

H. P. LISSAGARAY.

DESICCATORS FOR FERTILIZERS.

No. 176,474.

Patented April 25, 1876.

Fig. 1.

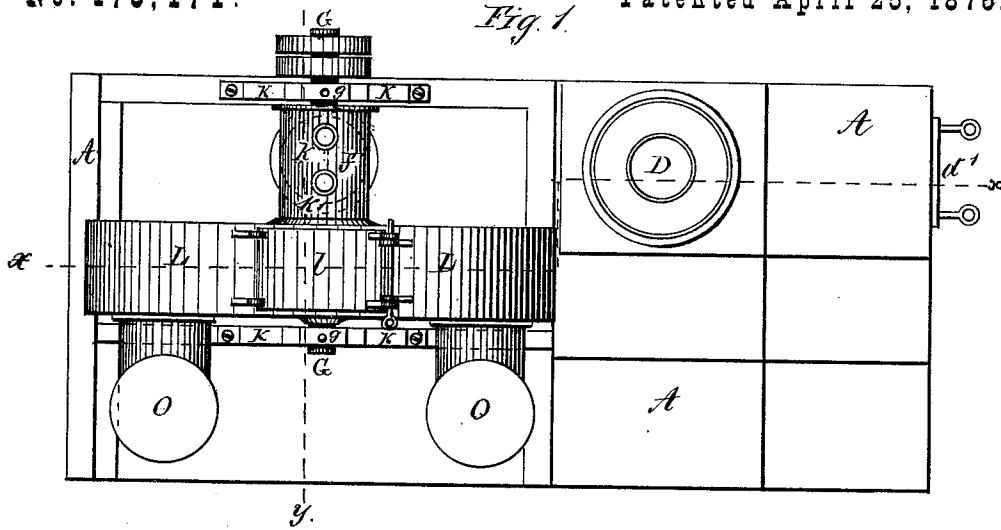
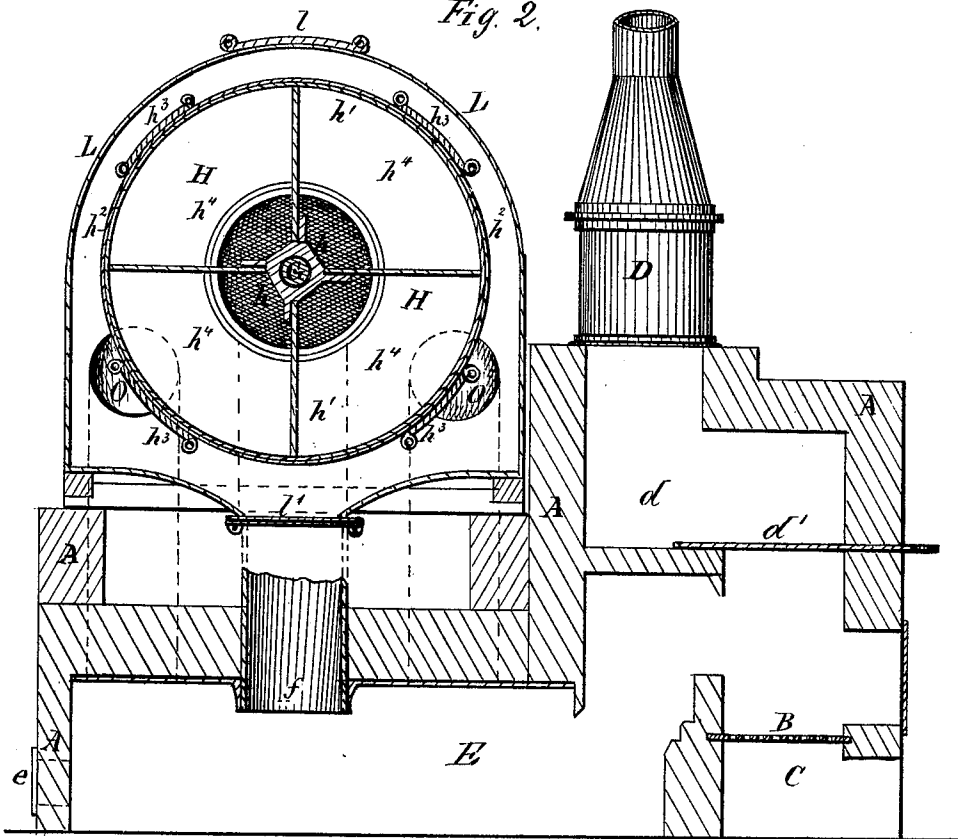


Fig. 2.



Witnesses
Hemi Guillaume
Charles Jacobin

Inventor
H. P. Lissagaray
J. Henry Cotte
att'y.

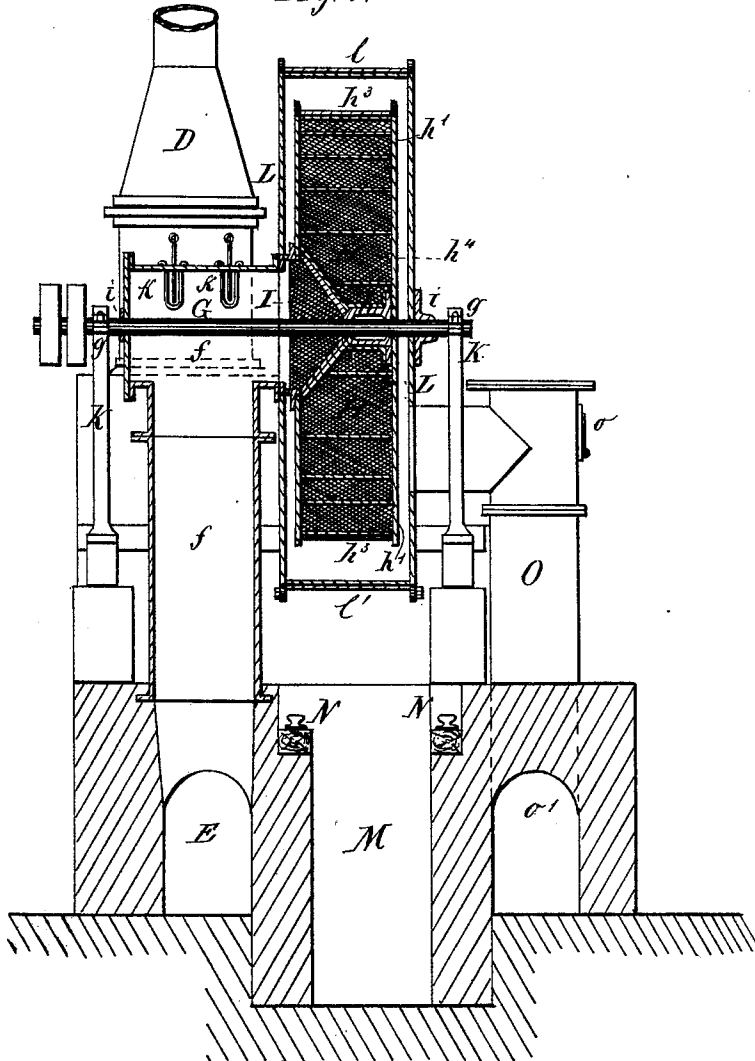
H. P. LISSAGARAY.

DESICCATORS FOR FERTILIZERS.

No. 176,474.

Patented April 25, 1876.

Fig. 3.



Witnesses.
Henri Guillaume
Chazacorn

Inventor
H. P. Lissagaray
per Henry Orth
att'y

UNITED STATES PATENT OFFICE

HENRI P. LISSAGARAY, OF PANTIN, NEAR PARIS, FRANCE.

IMPROVEMENT IN DESICCATORS FOR FERTILIZERS.

Specification forming part of Letters Patent No. **176,474**, dated April 25, 1876; application filed February 5, 1876.

To all whom it may concern:

Be it known that I, HENRI PROSPER LISSAGARAY, of Pantin, near Paris, France, have invented certain new and useful Improvements in the Manufacture of Manures from Blood, of which the following is a specification:

My invention has for its object the utilization of blood from slaughter-houses by converting it into a fertilizer; and consists in an improved apparatus for effecting the desiccation of the coagulum.

The blood is gathered at the slaughter-houses and poured into barrels or tanks of such size that they may be readily loaded upon wagons for removal to the converting establishment, and such blood is mixed with sulphide of soda, phenic acid, acetic acid, and a small quantity of sulphuric acid, to prevent putrefaction and decomposition during the time the tanks remain at the slaughter-houses, or during the transit of the blood from the latter to the converting establishment, where the blood is poured into suitable tanks for coagulation, by admitting steam under high pressure into the tanks in such manner that said steam shall not only cause the blood to enter into ebullition, but also effect a mechanical action upon such blood by stirring it ("barbottage") constantly or keeping it in a state of constant agitation.

The barrels or tanks into which the blood is poured at the slaughter-houses may serve the purpose of coagulating-tanks, by providing them with suitable inlet and outlet steam-pipes, to which the pipe from the generator may be readily coupled, and thus avoid the labor and time otherwise expended in transferring the blood from these receptacles to special coagulating-tanks.

I prefer, however, to employ special tanks, and provide them with a stirrer or stirrers actuated or set in operation by a suitable motor to augment the mechanical action of the steam, by constantly stirring the blood under treatment, which serves to hasten the coagulation. If desired, the barrels, however, may be provided with such stirrer or stirrers, their shafts projecting from one end sufficiently to mount a pulley thereon, or other means for connecting such shaft with a motor. This

stirring of the blood by mechanical means is, however, not essential, as the action of the steam under high pressure will be sufficient to effect a perfect coagulation. From twenty to twenty-six pounds of steam, under a pressure of five atmospheres, are required for every two hundred pounds of blood; and the following will indicate the perfect coagulation: First, the coagulum assumes a characteristic greenish-yellow color, which, however, it loses very rapidly again if allowed to cool. Secondly, the fluid separated therefrom is very limpid, and should at once be drained off, as it will dissolve a portion of the coagulum and become red again. It is essential that this separation of the serum-water should be effected before it has time to redissolve any portion of the coagulum, and is effected in the following manner: The water and coagulum, as soon as it is ascertained by the limpidity of the former and the color of the latter that the coagulation is perfect, are pumped or otherwise transferred upon a filter made of wire-cloth stretched above an inclined table covered with sheet-iron or other suitable sheet metal, corrugated in such manner as to form channels transversely across the table, which is provided at its front edge with a gutter terminating in a spout connected with a suitable eduction-pipe to carry off the filtered serum-water. The coagulum should be spread as evenly as possible over the filter, and allowed to remain until no more serum-water filters through, the only water remaining being that held by capillary attraction, which is removed by transferring the coagulum into stout canvas bags of suitable dimensions, and placing the same when filled into a hydraulic or other powerful press, taking care to separate the bags from each other by an intervening plate of sheet metal. The coagulum being subjected to powerful pressure, almost all the water is extracted, retaining a minimum quantity of moisture only. When withdrawn from the press, the coagulum is in the form of cakes, ready for market or use.

The coagulum and water should be removed from the coagulating-vessel when still at a temperature of from 70° to 75° centigrade.

The size of filter I have found most advan-

tageous has a surface of about sixteen square yards, and is adapted to receive about three thousand pounds of the coagulum.

Instead of the coagulum being subjected to pressure, it may be dried in any suitable apparatus, though I prefer to employ the apparatus especially designed for the desiccation of the coagulum which I will now describe, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of an apparatus constructed according to my invention. Fig. 2 is a vertical section through line *xx* of Fig. 1, and Fig. 3 is a similar section through line *yy* of Fig. 1.

A is the masonry or casing, constructed and arranged in any suitable manner, provided with a fire-grate, B, ash-pit C, and chimney D. The chimney is separated from the furnace by a flue, *d*, and a damper, *d'*, which latter is opened when the fire is first started, and closed again as soon as the fire is well ignited. The heated gases and products of combustion pass from the furnace into the flue E, which is also provided with an aperture, *e*, and a suitable door or damper thereto, to admit atmospheric air for regulating the temperature in the apparatus.

From the flue E the heated gases pass up through the connecting-pipe and branch-pipe *f* into the desiccating-wheel H, which is formed or constructed upon a sleeve, *h*, which latter, together with the wheel, is firmly keyed to the shaft G, which has its bearings J in uprights K, carried by the frame or masonry work of the apparatus. This shaft carries a fast and loose pulley, and is driven from any suitable motor.

The desiccating wheel is constructed as follows: The sides or ends *h'* are of sheet-iron or other suitable sheet metal, while its periphery is made of fine wire-cloth. The wheel is subdivided into four or more compartments by wire-cloth partitions running radially from the sleeve *h* to the periphery, which latter is provided with a series of doors, *h''*, one for each compartment *h'*, for charging and discharging the latter. The cylinder is provided with an inwardly-projecting cone, I, made of wire-cloth, formed centrally in one of its sides, as shown by Figs. 2 and 3, said cone being mounted upon the sleeve *h* at its contracted end, while its mouth is connected to the hot-air branch pipe *f* in such a manner as to permit it and the wheel H to rotate freely with its shaft, which latter also passes through said pipe *f*, the escape of hot air being prevented by suitable stuffing-boxes *i*. This conical recess I serves the purpose of admitting the hot air from the pipe *f* into all the compartments of the desiccating-wheel, which, by its rotation and the consequent shaking up of the coagulum, allows such heat to permeate the latter and effect the desired desiccation.

The branch pipe *f* is provided with suitable thermostats *k k'*, the one, *k*, filled with

lead, and the one, *k'*, filled with zinc. By means of these thermostats the required desiccating heat is determined and readily ascertained by the melting of the lead, while the zinc should not melt, and consequently the heat may be regulated by means of these thermostats, which at all times indicate whether sufficient, too much, or not enough heat is supplied by the cooling or melting of the lead when the heat is sufficient or insufficient, or by the melting of the zinc when the heat is too strong; in other words, the most appropriate degree of heat required is that which will cause lead to melt, or 630° Fahrenheit.

L is a casing surrounding the desiccating-wheel; it is made of sheet-iron or other suitable sheet metal, and is rigidly affixed to the frame or masonry of the apparatus, and is provided with a charging-door, *l*, and a discharging-door, *l'*; it is connected on one side to the branch pipe *f*, and thus prevents any escape of heat at the connecting-point of the cone I of the desiccating-wheel with such branch pipe, and forms an outer heat-chamber for the accumulation of the heated gases and air supplied by the furnace to the desiccating-wheel H.

M is a dumping-hole between the two flues, and N is a tramway, upon which cars are run immediately under the casing L, into which cars the dried coagulum is dumped through the discharge door *l'* of the casing and those, *h''*, of the wheel.

O is an eduction, or two eduction-pipes O may be employed, as shown in the drawings, connected to the casing to carry off the heated and saturated air and gases. They are provided with a thermometer, *o*, indicating at all times the temperature of the saturated air and gases, and thus afford a further guide for regulating the heat in the apparatus. The gases escape through the pipes O into the flue *o'*, and from thence into the chimney D. Since the damper *d'* is closed to divert all the heat and conduct it through the wheel, there would not be draft enough through the circuitous route; these heated gases and products of combustion have to travel to keep up the required combustion, and to supply this necessary draft I locate a fan or fans in the chimney D, driven from any suitable motor, which fans, by their suction, supply the necessary draft.

I have described an apparatus having a special firing-place or furnace to supply the necessary heat; but it will be obvious that by a slight modification in the construction of the flues and pipes, superheated steam may be readily conducted from a generator through the desiccating-wheel, and any skilled mechanic will readily understand the required alterations, and need therefore not be dwelt upon at length. When superheated steam is employed the fans are dispensed with, and the suction is then effected by aspirators, into which jets of superheated steam are in-

jected to create a vacuum, and the consequent aspiration of the saturated steam from the desiccating-wheel.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A desiccating apparatus, consisting essentially of a revolving desiccating-wheel having its sides made solid and its periphery made of wire-cloth, said wheel being subdivided into a series of compartments, and provided with a suitable orifice for the admission of heat, and suitable charging-doors, and the inclosing casing made of sheet metal and forming a heating-chamber, in combination with a furnace or other source of heat-supply, substantially as described, for the purpose specified.

2. The combination, with the heat-supply pipe and branch pipe *f*, wheel *H*, casing *L*, induction pipes *O*, flue *o'*, and chimney *D*, of a suction device for exhausting the heated and saturated gases from the apparatus, substantially as and for the purposes set forth.

3. The desiccating-wheel *H*, having its sides solid and its periphery of wire-cloth, and subdivided into a series of compartments provided with suitable doors, in combination with the cone *I*, made of wire-cloth, substantially as and for the purposes set forth.

4. The combination of the wheel *H* and cone *I*, constructed, substantially as described, with the short sleeve *h* and shaft *G*, substantially as and for the purposes set forth.

5. The combination of the wheel *H*, cone *I*, and short sleeve *h*, and shaft *G*, with the casing *L* and pipes *f o*, provided with suitable heat-indicators, the air-inlet *e*, and a furnace or other source of heat-supply, substantially as described, and for the purpose specified.

In witness that I claim the foregoing, I have hereunto set my hand this 18th day of August, 1875.

HENRI PROSPER LISSAGARAY.

Witnesses:

ROBT. M. HOOPER,
FRED. W. WEIL.