2 Sheets—Sheet 1.

H. G. SEEBER.

Apparatus for Drying Grain.

No. 202,124. Patented April 9, 1878.

Fig. 1

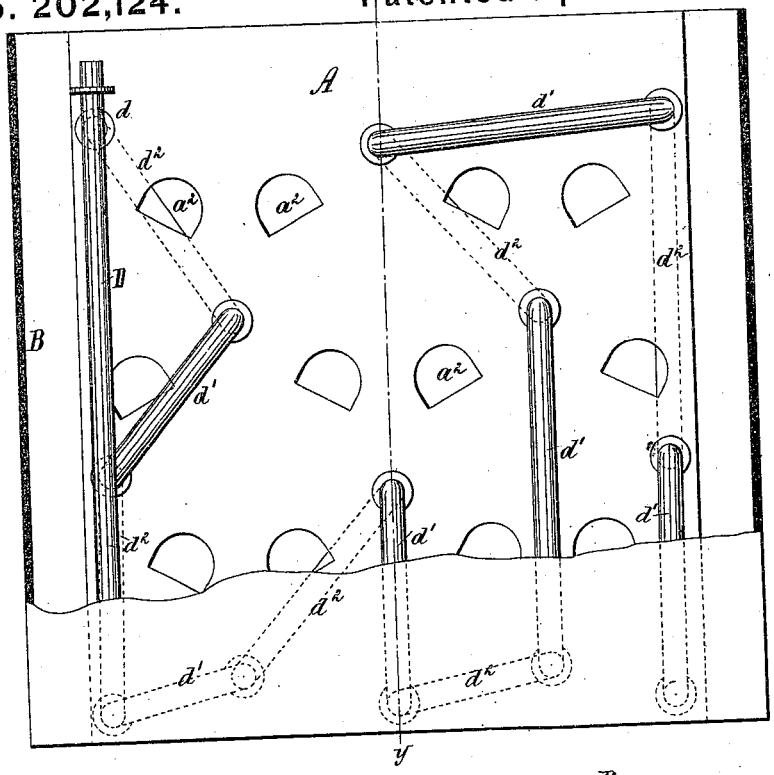

Fig. 2.

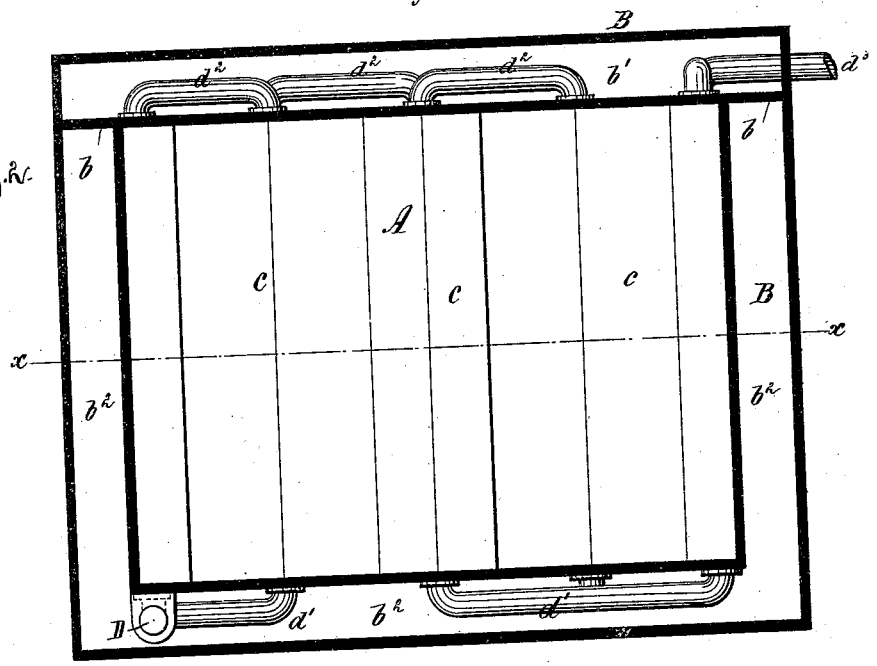

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Fig. 3.

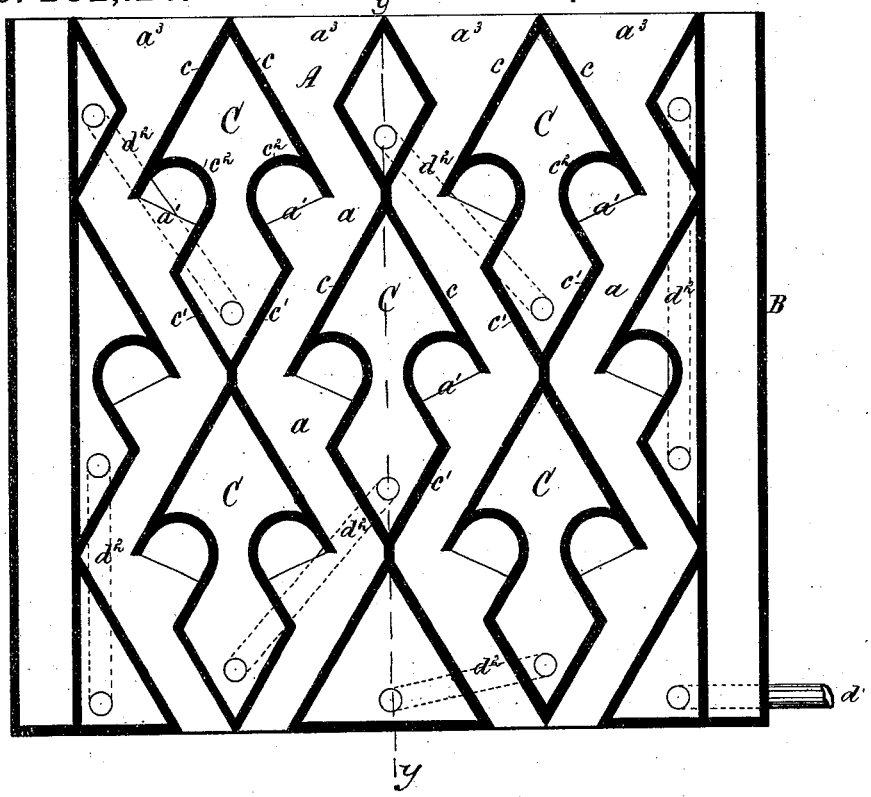
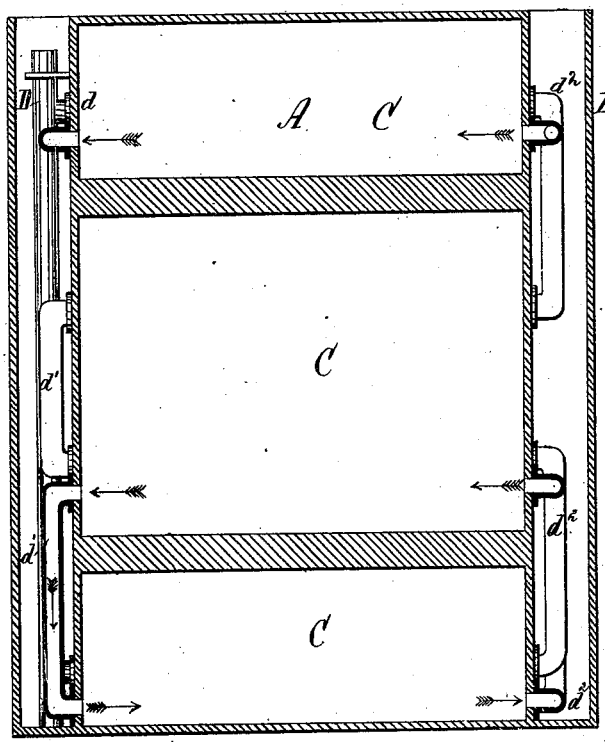


Fig. 4.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN APPARATUS FOR DRYING GRAIN.

Specification forming part of Letters Patent No. **202,124**, dated April 9, 1878; application filed March 4, 1878.

To all whom it may concern:

Be it known that I, HORATIO G. SEEBER, of the city of Brooklyn, county of Kings, State of New York, am the inventor of an Improved Apparatus for Drying Grain, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an apparatus for drying grain; and it consists in a chamber of any desired height, having within it, extending from end to end, series or sets of steam-cells, constructed in the peculiar form, and arranged in relation to each other, in the manner hereinafter described, so as to form separate and continuous zigzag vertical channels through the chamber, with spaces, as hereinafter set forth, communicating with said channels, together with apertures in the chamber-walls, at one or both ends, opening from said spaces, whereby grain entering the chamber at the top will fall through the said separate zigzag channels, and without accumulating at any part or point in said channels, and will be heated by the surfaces of the steam-cells, and the moisture given off by the grain will be collected in the spaces communicating with said channels, as named, from whence the moisture may be conducted away through the apertures in the end walls of the chamber.

My invention also consists in the combination, with this chamber, constructed and arranged as described, of an exterior chamber, arranged outside of said drying-chamber, and inclosing a space between the chambers, the said exterior chamber being provided with a partition, which cuts off one end of the outer chamber from the sides and opposite end thereof, so that a current of air drawn through the outer chamber will be somewhat warmed, and may be thence drawn through the apertures in the walls of the drying-chamber, and through the spaces communicating with the grain-channels, and out of the apertures in the opposite wall into the inclosing-chamber on that end which is partitioned off from the other portions, from whence it may be conducted from the apparatus, the current of air thus aiding to ventilate the apparatus and carry off the moisture given off by the grain.

Figure 1 is an end elevation of a grain-drying apparatus embodying my invention, showing an inclosing outer chamber, one end wall of which is partly removed to disclose the end wall of the drying-chamber, with its apertures. Fig. 2 is a plan of my apparatus. Fig. 3 is a vertical central sectional view of the same on the line *x x*, Fig. 2, showing the peculiar form and arrangement of the steam-cells, and the separate channels through which the grain passes, and their communicating spaces. Fig. 4 is a similar view of the same on the line *y y*, Figs. 1 and 3.

A is the drying-chamber, which may be of any desired height. Within this chamber, extending from one end to the other thereof, are the steam-cells C. These cells are constructed with the upper walls *c* diverging or inclined outwardly from an apex, as shown in Fig. 3, and the under or lower faces c^1 inwardly inclined and meeting at the apex of the cell immediately beneath. The under faces c^1 are formed with the inwardly-turned deep curves c^2, beginning at the lower extremity of the upper face on each side, as shown plainly in Fig. 3. The cells have thus an irregular lozenge shape in the outline of their cross-section.

The cells are arranged one above another in sets, joined at their apices, and the several sets are so placed in the chamber that the lower edge of the upper faces of the cells of one set are in line horizontally with the apices of the cells of the adjoining sets, as seen in Fig. 3. Thus the spaces between the sets of adjoining cells form irregular or zigzag vertical channels *a* from the top to the bottom of the chamber, and said channels are separate and distinct from each other throughout their entire length, and without communication from one to another.

The curves c^2 in the lower faces of the steam-cells inclose and form spaces a^1, communicating with said channels immediately over the upper faces *c* of each cell.

Apertures a^2 are formed in one or both of the end walls of the chamber A, opening through the walls at the extremities of the spaces a^1, as shown.

The upper ends of the channels *a* are widened into throats a^3, by suitably forming the alternate steam-cells in the top row, as shown, so that the grain may freely enter the channels.

The steam-cells may be supplied with steam by a pipe, D, which opens into one of the cells, as at *d*. By means of connecting-pipes running from one cell to another alternately on opposite ends of the chamber, as seen respectively at d^1 and d^2, the steam is circulated through all the cells, and finally escapes at d^3. The pipe D and connections d^1 d^2 are arranged on the exterior of the chamber, as shown.

Grain entering the chamber passes down through the channels *a* in unbroken and continuous columns over the faces of the steam-cells, which are heated by the contained steam. As the grain flows through the channels it gives off its moisture in its passage over the successive faces *c* of the steam-cells, and the moisture will rise and collect in the several spaces a^1, from whence it will escape through the apertures a^2. To assist in the escape of the moisture, the apertures on one end may be connected with pipes or flues leading to a single flue opening into an exhaust-fan, when the movement of the fan will operate to exhaust the moisture. When the apertures a^2 are made in both end walls of the chamber, and the fan is employed, as stated, at one end, a current of air may be drawn through the chamber along the spaces a^1.

B is an outer chamber, which may be arranged to surround the chamber A and inclose the same, leaving a space between the chambers. A partition, *b*, is arranged in this chamber B, as shown, to divide or separate it into two parts, b^1 and b^2, Fig. 2, the part or portion b^1 inclosing one end of the chamber A, and the portion b^2 inclosing the other end and the two sides of said chamber A.

Now, it is evident that air may be drawn through the portion b^2 of the chamber B, and thence through the chamber A by the apertures a^2, and out into the portion b^1 of the chamber B, and from thence be conducted away. By this means the air circulated through the chamber A will be somewhat warmed first in the chamber B by contact with the steam-pipes and the heated walls of the chamber A, and will not be liable therefore to chill the grain when brought in contact with it in the spaces a^1.

By means of my apparatus, constructed as specified, the grain is prevented from accumulating or choking in the channels, and from lying therein in masses and overheating, a continuous movement in layers of uniform thickness being secured.

I am aware that a grain-drier has been constructed containing triangular steam-cells, arranged to allow the grain to pass down over two inclined sides of each cell, for which Letters Patent No. 144,710 were issued to Asahel Soper, November 18, 1873, and disclaim, so far as this specification is concerned, all that is described or shown in said patent.

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

1. A grain-drying apparatus composed of the chamber A, provided with the steam-cells C, having the outwardly-inclined upper faces *c* and inwardly-turned curves c^2 in the lower faces c^1, arranged as described, to form the distinct and continuous irregular vertical channels *a* and the spaces a^1, communicating therewith, together with the apertures a^2 in one or both of the end walls of said chamber, all constructed and arranged to operate as and for the purpose specified.

2. In a grain-drying apparatus, the chamber A, provided with the steam-cells C, constructed with the inclined faces *c* and c^1 and curves c^2, as described, and arranged to form the distinct and continuous irregular vertical channels *a* and spaces a^1 communicating therewith, together with the apertures a^2 in the end walls of the chamber, in combination with an inclosing-chamber, B, having the partition *b*, arranged as described, and to operate as and for the purpose specified.

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