

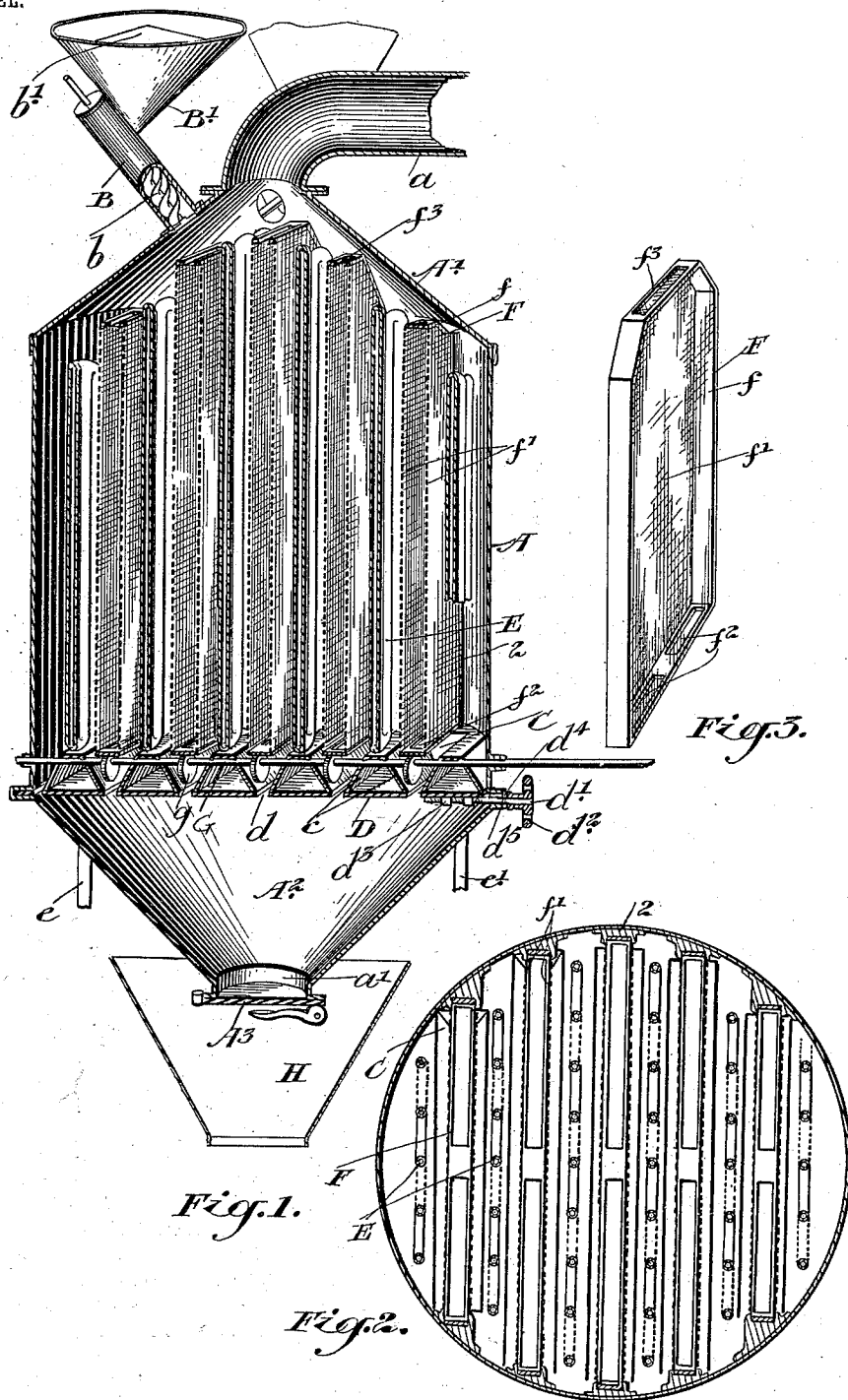
No. 748,079.

PATENTED DEC. 29, 1903.

J. G. KING.
GRAIN DRIER.

APPLICATION FILED JAN. 28, 1903.

NO MODEL.



Witnesses.

H. S. Gentry.
R. Shields

Inventor:

J. G. King
 Prof. Feltner Staughton & Co. Messrs.

UNITED STATES PATENT OFFICE.

JOSEPH GOODWIN KING, OF PORT ARTHUR, CANADA.

GRAIN-DRIER.

SPECIFICATION forming part of Letters Patent No. 748,079, dated December 29, 1903.

Application filed January 28, 1903. Serial No. 140,923. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH GOODWIN KING, of the town of Port Arthur, in the district of Algoma, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Grain-Driers, of which the following is a specification.

My invention relates to improvements in grain-driers; and the object of the invention is to devise an apparatus whereby grain or other substances or material containing moisture in a more or less degree may be rapidly and economically dried; and it consists, essentially, of a casing, a plurality of heat-radiators, and double screens, preferably alternately and vertically arranged above suitable hoppers, the top of the casing being provided with feeding-spouts for the grain and an exhaust-spout for drawing off the air and the bottom being provided with a suitable slide to shut off the bottom of the hoppers and a suitable gate to close off the funnel-shaped bottom, the parts being arranged and constructed in detail as hereinafter more particularly explained.

Figure 1 is a sectional perspective view showing my improved drier. Fig. 2 is a sectional plan. Fig. 3 is a detail of the steam-conducting screen or duct.

In the drawings like characters of reference indicate corresponding parts in each figure.

A is the casing, which is preferably made circular, and A' is the cone-frustum-shaped top and A² the cone-frustum-shaped bottom. The top A' is provided with an exhaust-tube a, which is suitably connected to the center of the top, and the top may be made so that it may be readily removed, but is so connected to the top of the casing that it will be hermetically sealed.

B represents a series of feed-tubes which extend into the top A' and are preferably provided with worm conveyers b. The top of the feeding-tube is provided with a funnel B', into which it is designed to feed the grain, and the funnel is interiorly provided with a suitable cover b', whereby the feed-tube and funnel may be hermetically sealed. There may be as many feed-tubes and funnels as may be found convenient and their location

in the top may be made as found most desirable.

The cone-frustum-shaped bottom is provided at the center with a suitable gate A³, whereby the orifice a' may be hermetically sealed.

C represents a series of crosswise-extending hoppers which are tapered from the top to the bottom, being narrower at the bottom. The walls of the hoppers I designate c.

D is a slide provided with a series of openings d, which are designed so that they may be brought to register with the bottom of the hoppers C, as indicated in the drawings.

d' is a spindle which extends through the casing and is provided with a hand-wheel d². The inner end of the spindle is threaded and extends through lugs d³, correspondingly threaded.

d⁴ is a pin which extends into an annular groove d⁵ in the spindle d'.

It will now be seen by turning the hand-wheel d² the slide D, which is supported in suitable ways, may be adjusted so as to open or close the bottom of the hopper C.

E represents a plurality of heat-radiators located between the hoppers C and vertically arranged. The radiators are connected together by communicating pipes and are provided at one end with a steam-inlet pipe e and at the opposite end with a steam-outlet pipe e', which preferably extend through the bottom of the casing.

F represents a plurality of screens comprising the bounding edges f and the fine-wire sides f' f'. The bottom edge has openings f² in the same and the top edge openings f³. The side edges of the screens are supported in suitable guideways 2. The screens F are located above the center of the hopper, leaving sufficient space between the bottom edges of the screens and the hopper so as to permit of the ready passage of the grain or other material.

G is a spindle which extends centrally through the hoppers underneath the screens and is provided with an eccentrically-arranged wheel g underneath each screen. The spindle G is caused to rotate in any suitable manner so as to impart a vertical vibratory

movement to the screens. I may dispense with this vibratory movement; but in some classes of material it is very essential that I should use it in order to insure of the descent of the material into the hoppers.

H is a receiving-hopper located beneath the gate A³. This hopper may be in the form of a trough or conduit or any other suitable form and is designed to carry off the dried grain or material.

Having now described the principal parts involved in my invention, I shall briefly describe its operation and utility. The slide D is manipulated by the hand-wheel so as to close the hoppers and the gate A³ is hermetically sealed. The damp grain is then fed in through the feed-tubes B, so that it fills the spaces between the screens and radiators. The feed-tubes are hermetically sealed by the covers or caps b'. The heat passing through the radiators now serves to dry the grain and necessarily in so drying the steam arises from such grain, such steam passing through the mesh of the screens and ascending through the top openings f³ of the screens. An exhaust air or vacuum pump of any suitable form is applied to the end of the tube a, so as to render the interior of the casing *in vacuo* and at the same time serves to draw off the steam through the heated screens. It will thus be seen that such grain may be dried very rapidly on account of the spaces produced, by the screens allowing of the radiation of the heat, and the passing off of the steam through the various layers of grain between the screens and the radiators.

Although I show a parallelly-arranged form of radiators and screens alternately arranged, it will be readily understood that the form of the air-spaces formed by the screens may be readily varied as well as the forms of the radiators, the essential object being to produce a plurality of heat-radiators and ducts to carry away the steam intersticed throughout the body of the grain, and I wish it to be understood that I do not wish to limit myself to the form in which I have shown the heaters in the radiator nor the form in which the ducts are shown, as these may be changed without departing from the spirit of this invention.

What I claim as my invention is—

1. In a grain-drier, the combination with the casing and a plurality of hoppers at the lower end thereof, of heaters located between the hoppers, and steam-ducts located above the hoppers as and for the purpose specified.

2. In a grain-drier, the combination with the casing and a plurality of hoppers at the lower end thereof parallelly arranged, of heaters located between and extending vertically above the hoppers, and steam-ducts located above the hoppers as and for the purpose specified.

3. In a grain-drier, the combination with

the casing and a plurality of hoppers at the lower end thereof parallelly arranged, of heaters located between and extending above the hoppers, and double screens having openings in the bottom edge, and openings in the top edge and located above the hoppers as and for the purpose specified.

4. In a grain-drier, the combination with the casing and a plurality of hoppers at the lower end thereof parallelly arranged, of heaters located between and extending above the hoppers, and double screens having openings in the bottom edge, and openings in the top edge and located above the hoppers, and suitable guideways for the side edges of the screens as and for the purpose specified.

5. In a drier, the combination with the casing and a plurality of hoppers at the lower end thereof parallelly arranged, of heaters located between and extending above the hoppers, and double screens having openings in the bottom edge, and openings in the top edge and located above the hoppers and suitable guideways for the side edges of the screens, and means for imparting a vertical vibratory movement to the screens as and for the purpose specified.

6. In a drier, the combination with the casing and a plurality of hoppers at the lower end thereof parallelly arranged, of heaters located between and extending above the hoppers, and double screens having openings in the bottom edge and openings in the top edge and located above the hoppers, and suitable guideways for the side edges of the screens, a rod extending crosswise through the casing and eccentrically-arranged wheels secured to the rod and designed to impart a vertical vibratory movement to the screens as and for the purpose specified.

7. In a drier, the combination with the casing and a plurality of hoppers at the lower end thereof parallelly arranged, and a slide provided with openings to register with the discharge-openings at the bottom of the hopper, and means for adjusting such slide, of heaters located between and extending vertically above the hoppers, and steam-ducts located above the hoppers as and for the purpose specified.

8. In a drier, the combination with the casing having a cone-frustum-shaped top and cone-frustum-shaped bottom, an exhaust-tube extending out from the center of the top and a feed-tube leading through the top, and a gate for normally closing the bottom, of suitable hoppers located in the casing, suitable heaters extending vertically above from between the hoppers and suitable steam-ducts extending vertically above the hoppers as and for the purpose specified.

JOSEPH GOODWIN KING.

Witnesses:

B. BOYD,

M. McLAREN.