

juice in the first pan, A', by means of the pipe R', which connects the hollow pillar K''' with the receiver P'; or it can be heated when the series of sirup-pans are not in operation, or when reboiling molasses by steam from the pipe Q', which branches off from the pillar K' at L', and which may be provided with a valve to shut off this connection when the striking-pan is to be heated by vapor from the first sirup-pan, A'. The vapor from the striking-pan A''' is drawn off and condensed by connecting the hollow pillar X' and valve l' with the condenser T' by means of the pipe d' and receiver X''', by means of which arrangement the last of the series of sirup-pans, as well as the striking-pan, are connected with the condenser, and this connection can be broken at pleasure by closing either of the valves m'', in the hollow pillar X''' or l' in pillar X'''. The saccharine juice is supplied to the first pan through the pipe o', governed by the valve p', and, after being partly concentrated under the highest degree of temperature, it is drawn into the second pan, A'', to be evaporated *in vacuo* through the pipe e', governed by the valve f', and from this it is transferred to the third pan, A''', to be still further concentrated through the pipe g', governed by the valve h', and from this it is delivered through the pipe i', governed by a valve, j', to the filters, in the usual manner; and from these it is drawn up and transferred to the striking-pan A'''' through the pipe q', governed by a valve, r', to be reduced to the striking or crystallizing point. But if only two sirup-pans should be used instead of three, then the sirup can be drawn off to the filters from the second pan, A'', through the pipe g' by closing the valve h' and opening the one h'', the third pan and all its connections being closed or dispensed with. Each of the chambers G' connected with the pans is provided with a cleansing and discharging pipe and valve, s'. By this arrangement it will be obvious that when the connection between the hollow pillar K', which conducts steam from a boiler (or the exhaust-steam from an engine) to heat the first pan, A', and the steam-pipe Q', that leads to the striking-pan A''', the striking-pan will be heated by a portion of the vapor of the saccharine juice in the first pan, A', by means of the connection between the receivers P' and S'', and that therefore the last of the series of sirup-pans, A'', can be connected with the condenser, and that the striking-pan can be worked independent of the sirup-pans in consequence of its connection with the steam-pipe L' or the first or second

of the series of sirup-pans in such manner that either of these connections can be broken at pleasure.

It will be obvious that this boiling or evaporating apparatus can be employed in connection with my improved heater and cooler by adopting the connections pointed out in the description of the entire apparatus.

Having thus pointed out the principle or character of my improvements and the manner of constructing and applying the same, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The method of heating the saccharine juice in a heater preparatory to its introduction in the evaporating-pans, by means of the waste hot water or escape steam from the evaporating-pans, substantially as described.

2. The method of clarifying saccharine juice by heating it in a heater provided with a spout for the discharge of the impurities in the form of scum, and a pipe for drawing off the clear liquid, the said pipe being so arranged as to receive the liquid from the heater below the level of the spout which discharges the scum, and then bending up above the said spout to cause the liquid in the heater to rise sufficiently high to discharge the scum, substantially as described.

3. The method of cooling and partially evaporating saccharine juice or other liquids by discharging the same in the form of spray or drops in a chamber, where it meets with a current of air, substantially as described; and this I also claim in combination with a condenser, substantially as herein described, whereby the liquid intended to be concentrated is prepared for the evaporating-pans and used as a means of condensing the vapor from the pans in which it is to be concentrated, or by means of which the water used for the condensing-jet is recooled, substantially as described.

4. The method, substantially as described, of combining a vacuum striking-pan with a series of evaporating-pans, the last of which is independent of the striking-pan, and the last of the series of evaporating-pans can be in connection with the condenser and work independently of each other, that either the striking-pan or the series of evaporating-pans can be worked without the other, as described.

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Witnesses:

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