No. 663,418. Patented Dec. 11, 1900.

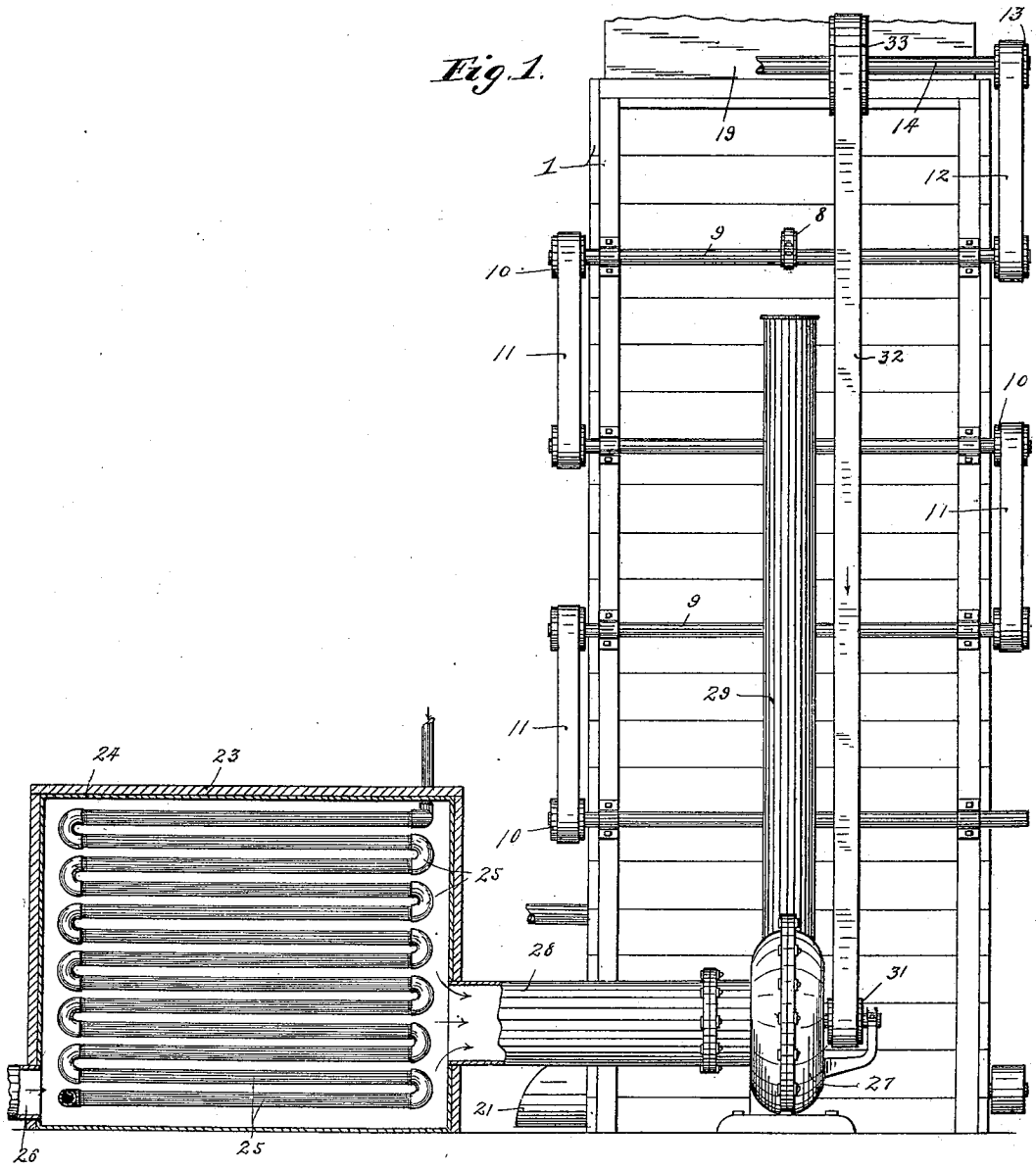
J. COOK.

GRAIN DRIER.

(Application filed Dec. 12, 1898.).

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses.
Harry Kilgor.
F. D. Merchant

Inventor.
John Cook.
By his Attorney.
Jas. F. Williamson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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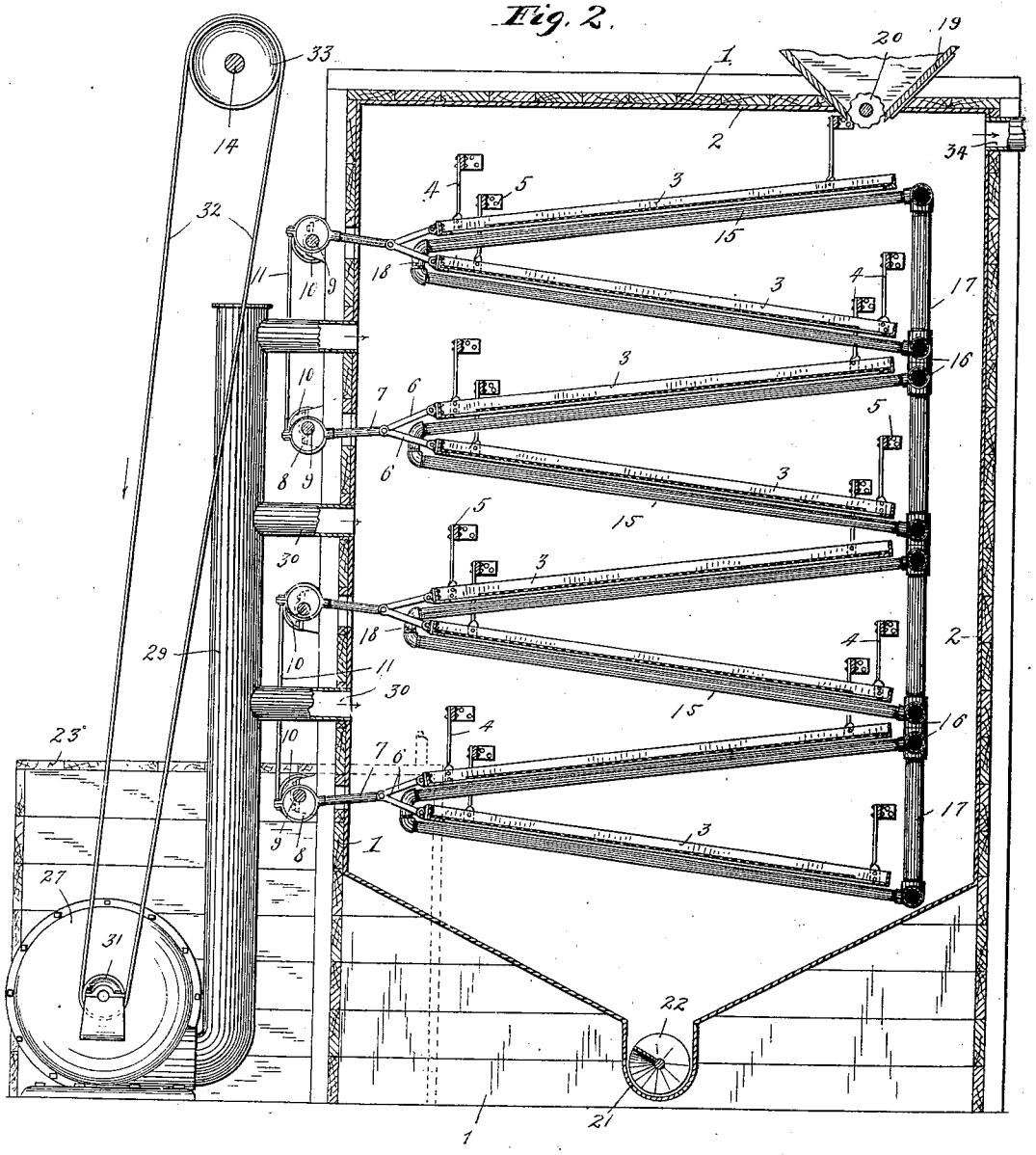
J. COOK.

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(Application filed Dec. 12, 1898.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 2.



Witnesses
Harry Kilgus
F. D. McCrehan

Inventor
John Cook.
By his Attorney.
Jas. F. Williamson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

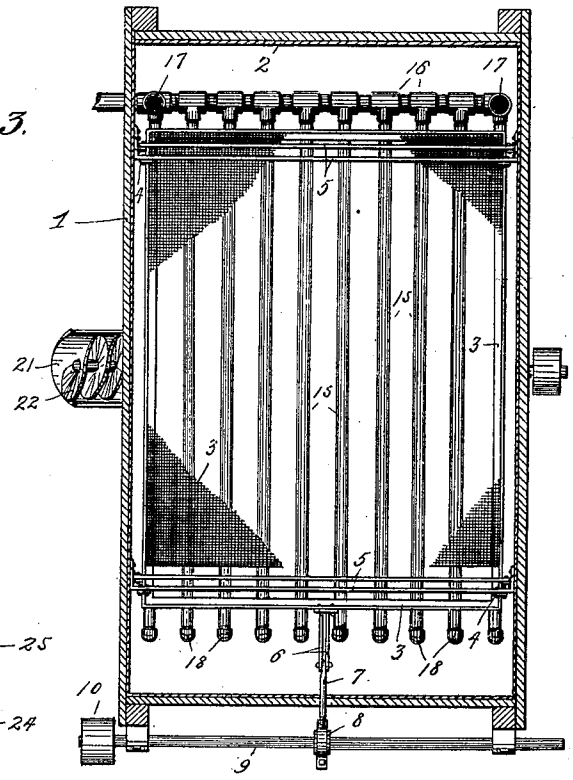
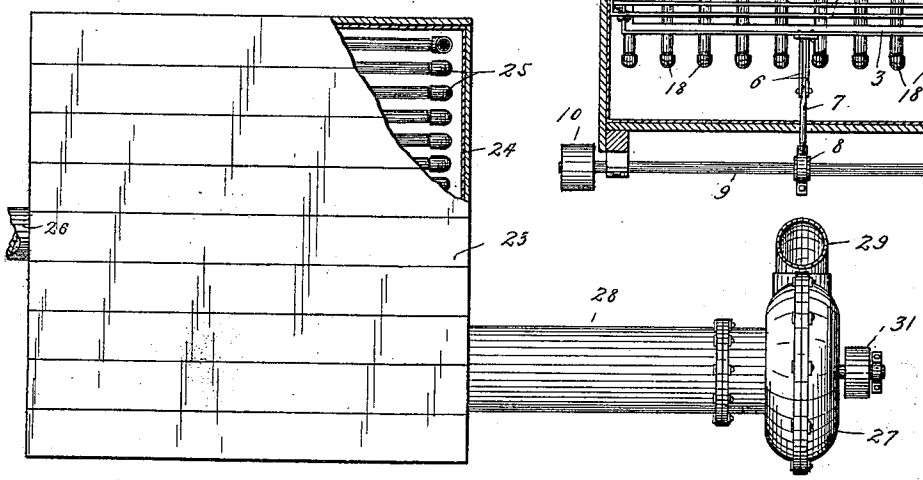


Fig. 4.



Witnesses.
Harry Kilgore.
F. D. Merchant.

Inventor.
John Cook.
By his Attorney.
Jas. F. Williamson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN COOK, OF GRAFTON, NORTH DAKOTA.

GRAIN-DRIER.

SPECIFICATION forming part of Letters Patent No. 663,418, dated December 11, 1900.

Application filed December 12, 1898. Serial No. 698,985. (No model.)

To all whom it may concern:

Be it known that I, JOHN COOK, a citizen of the United States, residing at Grafton, in the county of Walsh and State of North Dakota, have invented certain new and useful Improvements in Grain-Driers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved grain-drier.

To this end my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claim.

The invention is illustrated in the accompanying drawings, wherein like notations refer to like parts throughout the several views.

Figure 1 is a view showing the drier in end elevation and the air-heater in vertical section with some parts broken away. Fig. 2 is a view showing the drier in vertical section lengthwise of the shaking tables or screens and showing the heater and fan in elevation. Fig. 3 is a view in horizontal section through the drier, showing one of the shaking tables or screens and the underlying heating-pipes in plan view with some portions broken away, and Fig. 4 is a plan view of the air-heater and fan with some parts broken away.

Within a suitable closed casing, shown as made up of an ordinary wooden framework 1, having a sheet-iron lining 2, I mount a series of shaking-tables 3, preferably in the form of fine meshed screens or riddles. These shaking-tables 3 are mounted one over the other in a common vertical plane, with the alternate members reversely inclined and the screen-surface cut away at the proper ends for adapting the tables to receive from each other in succession under the action of gravity. As shown, the shaking tables or screens 3 are suspended by spring-bar hangers 4 from cross-bars 5, secured to the casing 1 2 in the proper position. These cross-bars 5 also serve to strengthen the frame. The convergent ends of each pair of tables 3 are connected by pivoted links 6 to the inner ends of eccentric-rods 7, projecting from straps mounted on eccentrics 8, carried by a series of shafts 9, which are mounted in suitable bearings at one end of the framework, as best shown in Figs. 1 and 2. The said shafts 9 are kept in continuous motion in any suitable way. As shown, the said shafts 9 are provided with pulleys 10, and the series of shafts 9 have their respective pulleys 10 connected by suitable belts 11 for receiving motion from belt 12, which engages a pulley 13 on the constantly-running counter-shaft 14, as best shown in Fig. 1.

Directly underneath the series of shaking tables or screens 3 are located a corresponding series of manifold heating-pipes 15, with the said manifolds 15 arranged parallel to the shaking-tables 3 and in close juxtaposition thereto, but not in contact therewith. The manifolds 15 therefore take the same disposition or zigzag arrangement in respect to each other as the shaking-tables 3. The manifolds 15 are all connected together at their convergent ends and at their divergent ends connect to headers 16, which in turn connect with vertical pipes 17, located at one side of the casing. The pipes 17 are provided with suitable connections (not shown) for affording a continuous circulation therethrough of a proper heating medium, such as steam or hot water, preferably steam. The manifolds 15 do not have their respective members connected in the horizontal plane at the convergent ends of said manifolds; but the corresponding members of convergent manifolds are connected at their convergent ends, as above stated, by suitable unions 18. This leaves clearance between the connected pipes of the successive manifolds 15 for the passage and free action of the links 6, which connect the shaking-tables to the eccentric-rods 7. The shaking tables or screens 3 have frames of proper form to hold the grain thereon while traveling over the screen-wire or other bottom surface of the table. As shown, the said screen or table frames are made up of angle-bars suitably secured together.

The wet grain is supplied to the drier at the head end of the top member of the shaking tables or screens 3 in any suitable way. As shown, it is assumed to be supplied through a suitable feed-hopper 19, supplied with a forced feed-roll 20. The bottom of the sheet-iron lining of the casing is shown as of the proper shape and as terminating in a con-

veyer-trough 21, supplied with a suitable conveyer 22 for conducting off the grain after being dried to any point desired.

At some convenient point, preferably near the drier, I provide a suitable air-heater, which, as shown, comprises a casing composed of a wooden framework 23, having a sheet-iron lining 24. Within said casing 23 24 is located a suitable heating-coil 25 with proper connections for circulating therethrough a suitable heating medium, such as steam or hot water, preferably steam. The casing 23 24 is provided with an air-inlet 26.

Intermediate the air-heater and the drier I provide a suction-fan 27, having its receiving end or intake connected by pipe 28 with the air-heater and its delivery end connected to a pipe 29, which extends upward parallel to the convergent ends of the shaking-tables 3 and the heating-manifolds 15 within the drier. The said pipe or delivery-spout 28 of the fan 27 is closed at its upper end and is provided with a series of branch pipes 30, which tap the wall of the drier in proper positions to deliver the air between the successive pairs of shaking-tables 3. The fan-pulley 31 is shown as connected by belt 32 with the pulley 33 on the constantly-running shaft 14.

The pipes for circulating the steam through the drier and the pipes for circulating the steam through the air-heater are of course in practice provided with suitable steam-pipes (not shown) in the customary way.

The operation of the apparatus above described will be readily understood. The meshes or perforations in the bottoms of the shaking tables or screens 3 are sufficiently fine to prevent the grain from passing therethrough. Hence the wet grain supplied from the hopper 19 at the top of the drier will pass in succession over the series of shaking tables or screens 3 and drop from the end of the lowermost table or screen 3 to the bottom of the casing and into the conveyer-trough 21. The manifolds 15 directly underlying the tables 3 within the drier supply a large amount of radiation in close juxtaposition to the sheet of grain moving over the bottoms or wire surfaces of the screens. At the same time the fan delivers continuously-forced currents of hot air from the air-reheater into the drier at points properly located to insure the circulation of air through the screens and over the moving sheet of grain. The air thus supplied from the fan to the drier finds escape through the outlet-pipe 34 and into the top of the drier. The grain thus being constantly subject to the shaking-screens is kept in agitation, so as to loosen up the same and present all surfaces thereof to the action of the heat supplied by radiation from the manifolds 15 and to the action of the hot air supplied from the fan and the air-reheater.

It must be obvious, therefore, that this mechanism is highly efficient for the purpose had in view.

By actual usage I have demonstrated the efficiency of the machine and have found that a large capacity is secured with a comparatively small amount of surface as compared with other machines now in use so far as known by me. For example, with the machine as illustrated in the drawings, which drawings are on the scale of a little more than one inch to the foot, I have in actual practice found that I can dry over eighty bushels of wet grain per hour.

It will be understood, of course, that the invention herein disclosed is capable of a considerable range of modification in construction without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

In a grain-drier, the combination with the series of shaking-screens 3 mounted one over the other in zigzag arrangement, in a common vertical plane, the radiators in the form of the manifolds 15 underlying said screens with the members of successive manifolds connected at their convergent ends and all the manifolds connected at their divergent ends with headers united by suitable circulating-pipes, the series of eccentric bearing-shafts, the eccentric straps or rods and the pairs of links connecting each eccentric-rod with a pair of said shaking-screens at the convergent ends thereof and working between the connected convergent ends of successive manifolds, all substantially as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN COOK.

Witnesses:
A. E. COBB,
CHAS. A. HARRIS.