(No Model.) 2 Sheets—Sheet 1

F. H. C. MEY.

GRAIN DRIER.

No. 456,732. Patented July 28, 1891.

Fig. 1.

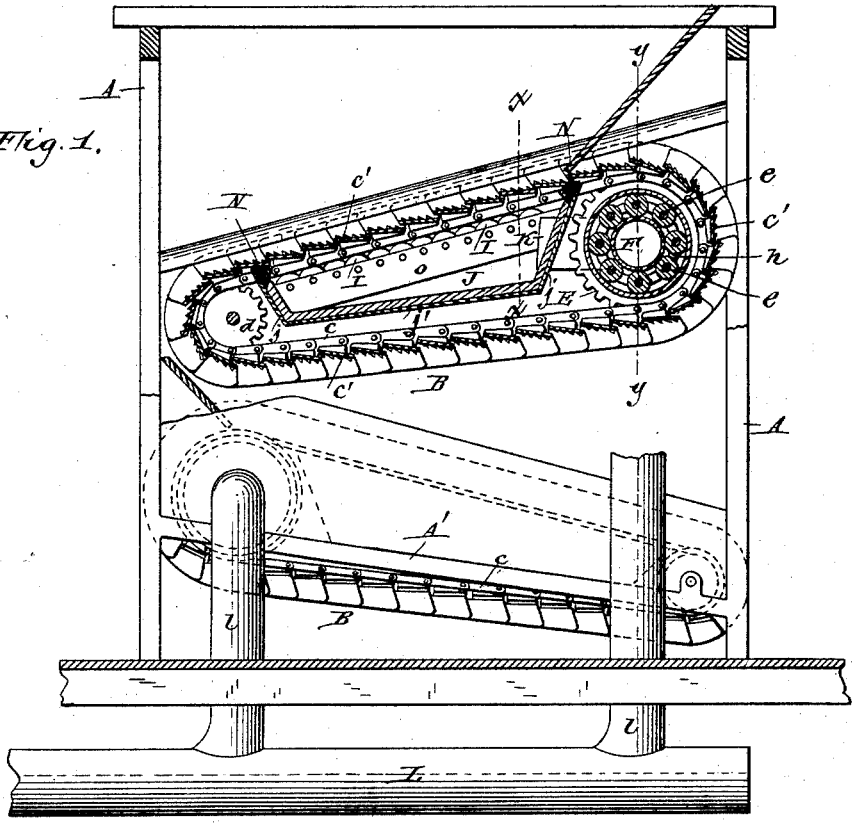
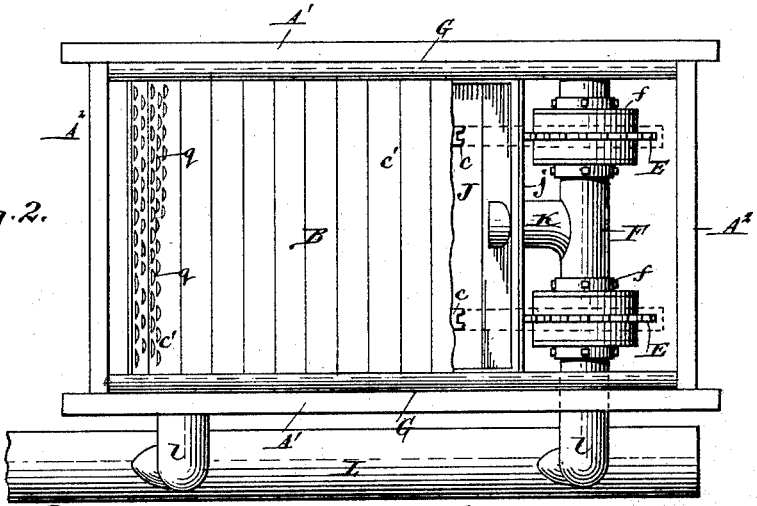


Fig. 2.



Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

F. H. C. MEY.

GRAIN DRIER.

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Fig. 3.

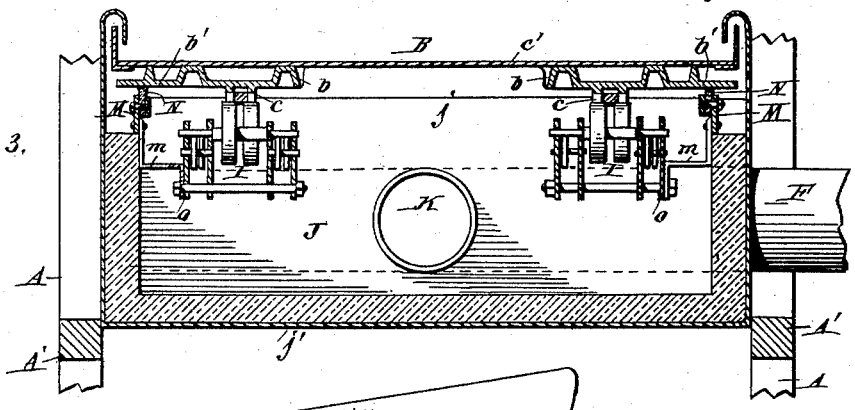


Fig. 6.

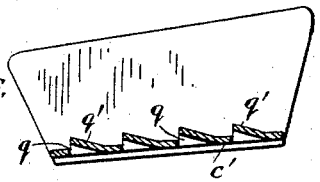


Fig. 4

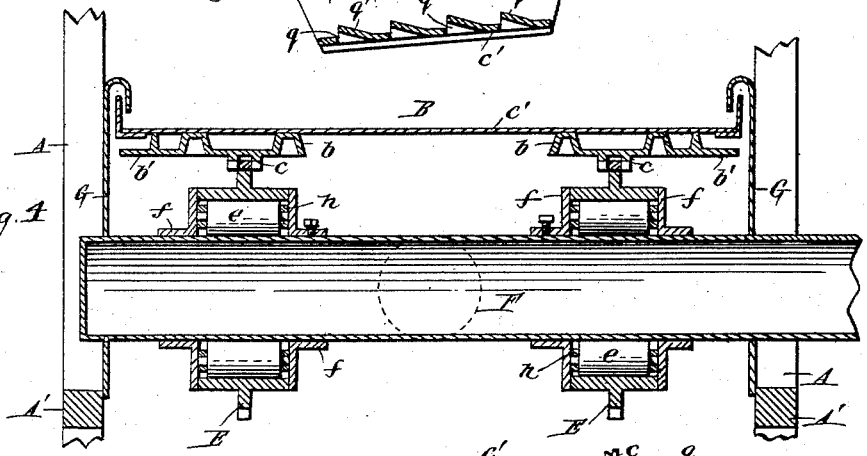
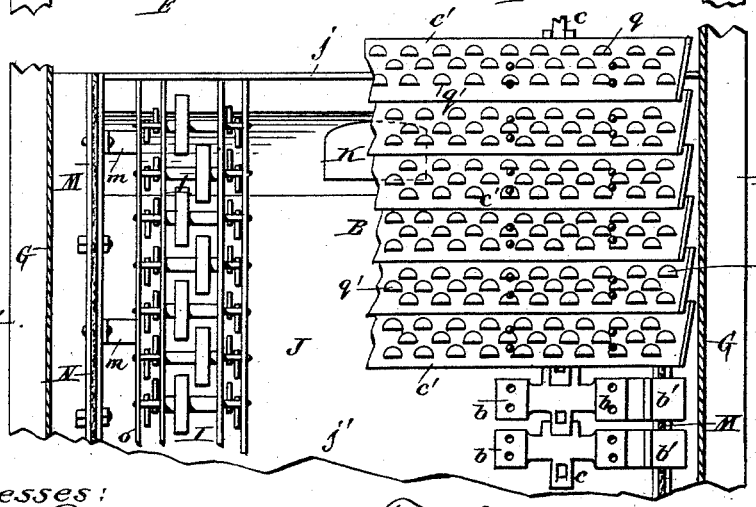


Fig. 5.



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UNITED STATES PATENT OFFICE.

FREDERICK H. C. MEY, OF BUFFALO, NEW YORK.

GRAIN-DRIER.

SPECIFICATION forming part of Letters Patent No. 456,732, dated July 28, 1891.

Application filed February 20, 1891. Serial No. 382,135. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK H. C. MEY, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Grain-Driers, of which the following is a specification.

This invention relates to that class of machines which are employed for drying and cooling grain, malt, &c., and which consist, essentially, of an endless conveyer or traveling apron, upon which the material is deposited, and means for directing an air-current through the endless apron for drying or cooling the material. Letters Patent of the United States No. 261,018 were granted to me July 11, 1882, for an apparatus of this kind.

My present invention relates more especially to improvements in the apparatus of the above patent, and has the object to expose a larger area of material upon the carrying-apron to the action of the air, and also to prevent the air from escaping from the apparatus without passing through the material upon the apron, thereby utilizing the air more effectually and increasing the capacity of the machine.

The invention has the further object to simplify the construction of the endless conveyer.

In the accompanying drawings, consisting of two sheets, Figure 1 is a sectional elevation of the machine. Fig. 2 is a top plan view of the apparatus with a portion of the upper endless conveyer broken away to expose the underlying parts. Fig. 3 is a transverse section of the machine on an enlarged scale, in line *x x*, Fig. 1. Fig. 4 is a similar section in line *y y*, Fig. 1. Fig. 5 is a fragmentary top plan view of the endless conveyer and its supports. Fig. 6 is a cross-section on an enlarged scale of one of the slats of the endless conveyer.

Like letters of reference refer to like parts in the several figures.

A represents the uprights, A′ the longitudinal beams, and A^2 the cross-pieces, of the stationary frame of the machine.

B B represent the endless aprons or conveyers arranged one above the other and inclined in opposite directions, so that the material escaping over the tail of the upper apron falls upon the head of the lower apron. Each conveyer B consists of a pair of endless chains *c* and transverse slats *c′*, secured to the supporting-blades *b*, with which the links of the chain are provided, as shown in Figs. 3 and 4. The front portion of each slat overlaps the rear portion of the slat in front of the same, and these overlapping portions are slightly separated to leave spaces or interstices for the passage of the air. The tail portion of each conveyer runs around sprocket-wheels *d*, which are mounted on transverse shafts secured to the stationary frame. The upper portion of the endless conveyer passes around sprocket-rims E, forming guide-wheels rotating upon anti-friction wheels or rollers *e*, which in turn revolve upon the outer surface of a hollow journal or air-pipe F, as represented in Figs. 1 and 4. This hollow journal or pipe passes through side walls G, secured to opposite sides of the uprights and having openings for the passage of the hollow journal. The anti-friction rollers *e* are journaled at their ends in circular frames or rings *h*, surrounding the hollow journal and whereby the rollers are kept at the proper distance apart. The rings are free to turn as the rollers revolve around the air-pipe. Lateral displacement of the rotating sprocket-rims and the friction-rollers is prevented by collars *f*, secured to the hollow journal on opposite sides of the sprocket-rims, as represented in Figs. 2 and 4.

The upper portion of the endless conveyer between the sprocket-wheels *d* and E is preferably supported by a series of compound anti-friction rollers I, such as are described and shown in my Letters Patent hereinbefore referred to.

J represents an air-receiving chamber or compartment arranged below the upper portion of each endless conveyer between the head and foot wheels *d* E. The sides of this chamber are formed by the walls G.

j represents the end walls of the chamber and *j′* its bottom. The top of the chamber is closed by the upper portion of the endless conveyer, as clearly shown in Fig. 1.

K represents an air-supply pipe or nozzle entering the front end of the air-chamber J and connected with the hollow journal or air-pipe F.

L represents the main air-supply pipe which is connected with a fan or any other air-propelling apparatus, and *l* is an upright branch pipe connecting the hollow journal F with said main air-pipe. The air-chamber J is tight on all sides, except at its top, which is closed by the endless conveyer. The walls of the chamber are preferably constructed of sheet metal and are lined with fire-brick or other refractory material to check the radiation of the heat. As represented in Figs. 3 and 5, the fire-brick of the side walls extends upwardly to within a short distance of the endless conveyer. The slats of the conveyer are preferably provided at their ends with upright flanges and the upper portions of the metallic side walls G, extending above the conveyer, are bent inwardly and downwardly to form depending flanges which overhang the flanges of the slats, as described and shown in the Letters Patent before mentioned.

M M represent upright longitudinal plates or rails arranged within the air-chamber I, and which close the spaces between the top of the fire-brick walls and the under side of the endless conveyer, as shown in Figs. 3 and 5.

N N represent packing-strips, preferably of asbestus, secured to the plates M and projecting above the same, so as to form as tight a joint as possible between said plates and the conveyer, and thereby prevent the air from escaping between the longitudinal edges of the conveyer and the side walls G. The supporting-plates *b* of the conveyer-chains are provided with lateral extensions or wings *b'*, (see Figs. 5 and 6,) which run upon the asbestus packing-strips and form a comparatively tight joint with the same. In the drawings the rails or plates M are represented as being supported by arms or brackets *m*, secured to the longitudinal rails *o*, in which the anti-friction rollers I are journaled, but they may be secured in place in any other manner, if desired.

In order to expose a larger portion of the material upon the conveyer to the action of the air, the slats of the conveyer are formed with rows of perforations or slits *q* having hoods *q'*, which are open at their front or advancing ends and closed at their rear ends, as represented in Fig. 6. These hoods are preferably formed by striking up the metal immediately behind the perforations, as shown in the above figure. By this construction the air is allowed to pass upwardly and forwardly through the perforations of the slats, while the material which moves in the direction in which the hoods of the perforations open is prevented from dropping through said perforations by the hoods. The endless conveyers are inclined sufficiently to prevent the material from rolling backward and falling through the perforations of the slats.

The material to be dried is fed upon the upper conveyer, and in passing over the same is exposed to the air which passes from the chamber J through the perforations in the conveyer-slats and the interstices between the overlapping slats. The material passing over the tail of the upper screen falls upon the head of the lower screen, and in passing over the latter is further subjected to the action of the air, the material being finally discharged over the tail of the latter into a bin or other receptacle. The air-chamber being tight on all sides and the joints between the under side of the conveyer and the top of the air-chamber being also practically tight, the air entering the chamber is compelled to pass through the perforations and interstices of the endless conveyer in seeking an exit, thereby utilizing the air to the best advantage and drying the material upon the conveyer more thoroughly and increasing the capacity of the machine.

By providing the slats of the conveyer with numerous perforations which allow of the passage of the air while retaining the material, a larger area of the layer of material is exposed to the action of the air and a more rapid and uniform drying of the material is effected.

By utilizing the upper horizontal portion F of the air-pipe as a journal for the sprocket-wheels at one end of the endless conveyer a separate shaft for these wheels is dispensed with, whereby the machine is rendered simpler and more compact in construction.

In the drawings two endless conveyers are shown; but a greater or less number may be employed, according to the desired capacity of the machine.

My improved machine is herein described as a grain-drier; but it is obvious that it may also be used for cooling grain, &c., by passing cold instead of hot air through the conveyer.

I claim as my invention—

1. The combination, with the stationary frame, of the endless conveyer running around guide-wheels at opposite ends of the frame, a tight air-chamber arranged between said guide-wheels and having its top closed by the upper side of the endless conveyer, and a transverse cylindrical air-pipe connected with one end of said air-chamber and forming a journal for the adjacent guide wheel or wheels of the endless conveyer, substantially as set forth.

2. The combination, with the stationary frame and a tight air-chamber having an open top, of an endless conveyer closing the top of the air-chamber and composed of transverse plates, and a longitudinal packing-strip arranged between the top of the air-chamber and the under side of the conveyer, substantially as set forth.

3. The combination, with the stationary frame and a tight air-chamber having an open top, of an endless conveyer closing the top of the air-chamber and composed of transverse plates, longitudinal rails or bars supported in the air-chamber below the endless con-

veyer, and packing-strips secured to said rails and bearing against the under sides of the conveyer-plates, substantially as set forth.

4. The combination, with the stationary frame and the tight air-chamber or compartment having an open top, of a traveling conveyer closing the top of said air-chamber and composed of transverse slats having perforations provided with hoods open at their front or advancing ends and closed at their rear ends, substantially as set forth.

Witness my hand this 10th day of February, 1891.

FREDERICK H. C. MEY.

Witnesses:
JNO. J. BONNER,
FRED. C. GEYER.