O. HOLDEN.
Grain Drier.

No. 201,785. Patented March 26, 1878.

Fig. 1.

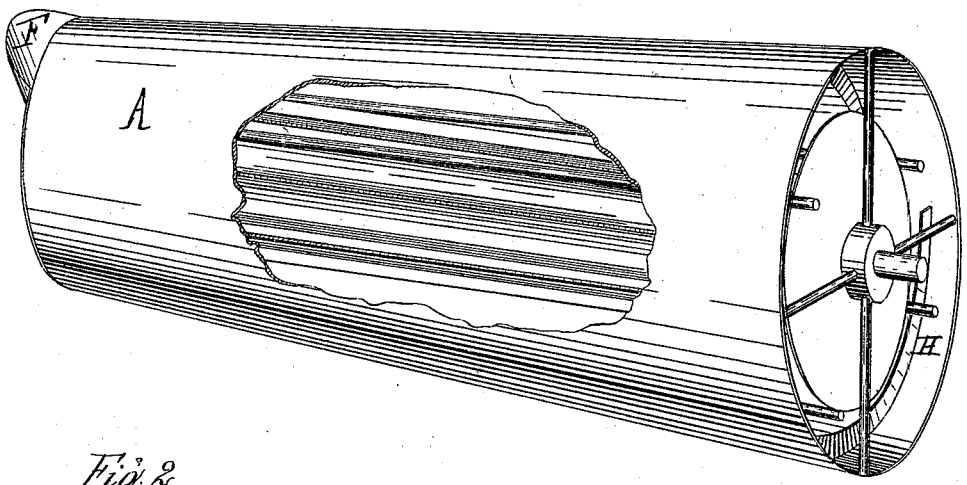


Fig. 2.

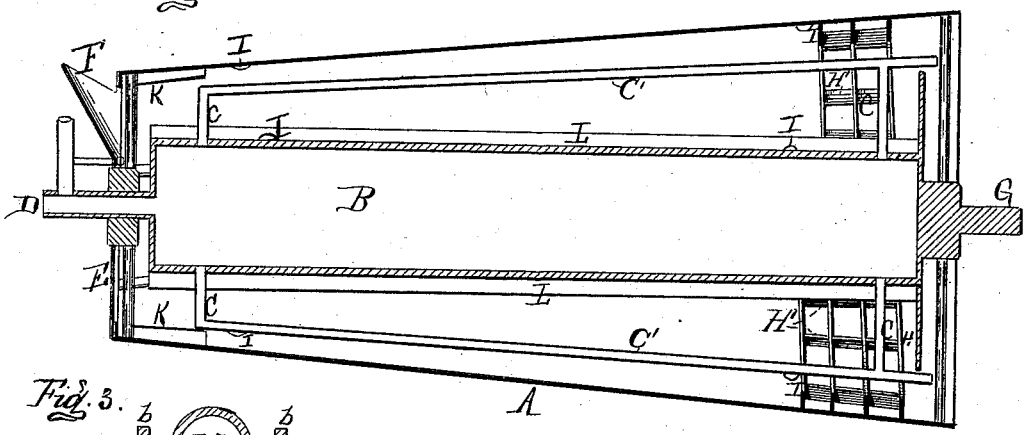
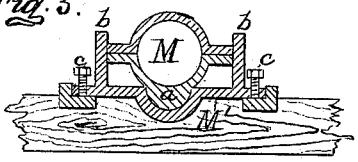


Fig. 3.



Attest:
Edward Barthel
Charles J. Kench

Inventor:
Oliver Holden
By Atty
Thos. S. Sprague

UNITED STATES PATENT OFFICE.

OLIVER HOLDEN, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN GRAIN-DRIERS.

Specification forming part of Letters Patent No. **201,785**, dated March 26, 1878; application filed January 4, 1877.

To all whom it may concern:

Be it known that I, OLIVER HOLDEN, of St. Louis, in the county of St. Louis and State of Missouri, have invented an Improvement in Apparatus for Curing Cereals, &c., by heat and electricity, of which the following is a specification:

This invention relates to an improvement upon the apparatus for which Letters Patent were granted to me October 13, 1874, numbered 155,948; and its object is to produce a machine which will be more reliable and efficient in operation, can be tilted more accurately and securely upon its axis, and can also be used for the treatment of cereals in an effective manner, and without clogging up at the entrance end of the machine.

My invention therein consists in the several combinations of the operative parts, as fully hereinafter set forth.

To enable others skilled in the art to manufacture and use my improvements, I will proceed to describe the same, having reference to the drawings, in which—

Figure 1 is a perspective view of the apparatus removed from its journal-boxes; Fig. 2, a vertical longitudinal section of the same; and Fig. 3, a sectional view of one of the ball-and-socket boxes in which the journals rest.

Like letters denote corresponding parts in each figure.

A is the outer conical cylinder. B is central steam-cylinder, preferably made of corrugated iron. C are steam-tubes, projecting radially from the central steam-cylinder, and having longitudinal connecting-tubes C′. D is the hollow axis or journal, through which steam is carried into the central steam-cylinder. E is the loose head of the small end of the cylinder, provided with spout F, through which the material to be operated upon is conveyed into the machine. G is the solid journal for the larger end of the cylinder. H is a spiral blade on the inside of the outer cylinder. K are angular conveyers, secured to the outer cylinder at its small end. L are longitudinal strips, secured to the outside and running lengthwise of the central steam-cylinder; and I are appliances for producing electrical action, such appliances being described in the beforementioned Letters Patent No. 155,948.

The cylinders are set one inside of the other, and are mounted in such a manner as to be capable of revolution in opposite directions; or the two cylinders may be revolved in the same direction with equal or different velocities. The inner cylinder B may be driven by a fixed gear upon the axis, and the outer cylinder A may be driven by a gear attached to the outside surface of its small end.

The steam is admitted through the hollow axis D into the central cylinder, and from thence flows into the pipes C C′, thus conveying its heat to near the periphery of the outer cylinder; and as the central heating-cylinder revolves, these tubes are carried around with it, which causes the mass under treatment to become charged with heat. The revolving of the central heating-cylinder constantly brings some of these tubes to the upper part of the machine and in contact with the impure vapor from the grain. This contact serves not only to agitate the vapor and to cause it to pass out of the machine more rapidly, but also superheats and dries it out. The stationary head at the front or small end of the outer cylinder has a hole in its center, through which the axis passes. The upper part of this head forms a spout, F, to convey the material into the machine. The axes at both ends rest in boxes or bearings M, under which there is a ball-and-socket tilting-joint, formed by a ball, *a*, on the under side of the journal-box, entering a socket in a bed-plate, M′. This plate has vertical guiding-plates *b*, between which the wings of the journal-boxes move. The bed-plate projects beyond the journal sufficiently to admit set-screws *c* to be screwed in its ends, which screws set on a plate of iron or other suitable obstruction placed under them. When the screws *c* are set down the axis will be raised, and by these means the machine may be tilted either way to hasten or retard the passage of the material through it. As the ends of the machine are raised or lowered the axis accommodates itself in the boxes as they turn on the trunnions or on the ball-and-socket joint; consequently a level bearing for the journal is always maintained. The spiral blade H is secured upon the inside of the outer conical cylinder, and extends any desired number of times around the same. It is made of thin

sheet-iron or other material, and projects inward toward the center of the cylinder from four to eight inches, more or less, and should be so secured to the outer cylinder that water will not pass between its flanges and the cylinder-shell. In the spaces between these projections longitudinal strips or partitions H′ are placed, which serve as lifters to convey the grain up as the cylinder revolves. The spiral blade prevents the grain being treated from running too freely through the machine, it only finding its way through as the machine revolves.

Appliances for producing electrical currents may also be attached to the spiral blade.

The conveyers K start at the front or square end of the outer cylinder, to which they are secured, and run diagonally from eighteen inches to three feet, more or less. These conveyers receive the material from the spout, and, by the motion of the outer cylinder, throw such material away from the end of the machine, so that it will not choke up or clog the machine.

What I claim as my invention is—

1. In a grain-drying machine adapted to operate upon the grain in a continuous stream, the combination, with the revolving conical cylinder A and the inner independently-revolving steam-cylinder B, between which the grain passes continuously, of the radial and longitudinal steam-pipes C C′, attached to and revolving with the said inner cylinder, constructed and arranged substantially as described and shown.

2. The combination, with the revolving cylinder A, having spiral blade H and longitudinal lifters H′, of the inner revolving steam-cylinder B, provided with catch-plates L, constructed and arranged substantially as described and shown.

OLIVER HOLDEN.

Witnesses:
SIMEON W. KING,
LEWIS B. HILLES.