to the details of which I do not

desire to be limited, what is claimed as new, and what is desired to secure by Letters Patent, is set forth in the appended claims.

I claim

5 1. In film-evaporator heating-coils, a cylinder having inclosing heads, tubes placed within the cylinder and between the heads, a spiral wire placed within the tube and en-  
gaging with the interior surfaces of the heads.

10 2. In film-evaporator heating-coils, a steam-cylinder having inclosing heads, tubes placed in the cylinder between the heads, a spiral wire having normally a greater exter-

nal diameter than the internal diameter of the tubes placed within the tubes and having its ends free and contacting with the heads of the cylinder so that when one of the heads is fastened in position it will produce pressure on the end of the coil and force its convolutions into closer contact with the interior of the tube.

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