

J. J. STORER.

Treating Offal and Manufacturing Fertilizers.

No. 135,383.

Patented Jan. 28, 1873.

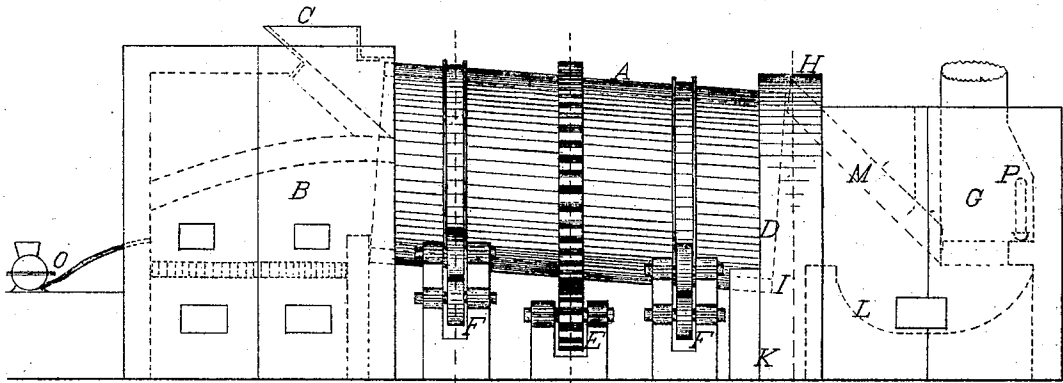


Fig. 1.

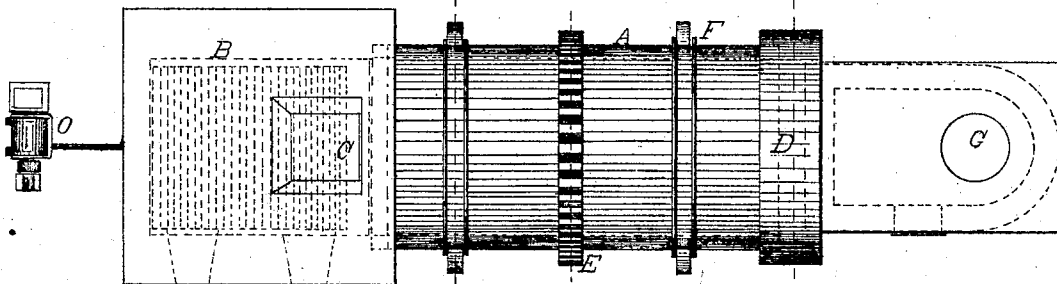


Fig. 2.

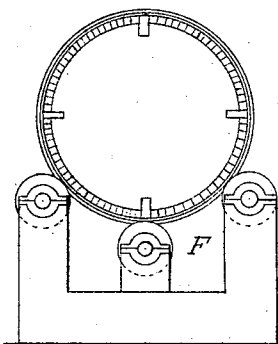


Fig. 3.

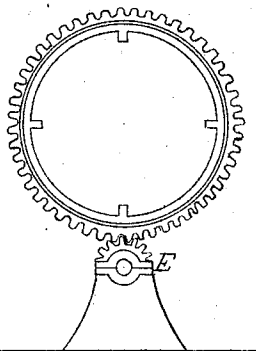


Fig. 4.

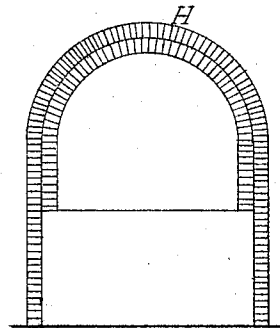


Fig. 5.

Witnesses

Charles M. Nicholson,
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UNITED STATES PATENT OFFICE.

JACOB J. STORER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN TREATING OFFAL AND MANUFACTURING FERTILIZERS.

Specification forming part of Letters Patent No. 135,383, dated January 28, 1873.

To all whom it may concern:

Be it known that I, JACOB J. STORER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Deodorizing Furnaces and Processes, and in the Manufacture of Fertilizers, which the following specification and accompanying drawing sufficiently describe.

The object of my invention is to dispose of the refuse animal and other matter of slaughtering, packing, rendering, bone-boiling, glue-manufacturing, and like establishments, in such a way that no offensive or noxious odors or gases shall escape into the air, and at the same time to utilize these substances as fuels or fertilizers, creating a value where now there is offense and cost.

For this purpose I have designed a revolving furnace or drying-cylinder, having at one end a stationary fire-box and at the other a smoke-stack, the base of which is enlarged into a chamber designed for a thorough mingling of the gases and steam with the flame and hot air escaping from the furnace, so that the complete combustion and deodorization of the former may be secured. The bottom of the chamber is made concave for the purpose of holding the blood, tank-water, or other liquids produced in these establishments, which is to be introduced therein for evaporation and drying. These elements—*i. e.*, the revolving cylinder, the fire-box, and the chamber with concave bottom at the base of the smoke-stack—constitute essentially the apparatus which I have designed, for the purposes set forth.

Figure 1 is an elevation of the apparatus. Fig. 2 is a plan of the same. Fig. 3 is a vertical section, showing friction-rolls and lining of cylinder. Fig. 4 is a vertical section, showing gear. Fig. 5 is a vertical section through hood.

The cylinder A is made of boiler-iron lined with fire-brick or other suitable refractory substance, and is, preferably, set on an incline for the more ready discharge of the material which is being operated upon; the same end may be accomplished, however, by furnishing the inside of the cylinder with blades or shelves set spirally. The lining is preferably made as shown in Fig. 3, where it is seen that some rows of bricks project beyond the others. This is for the purpose of causing a better distri-

bution of the offal, &c., around the cylinder when it is revolving, and for giving it (the offal, &c.) a more thorough exposure to the hot air and flame. When the projecting bricks of the lining are set in spiral lines they serve to assist in the discharge of the material at the exit-end D of the cylinder. The cylinder may be revolved by belt, chain, or gear, but preferably by gear, as shown at E, and is supported and made to revolve with but little friction by the friction-rolls F F. At the exit-end of the cylinder, where it approaches the chamber or base of smoke-stack G, is a brick-lined iron hood, H, open at the bottom. This serves the purpose of preventing the escape of flame or gases through the open joint between the end of cylinder and the chamber. At I is a space between the lower end of the cylinder and the chamber, permitting the downward discharge of the material into the pit K. The chamber or base of stack has a concave or basin-shaped bottom, L, for the reception of the tank-water, blood, &c., which is to be evaporated. The brick slope M serves to direct the flame passing from the cylinder down into or directly over the basin and its contents.

For the working of this apparatus a fire is made in the fire-place B, and urged until the cylinder has become sufficiently heated—say to a bright red or white heat—the cylinder being slowly revolved during this time, if it be deemed desirable, for the purpose of heating it more evenly. When the cylinder has become hot enough the offal, tank-stuff, or other refuse matter is fed into it, preferably while it revolves, through the hopper C. The time occupied in the movement of the material from the feed to the discharging end of the cylinder may be regulated by the slope of the cylinder, the pitch of its interior spirals, or by the speed of its revolutions, or by all or any of these causes combined; and they are easily controlled, so that the material fed into the cylinder shall be sufficiently dried before it is discharged.

I am aware that revolving cylinders have long been used for the purpose of converting offal and other refuse animal matter into fertilizers: one or more of them has the heat and flame applied to the outer surface of the cylinder; others are arranged to be jacketed with steam; in others steam and sometimes hot air

is forced into the mass of material in the cylinder for the purpose of drying it; while in some instances two or more of these methods are combined.

My process differs from all these in a most essential particular—*i. e.*, I cause the flame and products of combustion from the fire-place to enter the cylinder and come directly in contact with or to radiate heat directly upon the material which is to be dried or evaporated.

By this plan much quicker action is secured, while the offensive gases and steam arising from the material are decomposed and burned, without giving offense, in the apparatus itself, and, burning, serve as so much additional fuel for the prosecution of the work. Indeed, the volume of flame escaping up the smoke-stack when the apparatus is in operation is sufficient to generate a large amount of steam, and may easily be utilized.

As much care and skill are required to maintain a sufficiently-hot and constant fire in fire-place A alone for the efficient conduct of the process, I prefer to make use of pulverized coal as the principal fuel, according to the methods designed and patented by James D. Whelpley and Jacob J. Storer in United States patents No. 53,208, dated March 13, A. D. 1866; reissue No. 3,857, dated March 1, A. D. 1870, and No. 109,785, dated November 29, 1870; and by me in patents No. 131,131, dated September 3, A. D. 1872, and No. 132,498, dated October 22, A. D. 1872.

The advantages of applying pulverized fuel for this purpose are clearly set forth in the last two of these patents, and for applying it I preferably make use of a fan or pulverizer, shown at O, though it may be applied by other methods without derogating from my claims.

To add to the economies of the process, I place air-pipes P in the smoke-stack, where they are heated by the escaping flame. Air forced through these by fan or otherwise may be heated to 500° or 1000° Fahrenheit, and then be conducted into the fire-place or cylinder, or anywhere else where it may be of advantage.

The steam escaping from the rendering-tanks will be burned and deodorized if al-

lowed to pass through the fire or cylinder or both of them. It is preferable, however, to superheat it first, which may be economically done passing by it through hollow walls of the fire-place.

By the method above described any wet substances may be cheaply dried, charred, or burned, and many liquids evaporated, either in the cylinder or in the basin at the bottom of the smoke-stack; and for the longer retention of liquids or solid substances the cylinder may be placed on a horizontal plane or be made elliptical or oval, or have its ends drawn in or made smaller in some way; while in such case a discharging-door may be placed in some convenient part of it.

Having thus described my process and apparatus, what I claim is—

1. The process and apparatus, substantially as and for the purpose described.

2. The drying of offal, blood, or other animal matter in a cylinder, for the purpose of preparing it for a fertilizer, by passing flame and products of combustion through the cylinder only, not around or outside of it, directly over or in contact with said material, substantially as and for the purposes described.

3. In combination with the cylinder and fire-place, with or without the use of pulverized fuel, the gas and flame mingling and combustion chamber and the concave bottom of said chamber, substantially as and for the purposes described.

4. The production of a fertilizer from offal, blood, and other animal matter by drying it, and from tank-water by evaporating it, by the direct contact or radiation of flame or the products of combustion of solid or pulverized fuel, gases, or steam, substantially as described.

5. The drying of offal, blood, or other animal matter in a cylinder, for the purpose of preparing it for a fertilizer, by passing the flame of pulverized fuel and other products of combustion through the cylinder directly over or in contact with said material, substantially as and for the purposes described.

JACOB J. STORER.

Witnesses:

CHARLES M. NICKERSON,
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