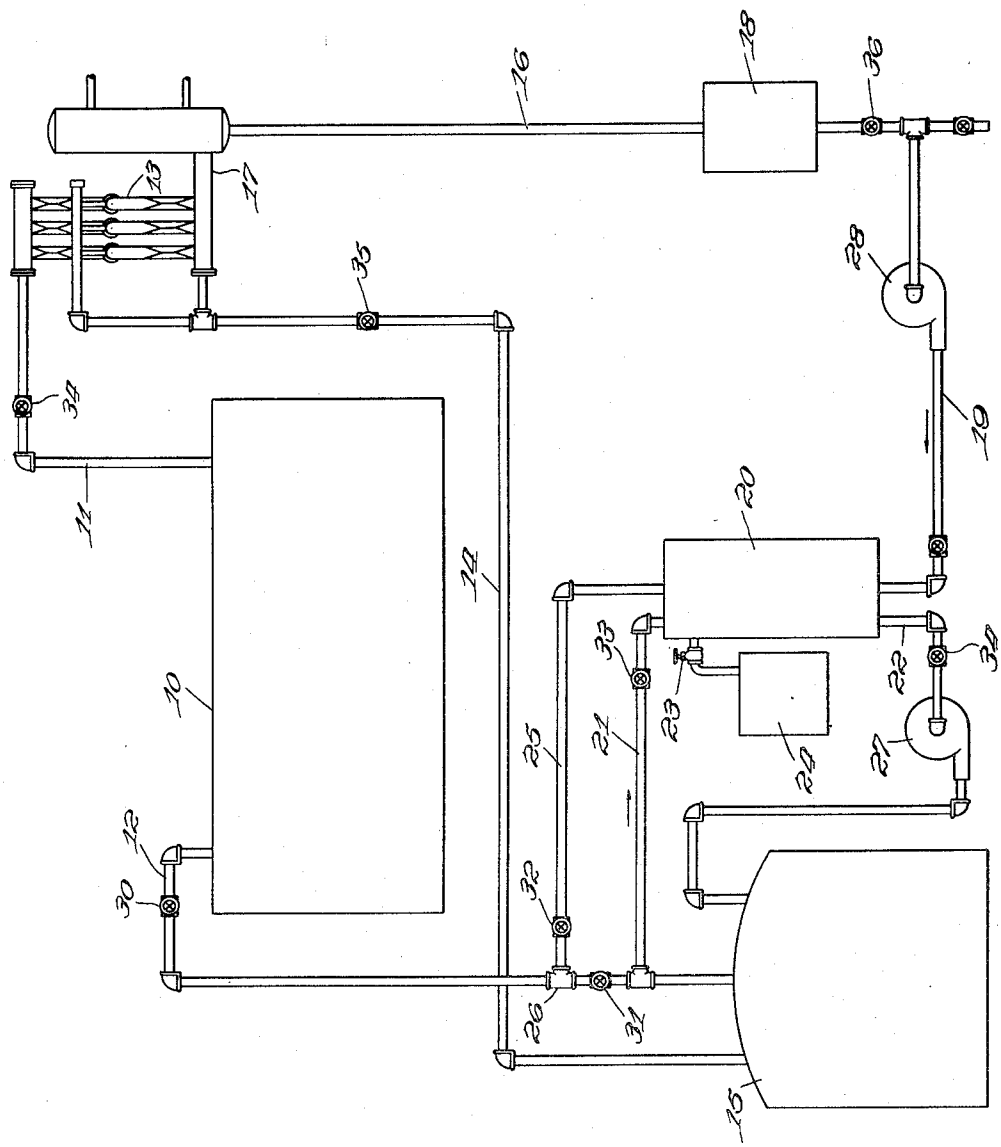
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RECYCLING SYSTEM FOR MOISTENING TOBACCO

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RECYCLING SYSTEM FOR MOISTENING TOBACCO

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5 Claims. (Cl. 131—133)

This invention relates to a recycling system for moistening tobacco.

In the treatment of tobacco, in which the material is subjected in hogsheads or bales to a high vacuum and is then steamed, after which the evacuation cycle is repeated to remove a considerable amount of water from the tobacco, it is customary to employ multiple-stage steam ejector systems for the evacuation, particularly for the later stages of vacuum where large amounts of water vapor must be handled. The steam ejectors are quite efficient and the amount of steam required for their operation is relatively small compared with the amount which is utilized in the steaming operation.

The products from the steam ejector are customarily condensed in a barometric condenser or semi-barometric condenser. In handling tobacco, however, these products are contaminated with extraneous materials from the tobacco, the nature of which is not fully understood, and which make the utilization of the water in a steam boiler undesirable.

The present invention affords a process by which the condensate from the steam ejection system may be re-employed for steaming the tobacco without passing through the coils of the boiler and in which, by such utilization, the amount of material evaporated from the tobacco is kept at a minimum due to the return of the evaporated materials in the subsequent cycles.

The invention is illustrated diagrammatically in the drawing in which 10 represents a conventional vacuum chamber provided with a vacuum line 11 and a steaming line 12. A system of steam ejectors 13, which is supplied with steam through the line 14 from the boiler 15, may be utilized to draw the necessary vacuum in the chamber. I have not shown the customary mechanical pump which is usually included in the system to remove the bulk of the air when the operating cycle commences. The discharge from the steam jets enters a barometric leg 16 through the line 17, and the condensate is collected in the receiver 18, which constitutes a part of the barometric leg. From this point the condensate is pumped through the line 19 and through the heat exchanger 20 in which the condensate or a portion thereof is evaporated by heat exchange with high pressure steam which passes into the heat exchanger through the line 21. A suitable trap (not shown) is provided in the upper portion of the heat exchanger through which a portion of the condensate may be drawn off through the valve 23 into the receiver 24. The volatilized condensate passes out of the heat exchanger through the line 25 and through the T 26 into the line 12.

Any condensed high pressure steam, together with uncondensed steam, if there is any, passes through the line 22 and the pump 27 to the boiler 15. A second pump 28 is provided in line 19 to pass the condensate through the heat exchanger.

As a typical example of the operation of the system, the tank 10 is evacuated to a suitably high vacuum, say an absolute pressure of 0.3 inch, initially by a mechanical vacuum pump which is not shown, and in the final stages by the admission of steam through the line 14 in the steam ejector system 13. This requires relatively little steam which, however, is condensed in the barometric leg 16. In the initial operations, where there may not be sufficient condensate, a high pressure steam may then be admitted through the line 12 from the boiler 15 to the tank by opening valves 30 and 31, valves 32 and 33 in lines 25 and 21 respectively being closed. At the same time valves 34 and 35 in lines 11 and 14 will likewise be closed, and pumps 27 and 28 will not be operating.

After the tobacco in the tank 10 has been raised to the proper temperature by the steam, valves 30 and 31 are closed, and valves 34 and 35 opened in order again to evacuate the chamber. During this procedure large amounts of water vapor contaminated with volatiles of the tobacco pass into the steam ejection system and are condensed in the barometric leg.

After the vacuum has been increased to the desired degree, valves 34 and 35 may again be closed, valve 36 in line 19 is opened, and pumps 27 and 28 are started. At this time valve 33 in line 21 and valve 34 in line 22 are opened, as are valves 32 and 30. The condensate from the receiver 18 is thus pumped through the heat exchanger wherein all or a portion of it is volatilized and passes into the chamber 10 as low pressure steam. Preferably the steam will not have a pressure much over 8 lbs., 3 to 8 lbs. being the preferred range when employing high pressure steam which is customarily from 40 to 100 lbs. The high pressure steam passing through the heat exchanger is preferably condensed and the liquid is passed back to the boiler by the pump 27. It will be seen that in this manner steam is provided for the moistening of tobacco without being contaminated by the volatiles thereof.

In practice, the amount of steam added to the system through the line 14 for evacuation purposes is in the same neighborhood as the net

amount required in moistening the tobacco, although it is of course much less than the gross amount required for that purpose where several moistening steps are included in the treatment of a single batch of tobacco. However, if the condensate proves insufficient, make-up steam may be added from the boiler as required. On the other hand, if the condensate tends to build up material which is unvaporizable, or which reaches a concentration sufficiently high to raise the viscosity of the condensate undesirably, a stream may be bled from the condensate just sufficient to maintain the desired operating conditions. Suitably this may be done through the trap and draw-off line 23 in connection with the heat exchanger, the trap receiving the liquid when most concentrated. In this way it is sometimes possible to procure a draw-off liquid of commercial value.

What I claim as new, and desire to secure by Letters Patent, is:

1. In the treatment of tobacco, during which a high vacuum is drawn on the tobacco, the tobacco is steamed to raise its temperature and moisture content and is later subjected to an increased vacuum to reduce its moisture content, the steps of condensing water evaporated from the tobacco, re-evaporating it by heat exchange contact with steam, and utilizing the re-vaporized condensate for further moistening of tobacco.

2. The method as set forth in claim 1, in which the evacuation of water from the tobacco is induced by steam, and the steam used for this purpose is condensed with the water vapor from the tobacco.

3. The method as set forth in claim 1, in which the steam utilized to volatilize the condensate is recycled to a combustion source of thermal energy without admixture with any of the condensate.

4. Apparatus for the treatment of tobacco comprising an enclosed chamber, steam ejector means for evacuating the chamber, a boiler connected with the ejector and adapted to supply high pressure steam thereto, means connected with the discharge side of the steam ejector system for condensing the vapors therefrom, means for passing condensate in heat exchange relationship with steam from said boiler whereby the condensate is volatilized without contaminating the steam from the boiler, and means for admitting the revolatilized condensate to the vacuum chamber.

5. Apparatus as set forth in claim 4, in which means are provided for withdrawing a bleeder stream from the condensate.

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