J. GUARDIOLA.

GRAIN DRIER.

No. 187,268. Patented Feb. 13, 1877.

Fig: 2.

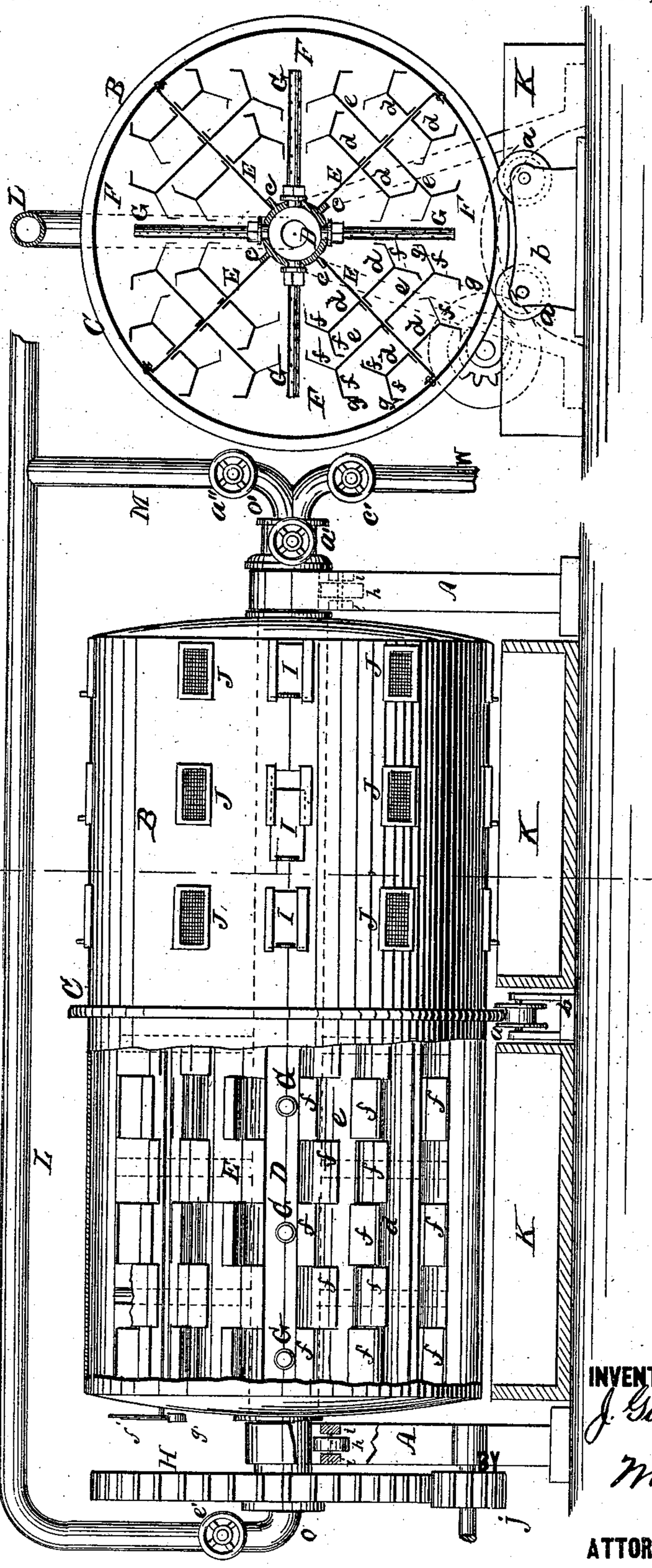

Fig: 1.

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JOSÉ GUARDIOLA, OF CHOCOLÁ, GUATEMALA.

IMPROVEMENT IN GRAIN-DRIERS.

Specification forming part of Letters Patent No. **187,268**, dated February 13, 1877; application filed January 8, 1877.

To all whom it may concern:

Be it known that I, JOSÉ GUARDIOLA, of Chocolá, in the Republic of Guatemala, have invented a new and useful Improvement in Grain-Driers, of which the following is a specification:

Figure 1 is a side elevation in part section. Fig. 2 is a transverse section on line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

This invention relates to a machine for artificially drying grain, coffee, malt, or other fruit, to prepare and fit the same for preservation, transportation, or other purposes. It is more particularly intended to supersede the common method of drying such articles by the heat of the sun, and thereby materially to hasten the evaporation of surplus moisture.

The invention consists in an arrangement of a rotating cylinder, containing a central hot-air tube and winged radial partitions, and perforated radial tubes, projecting from the central hot-air tube between the partitions. The said cylinder is provided with gauze-covered apertures for the escape of vapor, and with doors for the introduction and removal of the substance to be dried. By this arrangement the grain or coffee is constantly agitated while it is subjected to the influence of hot-air, which permeates the entire cylinder, the said apparatus being supplied with heated air by any of the ordinary well-known means.

In the drawing, A is the frame of the drying-machine, made of wood or other suitable material, and in which the cylinder B is journaled. This cylinder is made of sheet metal or other suitable material, and the parts of which it is composed are fastened together in any suitable and substantial manner. C is a flange encircling the center of the cylinder B, and projecting sufficiently beyond its surface to revolve in contact with the grooved wheels *a a*, which are journaled in a frame, *b*, placed upon a foundation sufficiently solid to resist the sagging or vibration of the center of the cylinder. D is a tubular shaft that runs through the cylinder B, and projects sufficiently beyond the heads of the cylinder to form journals upon which the cylinder revolves, and to receive the gearing by which the cylinder is turned. Longitudinal ribs *c* are formed on the tubular shaft D, and to them the radial partitions E are secured, which extend to the inner surface of the cylinder. These partitions divide the cylinder into segmental compartments F, which are entirely separate and disconnected. To the sides of these partitions transverse plates *d*, *d*, and *e* are attached, which run longitudinally through the segmental space included between the partitions E. The central plates *e* on each partition are widest, so as to more completely fill the space between the partitions. The plates *d d e* have wings *f f* at their terminations, projecting alternately inward and outward, and each wing is provided with a flange, *g*, that is bent backward toward the partition E, as fully illustrated in Fig. 2. A series of perforated tubes, G, are secured into the central tubular shaft D at suitable intervals, and project centrally into the compartments F. A number of sliding doors, I, are provided in the shell of the cylinder B, for charging the compartments F with material to be dried, and for removing the same after the drying operation is completed. A number of apertures, J, covered with gauze or a perforated plate, are also provided in the shell of the cylender B in each of the compartments F, for the escape of vapor, and the air driven into the cylinder by the blower. The meshes of the gauze covering the aperture J, as well as the perforations of the tubes G, should be smaller than the grains to be acted upon, in order to prevent such grains from falling through. The journals of the cylinder B, formed by the projection of the tubular shaft D through its heads, are supported by rollers *h*, which are journaled in a casting, *i*, attached to the upper cross-beam of the frame A. The tube D projects sufficiently beyond the roller *h* at one end of the machine to receive the spur-wheel H, which is keyed or otherwise secured to the end of the said tube. The wheel H takes its power through the pinion *j*, from any convenient motor, or any other equivalent means for imparting motion to the cylinder B may be applied. K K are boxes placed under the cylinder B, for receiving the coffee or grain when it is discharged through the door I. A thermometer, *f'*, is hung upon a pivot projecting from the head of the cylinder B, and kept in a vertical position by means

of a counter-weight, *g*. The tubular shaft D is connected or swiveled at each end to immovable conduits *o o'*, which are connected with air blast-pipes L M.

The operation is as follows: The grain, coffee, or other material to be dried is placed in the compartments F of the cylinder B, through the doors I, where, by the rotation of the said cylinder upon its axis, the grain is carried upward upon the plate *d e*, and as the cylinder revolves so that the winged edges of the plates incline downward, the grain runs off the plate, and is distributed by the wings *f* as it falls, so that the grain is continually agitated, and in falling through the currents of hot-air issuing from the perforations of the pipes G, parts with its moisture. The air thus introduced, and the vapor driven from the article being dried, escape through the gauze-covered aperture or perforated plates J. The coffee or grain is examined from time to time by opening the doors I, and when it becomes as dry as required, the doors I are all opened as the cylinder B rotates, and more or less of the contents of the cylinder drop into the boxes K at each revolution until the cylinder becomes emptied. The temperature of the cylinder may at any time be ascertained by observing the thermometer *f''*. The blast-gates *a'*, *a''*, and *e'* being open, and the blast-gates *c'* being closed, the air forced through the heater by the blower is conducted to the tubular shaft D of the cyilnder through the pipes L M. If it is desired to introduce a current of cold air into the drying-cylinder, the blast-gates *a''* and *e'* are closed, cold air passes directly from the blower into the pipe W, and enters the drying-cylinder, and, if desired, the blast-gates *e'* and *a'* may be closed, and the gate *c'* be opened, and the pipe W disconnected, when the hot-air from the heater will be discharged through a suitable pipe into the surrounding atmosphere.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent—

1. The cylinder B, tubular shaft D, radial partitions E, plates *d d e*, having formed upon them the wings *f*, all constructed and arranged substantially as herein shown and described.

2. The cylinder B, having the tubular shaft D and gauze-covered apertures J, the radial perforated pipes G, partitions E, and the plates *d d e*, having wings, in combination, substantially as herein shown and described.

3. The combination, in a grain-drier, of the conduit *o'*, blast-gates or valves *a' a''*, pipe W, blast-gate *c'*, tubular shaft D, and cylinder B, substantially as herein shown and described.

4. The combination of the pipe L, having conduit *o* and blast-gate *e'*, the pipe M, conduit *o'*, and blast-gates *a' a''*, with the tubular shaft D, cylinder B, and a suitable air-heater, substantially as herein shown and described.

5. The pivoted and counter-weighted thermometer *f''*, in combination with the revolving drying-cylinder B, substantially as herein shown and described.

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Witnesses:

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