S. C. KENAGA.

Grain Dryer.

No. 97,650. Patented Dec. 7, 1869.

Fig. 1

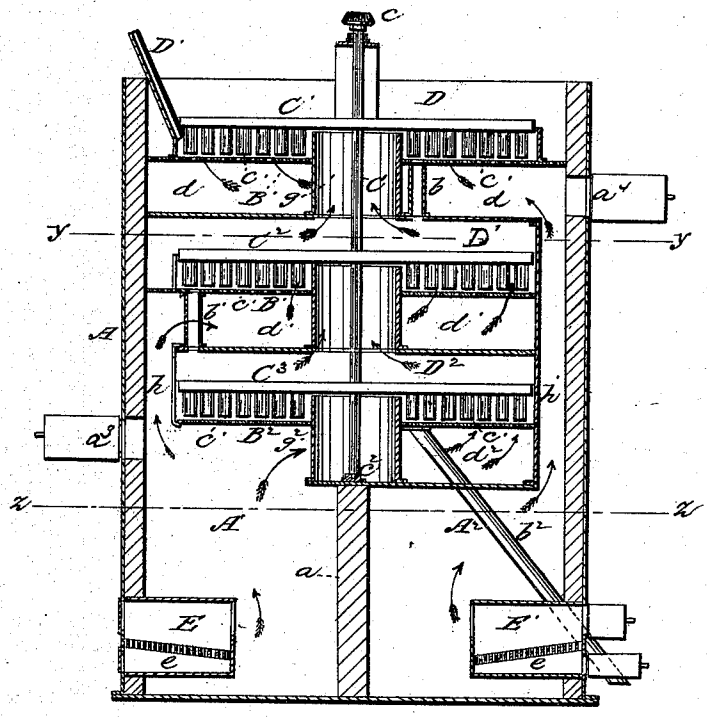


Fig. 2

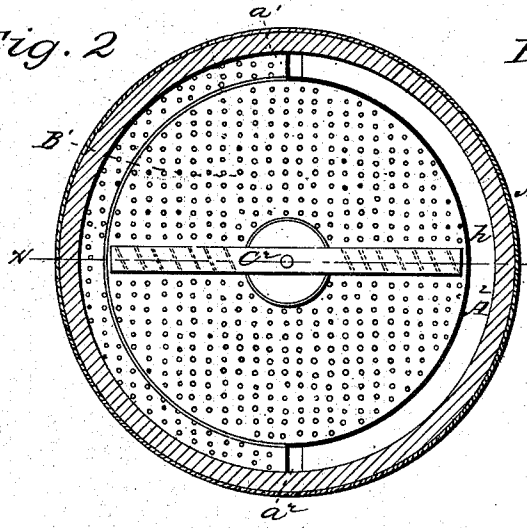
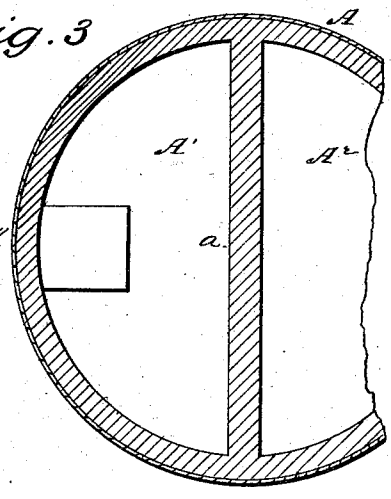


Fig. 3



Witnesses:

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Inventor:

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Per McGill, Graupta & Attys

# United States Patent Office.

S. C. KENAGA, OF KANKAKEE, ILLINOIS.

*Letters Patent No.* 97,650, *dated December* 7, 1869; *antedated November* 27, 1869.

## GRAIN-DRIER.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, S. C. KENAGA, of Kankakee, in the county of Kankakee, and State of Illinois, have invented certain new and useful Improvements in Grain-Driers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a vertical section of my improved grain-drier at the line *x x* of fig. 2, the conveyer-shaft and conveyers being shown in elevation;

Figure 2, a horizontal section of the same, at the line *y y* of fig. 1; and

Figure 3, a similar section at the line *z z* of fig. 1.

The object of my invention is to provide suitable means for thoroughly drying grain, in such manner that heat can be applied uniformly to the whole mass thereof, or to any desired degree to different portions thereof, at pleasure; to which ends,

My improvements consist in a case or chest divided by partitions into vertical compartments, and provided with a number of perforated drying-floors, one above the other, over each of which a suitable conveyer rotates.

Fire-boxes, or heaters, are placed at bottom of the different compartments, and the heated air therefrom, passing through the flues, flue-spaces, and perforated floors, dries the grain spread thereon by the conveyers.

Each compartment is provided with a ventilating-door, by means of which the amount of heat may also be regulated by the admission of cooler air at pleasure.

In the accompanying drawings, which show a convenient arrangement of parts for carrying out the objects of my invention—

A represents a cylindrical case or chest, which may be composed of brick or metal, lined with suitable material to prevent transmission of heat, and is divided, by the partitions $a$ $a^1$ $a^2$, into two vertical compartments, $A^1$ $A^2$.

In the case A, above the compartments $A^1$ $A^2$, are cylindrical chambers D $D^1$ $D^2$, having minutely-perforated floors B $B^1$ $B^2$, arranged one above the other, and separated by flue-spaces $d$ $d^1$.

The lower chamber $D^2$ has a flue-space, $d^2$, under that portion of it which is over the compartment $A^2$, so as to keep this last and the chamber $D^2$ completely separated, which flue-space $d^2$, as well as $d^1$, connects with the compartment $A^1$.

The upper flue-space $d$ communicates with the division $A^2$ through the flue $h$.

From the centres of the plates $f$, forming the tops of the chambers D $D^1$ $D^2$, and the bottoms of the flue-spaces $d$ $d^1$ $d^2$, the cylinders or chimneys $g$ $g^1$ $g^2$ rise, so as to form, with the cylindrical casing of the chambers D $D^1$ $D^2$, an annular space on the perforated floors B $B^1$ $B^2$, and are the only means of communication between the chambers D $D^1$ $D^2$, and the external air at the top of the apparatus.

A central conveyer-shaft, C, bearing in a step, $c^2$, on the partition $a$, is rotated by the application of power to the bevel-wheel $c$ on its upper end, and carries conveyers $C^1$ $C^2$ $C^3$, provided with inclined blades $c^1$, the conveyers being secured upon the shaft in such position as to rotate in close proximity to the upper surfaces of the respective drying-floors in the annular spaces between the casings of the chambers D $D^1$ $D^2$, and the chimneys $g$ $g^1$ $g^2$.

The grain is supplied to the upper floor B, through the feed-spout $D^1$, near its periphery, and the blades of the conveyer $C^1$ are inclined in such direction as to spread the grain over its surface, and discharge it through the spout $b$, near its centre, through which it passes to the floor $B^1$.

The blades of the conveyer $C^2$, which rotate above the floor, being inclined in contrary direction, sweep the grain from the centre to the periphery, and discharge it through the spout $b^1$ to the floor $B^2$, whence it is discharged by the conveyer $C^3$, whose blades are inclined similarly to those of $C^1$ through the delivery-spout $b^2$, to be packed or removed.

Any desired number of drying-floors may be employed, and by the alternate centrifugal and centripetal action of the conveyers, it will be seen that the grain is thoroughly stirred and spread over a large extent of surface, to be exposed to the action of the heat.

Fire-boxes, or heaters E $E^1$, having grates $e$ suitable for burning coal or coke, are arranged in the compartments $A^1$ $A^2$ respectively, and if more than two compartments should be made, each must be provided with a separate heater.

The heated air from the heater E, as indicated by the arrows, ascends through the compartment $A^1$, from thence through the flue $h$ and flue-spaces $d^2$ and $d^1$, up through the perforations of the floors $B^2$ and $B^1$, dries the grain thereon, and then passes off through the chimneys $g$ $g^1$ $g^2$.

The heated air from the heater $E^1$, as also indicated by the arrows, ascends through the compartment $A^2$, from thence through the flue $h^1$ and flue-space $d$, up through the perforations of the floor B, dries the grain thereon, and passes off through the top of the drier.

By this arrangement of parts, the heat applied to the grain on the floor B, can be regulated to any degree desired, without interfering with that applied to the grain on the floors $B^1$ and $B^2$, and *vice versa*.

Openings, which can be closed at pleasure by the ventilating-doors $a^3$ $a^4$, are made in the compartments

$A^1$ $A^2$, for the purpose of admitting cool air, to lower the temperature thereof when necessary.

I do not confine myself to the precise number of drying-floors and compartments herein shown, as such can be varied, without affecting the principle of my invention.

Different degrees of heat can be applied to the floors by proper regulation of the fires in the respective heaters, and the doors $a^3$ $a^4$ enable the temperature to be lowered if it should exceed proper limits.

Having thus fully described my invention,

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

The heating-compartments $A^1$ $A^2$, with their flues $h$ $h^1$, and flue-spaces $d$ $d^1$ $d^2$, in combination with the perforated drying-floors B $B^1$ $B^2$ of the chambers D $D^1$ $D^2$, the centrifugal and centripetal conveyers, $C^1$ $C^2$ $C^3$, chimneys $g$ $g^1$ $g^2$, and ventilating-doors, $a^3$ $a^4$, all arranged and operating substantially as and for the purpose herein set forth and described.

In testimony that I claim the foregoing invention, I have hereunto set my hand, this 8th day of February, 1869.

S. C. KENAGA.

Witnesses:

WARREN R. HICKOX,

JAMES MCGREW.