2 Sheets—Sheet 1.

# J. F. GUBBINS.

## Offal Drier.

No. 230,128. Patented July 20, 1880.

Fig. 1

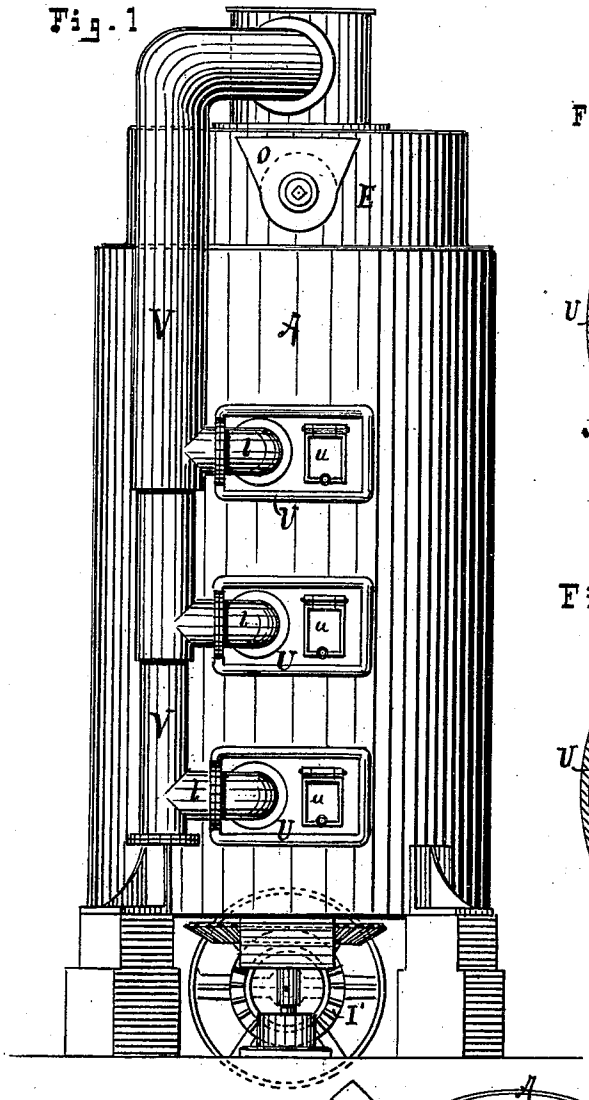



Fig. 5

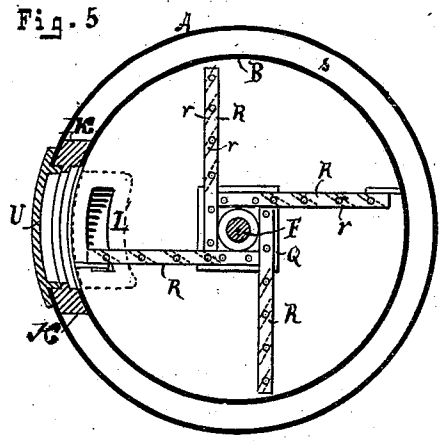



Fig. 6

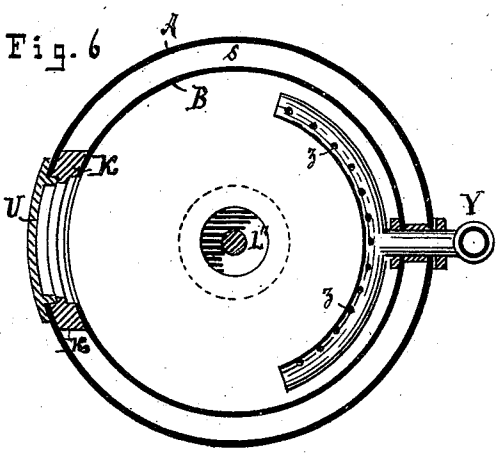
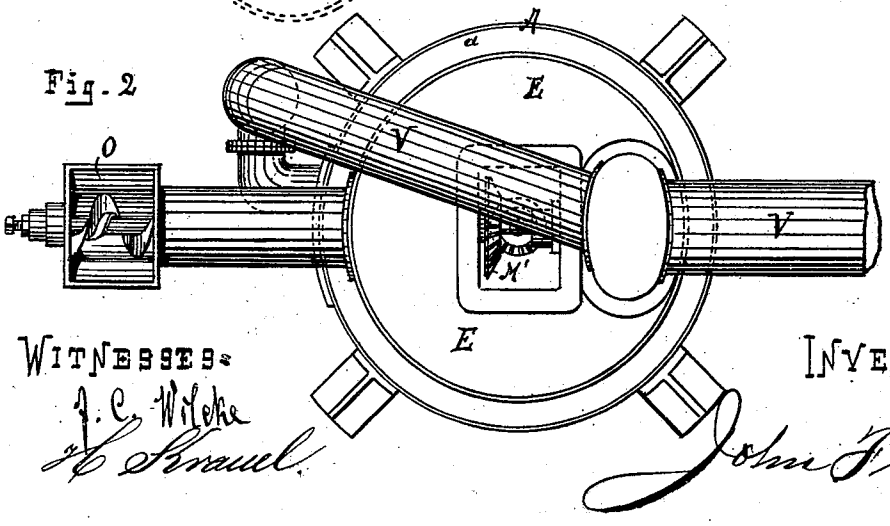



Fig. 2




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2 Sheets—Sheet 2.

# J. F. GUBBINS.

## Offal Drier.

No. 230,128. Patented July 20, 1880.

Fig. 3

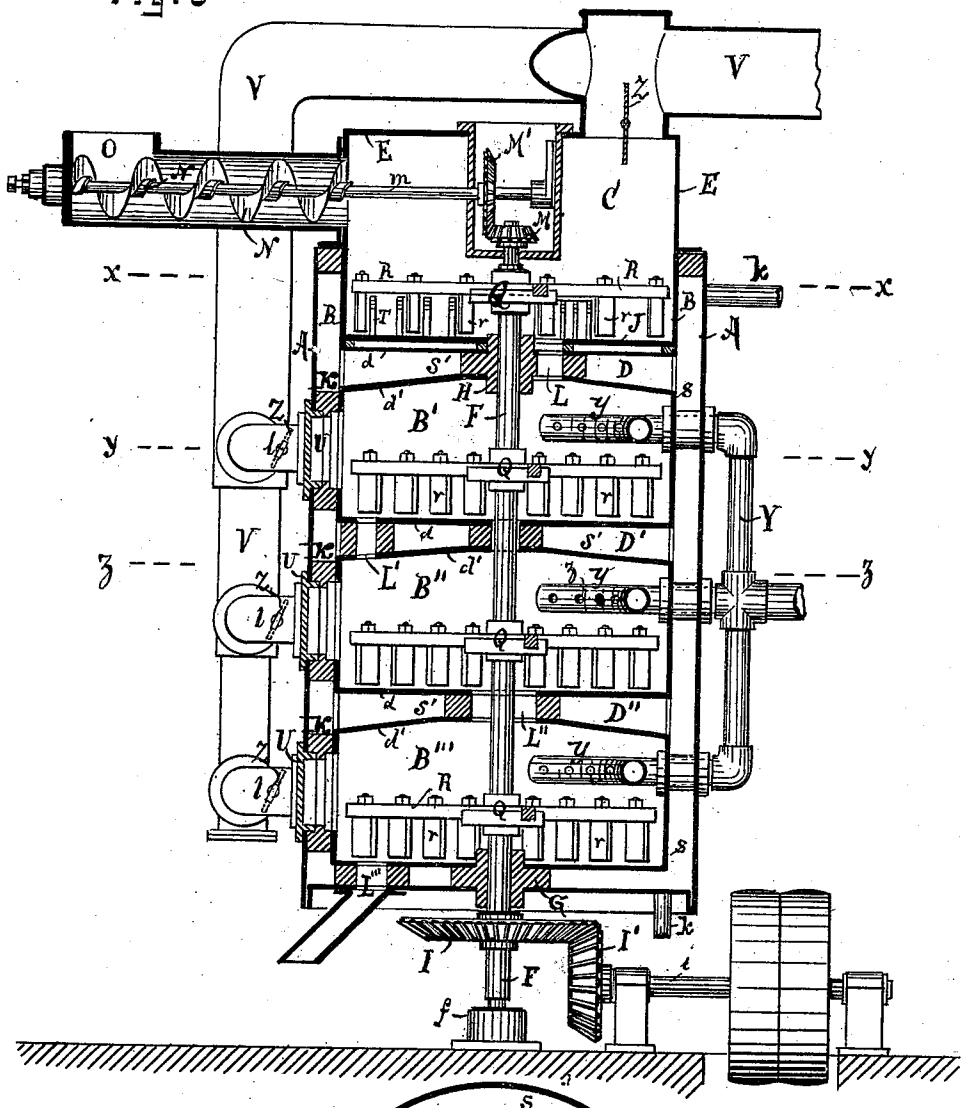
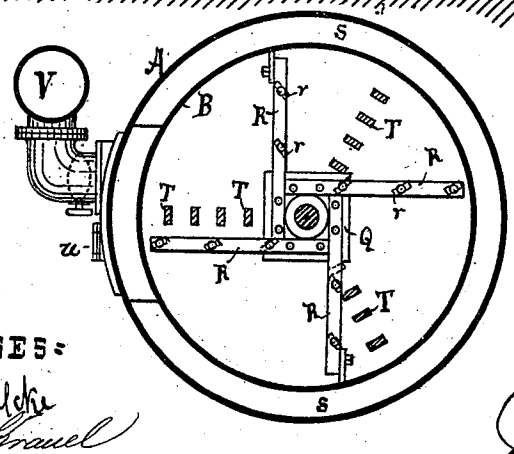



Fig. 4




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# UNITED STATES PATENT OFFICE.

JOHN F. GUBBINS, OF CHICAGO, ILLINOIS.

## OFFAL-DRIER.

SPECIFICATION forming part of Letters Patent No. 230,128, dated July 20, 1880.

Application filed February 17, 1880.

*To all whom it may concern:*

Be it known that I, JOHN F. GUBBINS, of Chicago, State of Illinois, have invented certain Improvements in Offal-Driers, which are described in the specification and claims as follows:

My invention relates to apparatus for drying offal and removing odors and vapors therefrom; and it consists in constructing the same with a series of communicating chambers or compartments, each surrounded by a steam-space and provided with a stirring device; in providing an exhaust-spout to remove the vapors and odors from the several chambers; in providing a hot-air pipe having branches for the several chambers or compartments to deliver the heated air to the same; in a series of teeth or prongs acting in conjunction with the stirrer of the first chamber to break up or loosen compacted masses or large pieces of material; and in other details, hereinafter described.

In the accompanying drawings, Figure 1 represents a face elevation of my improved apparatus; Fig. 2, a top-plan view of the same; Fig. 3, a vertical central section thereof; and Figs. 4, 5, and 6, horizontal sections taken, respectively, on the lines *x x*, *y y*, and *z z* of Fig. 3.

The apparatus consists, primarily, of two concentric upright cylinders placed one within the other, and of such relative diameters and so placed in reference to each other that an annular space is left between the two from top to bottom, and a like space is left between the bottoms of the two cylinders, the inner cylinder being divided by means of double-walled diaphragms into a series of chambers or compartments, through which the material travels successively, entering at the top and discharging at the bottom.

Within the casing or body is placed a central vertical shaft carrying a series of horizontal spider-frames, one for each chamber or compartment, the arms of which frames are provided with blades which serve to work the material under treatment and give it its proper direction in passing through the machine.

The first compartment or chamber has its floor furnished with a series of spikes or teeth, which tend to hold the larger pieces or masses of material under treatment while the arms of the carrier or stirrer tear apart or separate the same. A hot-air pipe having a branch to enter each chamber, and having that portion within the chamber perforated, is provided to assist in the drying operation; and an exhaust trunk or pipe, likewise provided with a branch for each chamber, removes the vapor and odors from each. This construction, which will be presently described in detail, insures the separation of the larger masses, lumps, or particles of material under treatment, exposes every particle to the action of the heated air and the exhaust draft, prevents the baking of the material in large lumps, from which the vapors and odors cannot be removed, and greatly expedites the action of the apparatus.

Referring now to the drawings, A represents an exterior cylinder or casing, and B an interior cylinder, concentric with but of smaller diameter than the first, within which it is placed, as indicated in Fig. 3, leaving an annular space, S, between the walls of the two. The bottom of the interior cylinder is supported or held slightly above the bottom of the exterior cylinder, as also shown in Fig. 3, forming a continuation of the space S between them.

In practice I stop the outer cylinder or casing a short distance below the top of the inner one, as shown in Figs. 1 and 3, closing the space between the two at the top by means of an annular head of wood or other suitable material, as shown.

At suitable points within the cylinder B, I form or secure horizontal diaphragms or partitions D D′ D″, each consisting of two plates or walls, *d* and *d′*, separated by a steam-space, S′, communicating with the annular steam space S, as shown in Fig. 3.

From the above it will be seen that the steam which enters the steam-jacket, either at the top or bottom, through a pipe, *k*, is free to pass into the spaces S′ of the diaphragms, and that as a consequence the chambers or compartments B′ B″ B‴, formed by the introduction of the diaphragms, are completely surrounded by steam, or practically so, and hence the material treated in the chambers will be most effectually and thoroughly heated.

F represents a central vertical shaft, which extends through the several chambers, is carried in a step or bearing block, *f*, at its lower end, and terminates at its upper end within the upper end or dome, C, of the cylinder B, where it is furnished with a bevel-pinion, M, meshing with a second pinion, M′, secured upon the shaft *m* of a horizontal spiral conveyer, N, by which latter the material to be treated is delivered from the supply-hopper O into the dome or chamber C. In order that the gearing M M′ may not become clogged or fouled by the material within the dome C the gearing is incased by a box or shield, as shown in Figs. 2 and 3, open at the top to permit of access to the gear. Upon the shaft F, within each of the several chambers, is secured a hub or boss, Q, provided with a series of arms, R, arranged either at an angle to the radii, or radially, as preferred, and these arms are, in turn, provided with depending blades *r*, as shown, the blades being inclined in one or another direction, as hereinafter explained.

L, L′, L″, and L‴ represent openings or passages through the several diaphragms and the bottom, which, as shown in Fig. 3, are located alternately near the center and near the circumference of the diaphragms, the object being to cause the material in passing through the machine to take a corresponding course. The blades *r*, which are caused by the rotation of the shaft to travel all in one direction, are placed at one inclination on the arms of the first spider and at a reverse inclination on the next, and so on, alternating throughout the machine, to correspond with the location of the discharge passages or openings.

The shaft F is furnished, at a point below the bottom of the body or casing A, with a bevel-gear wheel, I, meshing with a bevel-pinion, I′, secured upon the driving-shaft *i*, which latter is furnished with the usual fast and loose pulleys, and the rotation of which imparts motion to the shafts F and *m*, with their attendant parts, as above described.

Y represents a hot-air supply-pipe, which in actual operation will communicate with a suitable furnace, and which is furnished with a series of arms or branches, *y*, one for each chamber or compartment, the arms or branches within the chambers being perforated to permit the heated air to come into direct contact with the material operated upon.

V represents an exhaust pipe or trunk provided with a series of branches, *l*, of which one enters each chamber, serving to withdraw the vapors and odors therefrom, a fan or pump being connected with the exhaust trunk or spout, and discharging the vapors and odors, in practice, into a deodorizing apparatus. Each branch *l* is furnished with a valve, *z*, by which to control the exhaust of each compartment or chamber.

In order to facilitate the cleaning and repair of the interior of the apparatus a man-hole provided with a lid or door, U, is provided for each chamber or compartment, opening through the walls of the two cylinders, as shown in Figs. 3, 5, and 6, and having the space between the cylinders closed around their sides by casings K, to prevent escape of steam from the steam-jacket to the interior. To enable the attendant to inspect the material in each chamber while under treatment, each door or lid U is furnished with a smaller opening closed by a door or cover, *u*, as shown in Figs. 1 and 4.

By reference to Figs. 2 and 3 it will be seen that the dome or chamber C is formed with a hollow or double floor, J, to prevent all possibility of leakage, and that said floor is armed with a series of upwardly-projecting prongs or teeth, T, which serve to hold the larger pieces or masses of material, while the teeth or blades of the spider R tear apart or reduce the same; that a collar or ring of wood or other suitable material is inserted between the two walls *d d′* of each diaphragm at the center, to prevent the steam from entering the interior of the cylinder B, the collars G and H being made to fit closely around the shaft F, to steady and support the same, and that the lower plate or wall of each diaphragm is inclined slightly downward toward the circumference, to prevent the accumulation of water of condensation thereon, the latter gravitating to and being discharged at the bottom of the machine.

The materials to be operated upon (consisting of refuse matter from slaughter-houses, rendering-tanks, and like places, or of such other substances as it may be desired to treat,) are placed in the hopper O of the machine constructed as above, conveyed into the dome C, and separated or reduced, and then worked in and out over the successive diaphragms, subject to the heat of the surrounding steam and of the jets of heated air, the vapors and odors being at the same time drawn off by the exhaust fan or pump, and the finished material is delivered through the spout L‴.

It will be seen from the above description and the drawings that the chambers or compartments are closed with the exception of the passages for the entrance and discharge of material, the hot-air inlets, and the exhaust-openings. This arrangement is important in that the material is thereby protected against the moisture of the steam, and for the further reason that the exhaust produces an inward draft of air through the supply and discharge openings when the machine is thus constructed, thereby preventing the escape of vapors and odors from the machine to the open air.

Having thus described my invention, what I claim is—

1. The herein-described drier consisting of the double-walled body and hollow diaphragms, the central shaft, F, armed with stirrers R *r*, exhaust-pipe V, hot-air pipe Y, and steam-pipe K.

2. In a drier, the combination of the cylinders A B and the double-walled diaphragms, as shown, whereby the cylinder is divided into

compartments, each surrounded, on its top, bottom, and sides, by a steam-space, as set forth.

3. In combination with the cylinder or body having a series of compartments and the steam-space S S′, the exhaust-spout V and hot-air pipe Y, each communicating with the interior of the several chambers.

4. In a drier, the false-floor J, armed with teeth or prongs T, in combination with the rotating arms R, having scrapers *r*, substantially as shown and described.

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