A. L. BRINK.

Evaporating Pan.

No. 52,022. Patented Jan. 16, 1866.

Fig. 1.

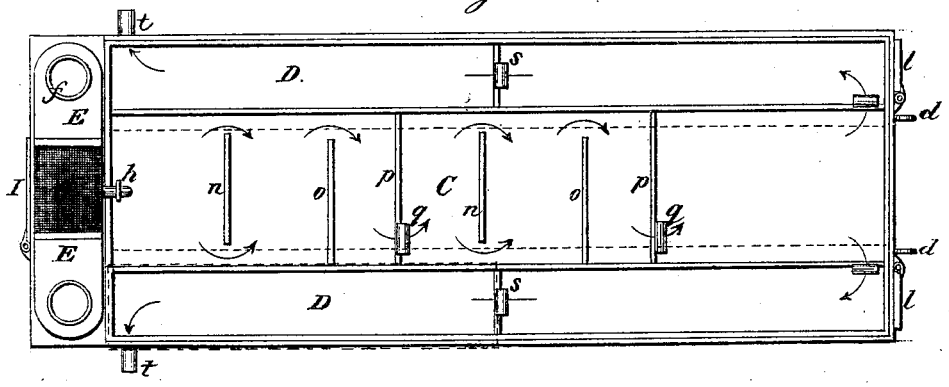


Fig. 2.

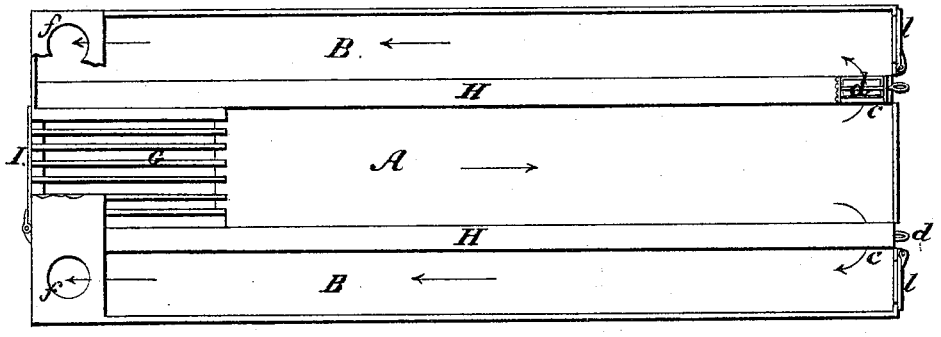
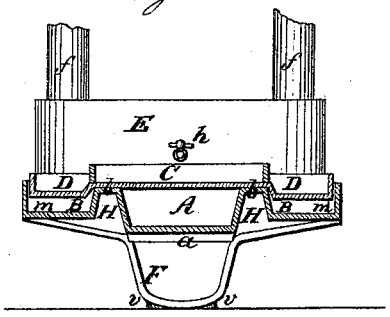


Fig. 3.



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UNITED STATES PATENT OFFICE.

ABRAM L. BRINK, OF WARREN, ILLINOIS.

IMPROVED SUGAR-EVAPORATOR.

Specification forming part of Letters Patent No. **52,022**, dated January 16, 1866.

To all whom it may concern:

Be it known that I, ABRAM L. BRINK, of Warren, in the county of Jo Daviess and State of Illinois, have invented certain new and useful Improvements in Sugar-Evaporators; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of an evaporator with my improvements. Fig. 2 is a plan of the furnace, the evaporating-pan and heating-reservoir being removed; Fig. 3, a central transverse section of the apparatus, showing the heating-reservoir in elevation.

Like letters of reference indicate corresponding parts in all the figures.

My invention consists in the combination of a sugar-evaporating pan divided into a central and two side compartments, having a communication with each other, with a furnace consisting of three flues corresponding with said compartments in hollow supporting-partitions between the flues of the furnace, upon which rest the central compartment of the pan, as hereinafter described, of transverse supporting-rockers, arranged in the manner specified, and in the arrangement of a heating-reservoir with the flues of the furnace, substantially as set forth.

In the drawings, A represents the central, and B B the side, flues of my furnace; C the central, and D D the side, compartments of my evaporating-pan, corresponding with and resting over the flues A B B; E, the heating-reservoir, and F one of the transverse rockers which support the apparatus.

The central flue, A, of the furnace is made deeper at its forward end, where the fire-grate G is placed, the bottom of the flue having a gradual inclination or rise to its rear end, so as to diminish the size of the flue, as less space is there required, this inclination being partially shown at *a* in Fig. 3. The side flues, B B, which may be made of the same size throughout, are separated from the central flue by the hollow supporting-partitions H H, which are formed by connecting the contiguous or adjacent sides of the flues, at their top, by a flat horizontal portion, *b*, upon which rests the central compartment, C, of the pan, and thus leaving an open air-space beneath, as shown in Fig. 3, for a purpose presently to be described. Communication is made from the central flue, at its rear, to the side flues, by means of short transverse flues *c c*, through the hollow partitions H, which are provided with dampers *d d*, Fig. 2, of any suitable construction, for regulating the draft through the same.

At the front end of the furnace, over both central and side flues, is situated the heating-reservoir E, through the ends of which pass the two upright pipes *f f*, through which escape the products of combustion from the side flues. This reservoir is provided with a strainer, *g*, at its top, through which the green juice is first strained, which removes any such impurities as sticks, portions of cane, &c. After being heated the juice is discharged through the faucet *h* into the front end of the compartment *c* of the evaporating-pan.

I is a door for the admission of fuel, and *l l* doors for cleaning the side flues.

The evaporating-pan is designed to be made of sheet-iron, and to closely fit inside of the sides of the furnace, and rest upon ledges *m m*, attached to said sides and the hollow partitions H H, as before described, as shown most clearly in Fig. 3.

The central compartment, C, is made of a width equal to, or a little more or less than, that of the central flue, A, and the flat portions *b b* of the hollow supporting-partitions, which may be made of varying width, from four to ten inches, as desired. By this construction the sides of the compartment C are subjected to a less degree of heat than the central portion, and to a reduction of temperature, owing to the width of the part *b* and the ready access and cooling effect of the air thereto from beneath. The compartment C is provided with the central ledges, *n n*, side ledges, *o o*, having a passage for the juice at one end only, and the partitions *p p*, having gates *q q*, for regulating or entirely preventing the flow of the liquid through the same from one division to the other. At the rear end of C are similar gates, *r r*, for regulating the admission of the partly-finished sirup into the side compartments, D. These compartments are also provided with partitions and gates *s s*, for like purpose of *p q*, and with outlet-pipes *t t*, for discharging the finished sirup.

The furnace is so constructed as to give the central compartment of the pan a declination backward of about one-eighth fall to the inch, while the side compartments require a similar

though a little greater inclination (owing to the greater density of the liquid,) in the opposite direction, so as to cause a ready flow of the juice through the compartments, and from one to the other, as may be required. The side compartments, one or both divisions, are provided with movable covers, of any suitable construction, to prevent the drippings, in skimming from the central compartment, from falling into the finished or nearly-finished sirup, as shown in red lines in Fig. 1.

The apparatus may be made of different sizes, as to length, width, &c., as occasion may require. It is supported on two or more rockers, F, Fig. 3, placed transversely, as represented, so as to form both a support for the apparatus and a brace to the side divisions of the same. These rockers, which may be made of angle-iron, enable the apparatus to be easily adjusted to a level by means of blocks *v v* placed under the former.

The furnace may be made of cast or sheet iron, or of both combined; and it may be partially or entirely lined on the inside with brick or other non-conducting material; or it may be constructed entirely of stone or brick, making the partitions H H solid walls, and thus dispensing with the use of the rockers F, as may be desired.

The operation of my evaporator thus constructed is as follows: The apparatus being properly adjusted, as above described, and a fire kindled, the green juice is let or poured into the heating-reservoir through the strainer *g*, where, after it has become partially heated, it is discharged in a continuous small stream, or at intervals, through the faucet *h*, into the front end of the central compartment of the evaporating-pan, when the boiling and evaporating process begins. It is then, by the ledges *n* and *o*, caused to flow to the sides and cooler portions of the compartment, as indicated by the arrows in Fig. 1, where the reduction of the temperature causes the impurities in the liquid to more readily rise to the surface, so that the same may be removed by skimming. It may be allowed to pass through the gates *q* of the partitions *p* either in a continuous or intermittent stream, as may be required, constantly skimming off the scum as fast as it rises. The juice is retained in the central compartment till evaporated to nearly the proper consistency, when it is allowed to flow through the gates *r r* into the side compartments, which are a little lower than the central one, as represented in Fig. 3, where it is finished in a deeper stratum and at a reduced temperature, less heat being required to boil the liquid at this stage of the process, the degree of heat being regulated by the dampers *d d*, and more care required to prevent the sirup from scorching. When the sirup is finished it is drawn off through the pipes *t t*.

The following are the advantages of my improvements:

First, the arrangement of the heating-reservoir, which extends over all the flues, so as to receive heat not only from the central one but also from the return-flues and escape-pipes, utilizes a considerable amount of heat that would otherwise be wasted; and, secondly, by previously heating the juice, causes the boiling process to commence immediately upon its entrance into the pan.

Second, the overlapping or extension of the central compartment of the pan beyond the sides of the central flue, so as to subject those portions to a less degree of heat, thereby greatly facilitates the rising of the impurities, and consequently their removal from the boiling liquid.

Third, the construction of the hollow supporting-partitions H H allows the free access and circulation of the air to the under side of *b*, which diminishes the temperature of the side portions of the central compartment of the pan resting thereon.

Fourth, the division of the pan into three compartments, in connection with the corresponding flues of the furnace, enables the sirup to be finished in a larger space and deeper stratum, and at the reduced temperature so essential to prevent scorching or burning, the partitions and gates enabling the flow of the juice to be easily regulated, as may be required.

Fifth, the rockers F form a simple, cheap, and substantial support and brace for the apparatus, and enable the pan to be readily adjusted to the required level, as before described.

Sixth, its great economy, as the use of my improvements effect a saving of one-half of the fuel ordinarily required in the use of other evaporators.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the central and side compartments, C D D, with the corresponding central and side flues, A B B, arranged substantially in the manner and for the purposes set forth.

2. The extension of the compartment C beyond the sides of the central flue and over the hollow partitions H H, substantially as and for the purposes described.

3. In combination with a furnace consisting of the central flue, A, and side flues, B B, the transverse supporting-rockers F as a means of strengthening and sustaining the side divisions of the apparatus and readily adjusting the level of the pan, substantially as set forth.

4. The hollow supporting-partitions H H between the central and side flues, in combination with the central compartment, C, constructed and arranged as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ABRAM L. BRINK.

Witnesses:
PHEBE WRIGHT,
ALICE F. WRIGHT.