A. PALMER.

Malt and Grain Drier.

No. 197,740. Patented Dec. 4, 1877.

Fig. 1.

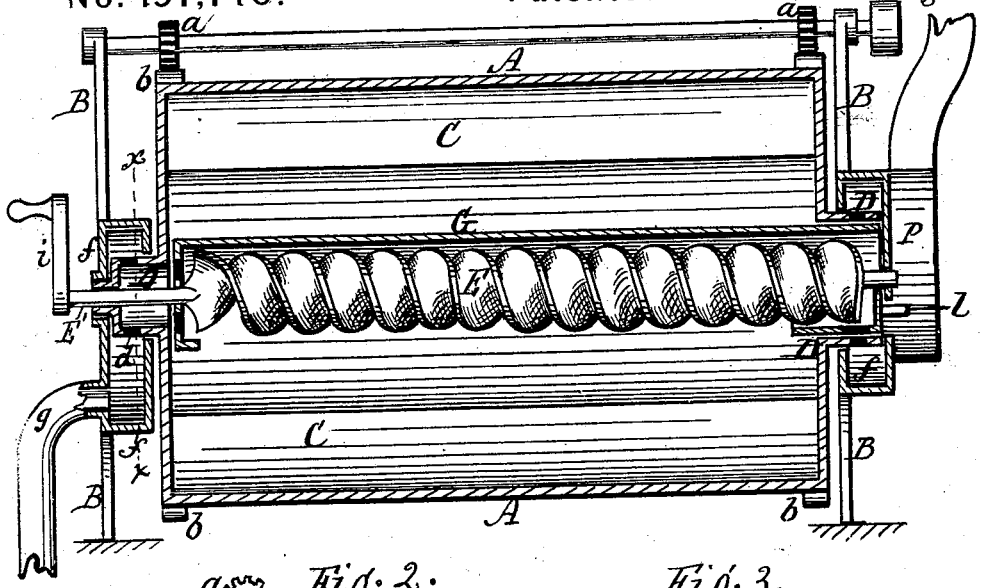



Fig. 2.

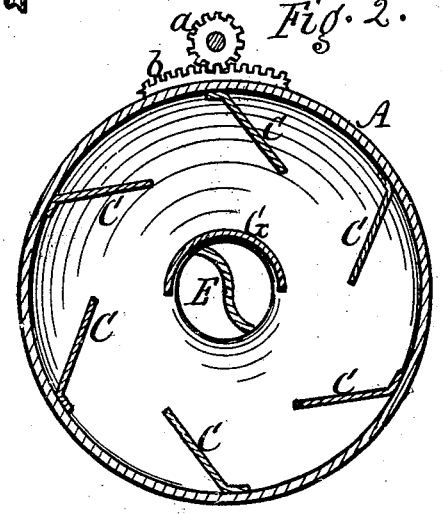



Fig. 3.

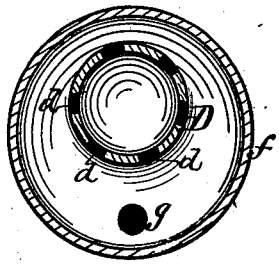



Fig. 4.

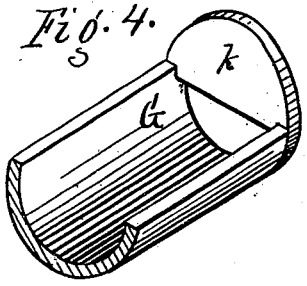
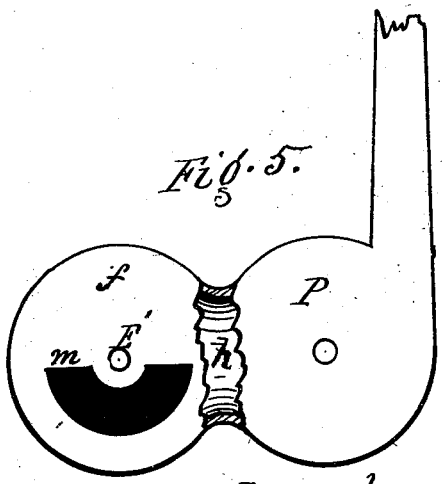



Fig. 5.




Attest.

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# UNITED STATES PATENT OFFICE.

AARON PALMER, OF ROCHESTER, NEW YORK, ASSIGNOR OF TWO-THIRDS HIS RIGHT TO JOSEPH A. HOLMES, OF ARLINGTON HEIGHTS, ILLINOIS, AND WILLIAM N. OOTHOUT, OF ROCHESTER, NEW YORK.

## IMPROVEMENT IN MALT AND GRAIN DRIERS.

Specification forming part of Letters Patent No. **197,740**, dated December 4, 1877; application filed April 9, 1877.

*To all whom it may concern:*

Be it known that I, AARON PALMER, of the city of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Malt and Grain Driers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section. Fig. 2 is a cross-section. Fig. 3 is a section in line *x x* of Fig. 1. Fig. 4 is a perspective view of one end of the trough. Fig. 5 is an elevation of the drum and fan-case at one end of the machine.

My improvement relates to malt and grain driers in which a rotating cylinder is employed, armed with buckets which elevate the material, allowing it to fall again while it is subjected to heated air which enters the cylinder, said air being drawn off by an exhaust-fan or equivalent.

The invention consists in the construction and arrangement of parts, hereinafter more fully described and definitely claimed.

A represents a cylinder some twenty feet long and of suitable diameter, closed at the periphery, but having openings at the ends for the passage of the hot air. This cylinder rests in standards B B at the ends, and receives a slow rotary motion by means of pinions *a a*, which engage with cog-rims *b b* at the extremities, or by any equivalent devices.

C C are a series of buckets, attached longitudinally on the inside of the cylinder. They are straight in cross-section, but stand tangentially, as shown in Fig. 2, projecting sufficiently inward to serve as scoops to catch and hold the malt or grain at the bottom, carry it up near to the top, and then gradually discharge it in a continuous thin sheet, which falls across the cylinder-space back to the bottom again, during which passage it is subjected to the current of heated air that passes from one end to the other of the cylinder. These buckets differ from ordinary buckets in being made straight instead of curved in cross-section, being thereby more effective in discharging the material, commencing quicker and continuing longer, by which means the stream is made thinner, and is better acted upon by the heat. The outer edges of the buckets are preferably secured by stays, which connect them with the cylinder.

D D are hollow bearings at the ends of the cylinder, which form the journals that rest in the standards B B. They are closed at the ends, but they have radial perforations *d d*, which open outward. *f f* are hollow drum-spaces, which inclose the bearings D D, and into which the passages *d d* open. These drums form part of the standards B B, and are made close-fitting to the bearings D D, but not so as to impede free rotation of the cylinder. At the heat-induction end of the cylinder (shown at the left in Fig. 1) a hot-air pipe or flue, *g*, opens into the drum *f*, and conducts the hot air into the cylinder from any suitable heating apparatus. The hot air from the drum-space *f* passes through the perforations *d d* into the hollow bearing D, and thence into the cylinder, without affecting the rotation of the latter. At the opposite end of the machine the hot air passes out through the perforations *d d* into the drum *f*, in the same manner. P is an exhaust-fan case, connected with the drum at this end of the machine by a passage, *h*.

This fan-case may be attached direct to the machine, as shown in the drawings; or it may be located some distance therefrom, and connected with the drum by a pipe. It serves to draw the hot air through the cylinder, as before described, thereby heating the material and expelling all moisture.

By the construction above described a larger bearing is secured at the journals of the cylinder than where pipes simply enter, which is essential in a machine of so much capacity. The bearings D D are so large in diameter that free ingress and exit of the air is produced, and the whole interior of the cylinder is left open, which is usually obstructed by a pipe passing through.

E is a conveyer, in the form of an auger or screw, attached to a shaft, E′, which projects through the cylinder centrally. At one end it has a pulley or crank, *i*, by which it is driven.

G is a half-cylindrical trough or hopper, in

which the conveyer rests. This trough at the ends has half-heads *k k*, which rest upon the shaft E′, and form bearings having a free turning movement upon the shaft. By this means the trough may be turned above or below the conveyer. When the charge is in the cylinder and under action, the trough is turned above, as shown in Fig. 2, and the conveyer is at rest. In this case the material, as it falls from the buckets, drops on the inverted top of the trough and is thrown over, thereby preventing clogging. In this case the half-head *k* at the right-hand end of the machine comes opposite and closes an open space, *m*, at the end of the machine, through which projects a pin or crank, *l*, by which the trough is turned.

In feeding in or withdrawing the charge of malt or grain the trough is turned down, as shown in Fig. 4, and the conveyer is turned in one direction or the other. In feeding in, the grain is passed through the opening *m* into the end of the trough, and the conveyer draws it in, preventing clogging. In withdrawing the charge the material drops from the buckets into the trough, and the reverse movement of the conveyer draws it out through the end of the machine.

Having thus described my invention, I do not claim, broadly, a cylinder armed with buckets; nor do I claim forcing a blast of hot air into the cylinder; but

I claim—

1. In a malt or grain drier, in combination with the cylinder A, provided with the buckets C C, the hollow journals D D, provided with perforations *d d*, and the hollow drum-spaces *f f*, inclosing said journals, but allowing free rotation, the whole arranged as set forth, so that the hot air is received through one end and discharged through the other, as shown and described, and for the purpose specified.

2. In a malt or grain drier, the combination, with a cylinder, A, provided with buckets C C, enlarged hollow perforated journals D D, and the hollow drums *f f*, of an induction hot-air pipe, *g*, at one end, and an exhaust-fan, P, at the other, connecting with the said drums, for the purpose of producing an exhaust through the cylinder, in contradistinction to a blast, as herein shown and described.

3. In a malt or grain drier, the combination, with the cylinder A, provided with the buckets C C, of the central trough or hopper G and the screw-conveyer E, arranged as set forth, to feed the charge into and withdraw it from the cylinder by the rotation of the conveyer in opposite directions, as herein shown and described.

4. In a malt or grain drier, the combination of the trough G with the conveyer E, the trough being a half-cylinder, and capable of turning either above or below the conveyer, as and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

AARON PALMER.

Witnesses:
R. F. OSGOOD,
JACOB SPAHN.