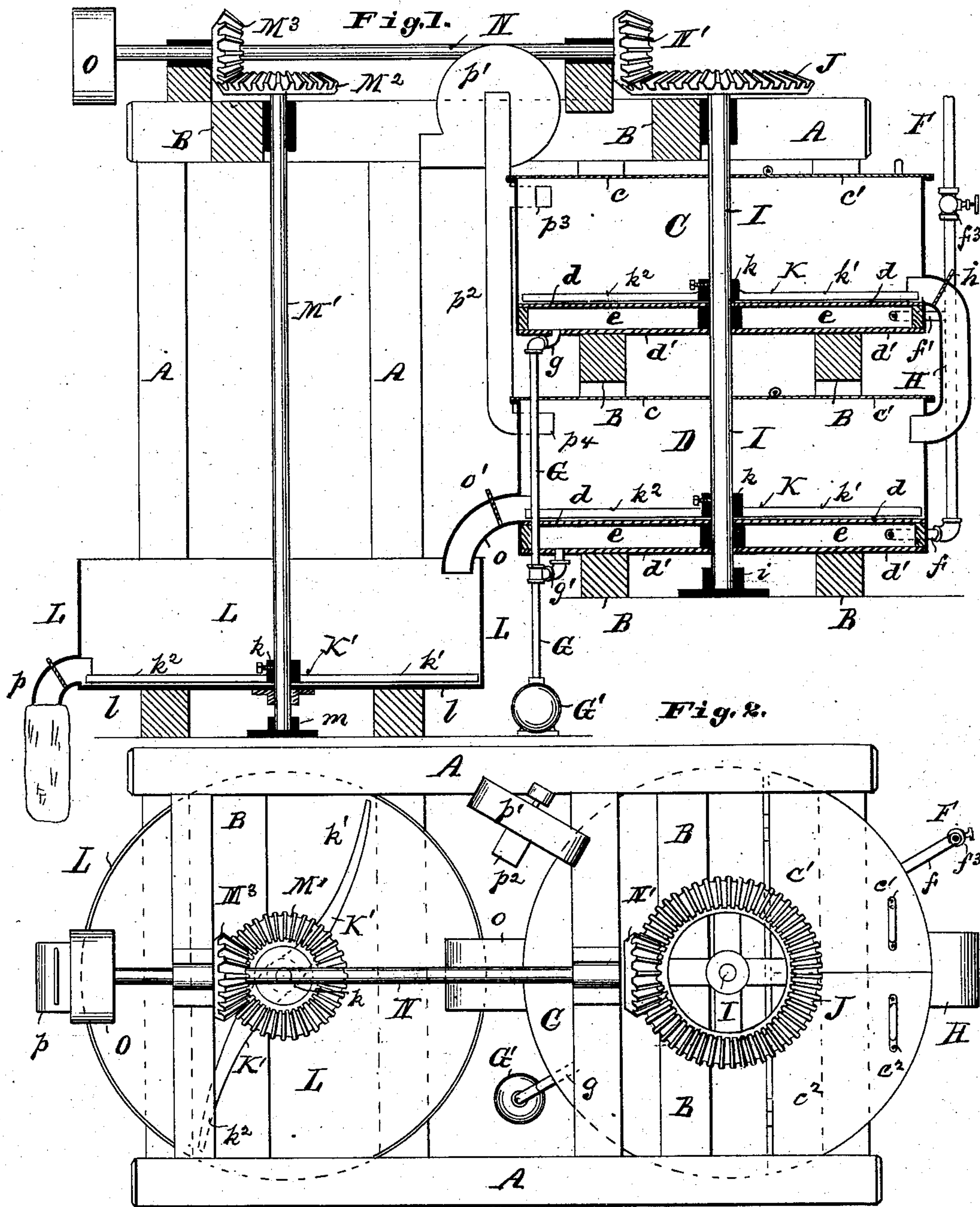


(No Model.)

M. TAMM.
OFFAL DRIER AND COOLER.

No. 260,801.

Patented July 11, 1882.



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UNITED STATES PATENT OFFICE.

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OFFAL DRIER AND COOLER.

SPECIFICATION forming part of Letters Patent No. 260,801, dated July 11, 1882.

Application filed August 16, 1881. (No model.)

To all whom it may concern:

Be it known that I, MAX TAMM, a citizen of the United States, residing at St. Louis and State of Missouri, have invented a new and useful Improved Offal Drier and Cooler, of which the following is a specification.

My invention is an improved apparatus for drying and cooling the refuse matter derived from rendering - establishments, slaughter-houses, &c., commonly termed "offal," and preparing same as a suitable material or article for fertilizing purposes.

I will first fully describe the construction and operation of my improved "drier" and "cooler," and hereinafter point out the novel features thereof in the claims.

Of the drawings, Figure 1 is a vertical central section through the series of driers, also a like section of the cooler alongside of the driers. Fig. 2 is a top plan view of the same parts shown in Fig. 1. Fig. 3 is a detail cross-section of a rake or stirrer.

Similar letters refer to similar parts throughout the several views.

A and B represent suitable frame-work of wood or cross timbers, upon which each drier is mounted. As illustrated in the drawings, I show two driers arranged one above the other, although a series of these can be employed. Each drier or apparatus for drying the offal is of similar construction and operates the same. Each tank is cylinder-shaped, closed at top by the top plate, *c*, and its hinged doors *c'* and *c''*. (See Figs. 1 and 2.) Both doors can be opened to permit access to the interior of the tank; also, either one of the doors can be opened to insert the "charge" of offal in the tank. Each tank has a double bottom—viz., *d* and *d'*, the former being the "false" or inner bottom, the latter the "true" or outside bottom. Both these bottoms *d d'* are properly united so as to form the steam space or chamber *e*. (See Fig. 1.) The inside bottom, *d*, is preferably of steel, and should present a smooth or level top face to the action of the revolving stirrers. The steam is derived from the supply-source by means of the vertical pipe *F*, which, further, by its branch pipes *f f'*, enters the respective steam-chambers of each tank or drier. *f³* is a valve to control the passage of

the steam through steam-pipe *F*. (See Figs. 1 and 2.) I simply utilize the steam to heat the steam-chambers or bottom parts of each drier, my object being chiefly to keep the inner bottoms, *d d'*, constantly heated. Hence the material treated in the drier or lying upon said heated bottoms can be sufficiently heated or subjected to drying action.

G represents a water-pipe. This by its respective branches *g g'* communicates also to the steam-chambers, as shown. The lower end of said water-pipe connects to a suitable steam-trap, *G'*. (See Figs. 1 and 2.) By means of this water-pipe connection to the steam-chambers, whatever water of condensation collects in said chambers is drawn off or permitted to escape.

H represents a feed-pipe communicating from the bottom of the upper tank to a point near the top of the lower tank. It is through said pipe that the charge of offal from one tank or drier is fed down or emptied into the compartment of the lower one, a slide, *h*, in said feed-pipe controlling the passage of the material from one drier to another. (See Figs. 1, 2.)

I represents a vertical shaft arranged to pass through the center of the driers, the lower end of said shaft turning in a step, *i*, while the upper end of said shaft carries a bevel-wheel, *J*. (See Figs. 1, 2.) The revolution of the shaft *I* operates the stirrers *K*, which are placed upon the bottom of each tank. Each stirrer *K* consists of a hub, *k*, from which extend two or more radial arms, *k' k''*. (See Figs. 1, 2, 3.) The arms *k' k''* of the stirrer have a slight curvature in opposite directions from the hub to outer ends, as shown in Fig. 2, and the top face of each stirrer or arms thereof presents the incline face *k³*, shown in Fig. 3. In so forming the stirrers *K* to be of the shape shown in Figs. 2 and 3, besides the usual action of grinding, the following important results in action are achieved, viz: first, owing to the slight curvature of the arms, the stirrers *K* distribute the material more uniformly over the heated bottom, keeping the same at all times covered with the offal; secondly, the taper face of the stirrer causes the material it comes in contact with to roll over or change

its position, hence the better to be subject to the heat or drying action. It also facilitates the escape of the odors or vapors arising from the stirred material. The dried offal is discharged or emptied into what I term the "cooler."

L represents the cooler. It consists simply of a compartment or tank, L, left open at its top, and on its bottom l is provided a like stirrer, K' , operated by the shaft M' , as shown in Figs. 1 and 2. The vertical shaft M' passes centrally through the cooler, turns in a step, m , below, and at top, by bevel-gears $M^2 M^3$, is operated by the horizontal top shaft, N. (See Figs. 1 and 2.) The same top shaft, by its further bevel-gear N' , meshing with that of gear-wheel J, revolves the vertical shaft that passes through the driers.

O is a belt-wheel on the top shaft, which by belting connects said shaft to the power source. The cooler L and its parts are situated somewhat lower than the lowest drier, and by the discharge spout or pipe O, having slide O' , the dried offal can be emptied into said cooler. p is the final discharge-pipe to convey the dried and cooled offal into a sack or other receptacle, as indicated in Figs. 1, 2.

To remove the odors and vapors that arise from the material during its treatment in each drier, I employ the usual suction-fan, p' , which, by the pipes $p^2 p^3 p^4$, connects to the respective compartments of each drier, as shown. As apparent, the revolution of the top shaft produces rotation of the respective vertical shafts and their stirrers, also the suction-fan is operated. The material is first subjected to drying action—that is, the charge of offal contained in each drier is continually stirred to cover uniformly the heated bottom, permitting the heat to permeate the particles of offal, while at the same time the odors and vapors are being withdrawn. In practice, by the time the charge of offal in the cooler has been sufficiently cooled—that is, stirred in the open tank L exposed to the atmosphere—the charge in the lowest drier is effectually dried and the charge treated in the upper drier is ready for further treatment in the lower drier. I am thus enabled to pass the offal through the driers and the cooler and deliver the said dried and cooled offal or material immediately into sacks, or in condition for imme-

diating storing and shipping, or use. The expense in time, labor, &c., ordinarily incurred in spreading the dried material upon floors to cool is therefore obviated. To accomplish this latter object it will be noted that only when the cooler has been emptied of its charge another charge is filled into the cooler; otherwise a mixture of dried and cooled offal is had which can be avoided. Each charge of offal is therefore treated properly in its turn and reaches the cooler, from which the prepared fertilizing material can be immediately used or placed upon the market.

I am aware that substances have been dried in chambers heated by steam, and that these substances have been agitated during the drying process by stirrers. I do not therefore broadly claim this feature, but

What I claim is—

1. The cooler L, consisting of a tank left open at top, the rotating shaft M' , revolving stirrer K' , having radial arms $k' k^2$, with incline face k^3 , the drier consisting of two or more tanks, C D, closed at top, its two bottoms, $d d'$, forming a steam-space, e , the steam-pipe F, the water-pipe G, and the rotating-shaft I, carrying stirrer K, of like construction to that in the cooler, all said parts combined and constructed as shown and described, by means whereof the dried offal can be immediately cooled and packed for use.

2. The combination of one or more driers, consisting of a tank or compartment having closed top, the bottoms $d d'$, forming a steam-space, e , the steam-pipe F, with its branches, the water-pipe G, with its branches, the shaft I, its stirrers K, having curved arms $k' k^2$, with incline face k^3 , the feed and discharge pipes H and O, the cooler consisting of a tank, L, open at top, its shaft M' , carrying stirrer K' , the fan and its communications to the driers, and the top shaft and gearing meshing with said vertical shafts, all said parts constructed and operating substantially in the manner and for the purposes set forth.

In testimony of said invention I hereunto set my hand.

MAX TAMM.

Witnesses:

WILLIAM M. HERTHEL,
JOHN W. HERTHEL.