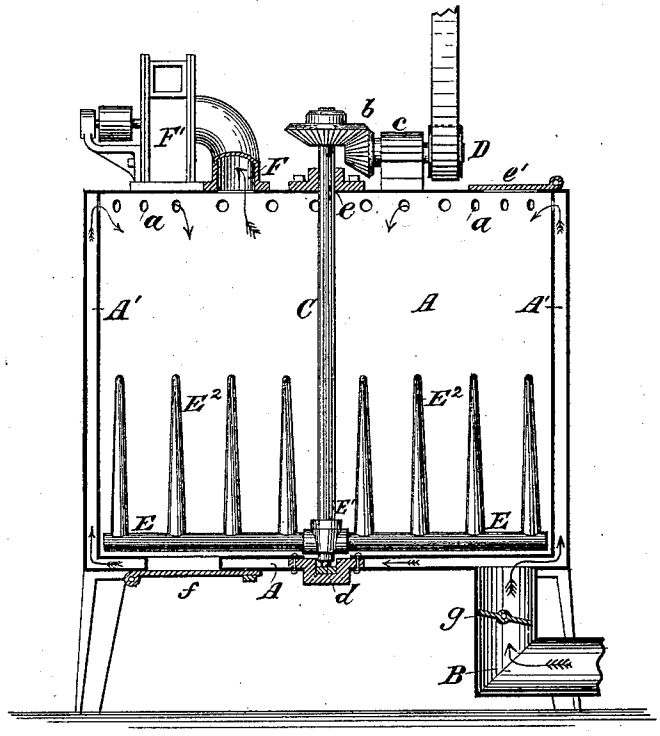
(No Model.)

W. WRIGHT.

APPARATUS FOR DRYING FERTILIZERS.

No. 299,898. Patented June 3, 1884.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM WRIGHT, OF NEW YORK, N. Y.

APPARATUS FOR DRYING FERTILIZERS.

SPECIFICATION forming part of Letters Patent No. 299,893, dated June 3, 1884.

Application filed June 4, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WRIGHT, of the city of New York, in the county and State of New York, have invented a new and useful Improvement in Apparatus for Drying Fertilizers and other Materials, of which the following is a specification.

Fertilizers have heretofore been dried in vessels subjected to direct heat from a fire, and they have also been dried in steam-jacketed receptacles. The first method is objectionable because by direct and intense heat the ammonia is volatilized and driven off, thus greatly impairing the quality of the fertilizer, and the second method is objectionable because the steam, unless superheated, has not sufficient heat.

My invention consists in an apparatus of novel construction wherein fertilizers or other materials are dried by means of heated air.

The accompanying drawing represents a vertical section of a drying apparatus embodying my invention.

A designates a closed cylindric vessel, the axis of which is vertical, and which has a flat or approximately flat bottom. It is surrounded on the bottom and side by a jacket, A′, to which heated air is introduced through a pipe or flue, B. Near the top of the vessel there are openings *a*, which afford communication between the interior of the vessel and the jacket.

C designates a shaft which extends from top to bottom of a vessel, A, and to which rotary motion is imparted by bevel-wheels *b* from a horizontal shaft, D, supported in the bearing *c* on top of the vessel. The shaft C is supported at its lower end in a step-bearing, *d*, and near its upper end in a bearing, *e*, attached to the top of the vessel.

Upon the shaft C is mounted a spider, which consists of a number of arms, E, radiating from a hub, E′, secured on the shaft, and carrying pins or projecting teeth E^2. The spider and its pins or projecting teeth form a stirrer to agitate the contents of the vessel and bring all the material in contact with the heated walls of the vessel. The stirrer might be secured higher up on the shaft and have its teeth or pins projecting downward, and, if desired, a second stirrer may be attached to the upper portion of the shaft, so as to rotate in the upper part of the vessel.

The fertilizer or other material to be dried is introduced through a man-hole, *e′*, provided with a suitable cover at the top of the vessel, and the dried fertilizer or material is delivered from the bottom of the vessel through a discharge-opening or man-hole, *f*, also closed by a suitable cover or lid.

F designates an outlet pipe or flue for the vapors, to which I apply an exhaust-fan, F′, which is mounted on the vessel A, as shown, or in any convenient relation thereto.

The fertilizer to be dried having been placed in the vessel, the rotary shaft and its stirrer or stirrers are set in operation, and heated air is admitted to the jacket A′, under control of a damper, *g*, arranged in the pipe B. The vapor arising from the drying material is drawn off by the exhauster F′, which also produces the flow of air from the jacket through the holes *a*. Thus an active circulation of heated air through the jacket is maintained. The mingled vapor and air may be passed through a condenser, if desired, and then into a furnace for the purpose of destroying the noxious gases and vapors emanating from the drying matter. By this drying apparatus just the right degree of heat is maintained without using such a high degree of heat as will vaporize the ammonia, and the drying is effected rapidly and economically.

Inasmuch as hot air is used instead of steam, there is no need of calking the joints of the vessel or its jacket, and it may be made of cast-iron or thin plate or sheet iron. The heated air for supplying the jacket is furnished from any source.

I am aware that it is not new to employ for rendering animal matter a cylindric vessel heated by an external steam-jacket and to force heated air directly into the interior of the vessel after the heating of the contents by steam is completed. I do not claim such an apparatus as of my invention.

I have hereinabove stated that heated air is much more desirable than steam for use in the jacket surrounding a drying-cylinder, because there is not the necessity of having the jacket

calked absolutely tight that there is when steam is used, and the blower in the apparatus to which I refer is not used to accomplish the same purpose as my exhaust-fan, nor does it have the same effect. In the referred-to apparatus there is no provision for the passage of the heating agent, which is steam, from the jacket into the interior of the vessel, and when hot air is forced into the vessel it does not first pass through the jacket, but enters the interior of the vessel directly. My jacket being in communication with the interior of the vessel, and the exhaust-fan being connected directly with the interior of the vessel, the exhaust-fan not only serves to take off vapor arising from the contents of the vessel, but also serves the purpose of producing a lively circulation of heated air in the jacket, and the fan-blower in the previous apparatus has no such double effect. The exhaust-fan is also much more advantageous than a fan-blower or force-fan, because it produces a diminution of pressure in the vessel slightly below the atmosphere, and hence the escape of vapor from the drying contents is greatly promoted.

What I claim as my invention, and desire to secure by Letters Patent, is—

In a drying apparatus, the combination, with a vessel for the reception of material to be dried, provided with a surrounding jacket for hot air which communicates with the interior of the vessel, and a pipe for supplying hot air to the vessel, of a stirrer in said vessel for agitating or moving the drying material, and an exhaust-fan connected directly with the interior of the vessel, and serving by its action to promote the circulation of heated air in the jacket and to convey away from the vessel the air entering from the jacket and the vapors emanating from the drying material, all substantially as and for the purpose herein described.

WILLIAM WRIGHT.

Witnesses:
FREDK. HAYNES,
ED. L. MORAN.