

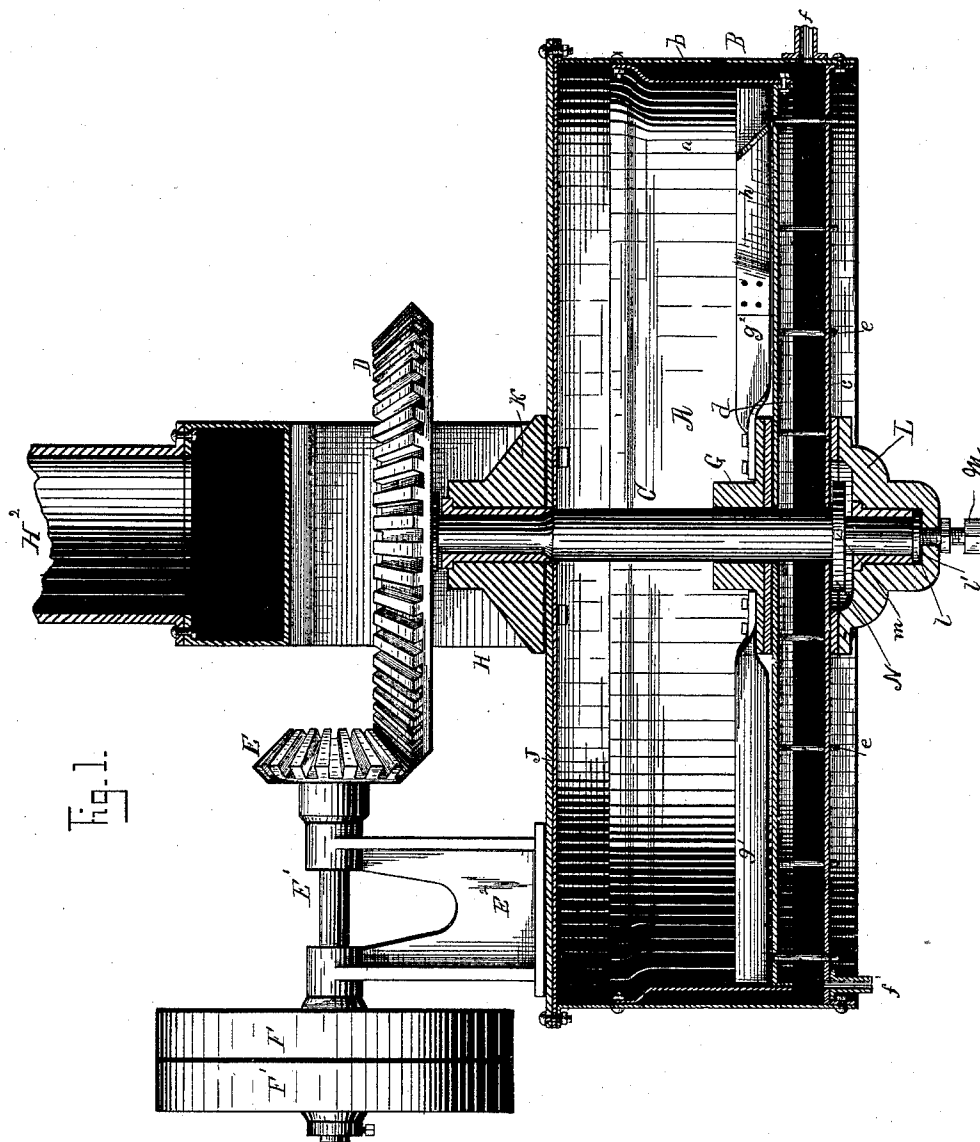
(No Model.)

2 Sheets—Sheet 1.

W. W. COWLEY.
APPARATUS FOR MAKING FERTILIZERS.

No. 416,155.

Patented Dec. 3, 1889.



Witnesses
C. B. Nash
J. D. Fay

W. W. Cowley ^{Inventor}
By his Attorney Thos B. Hall

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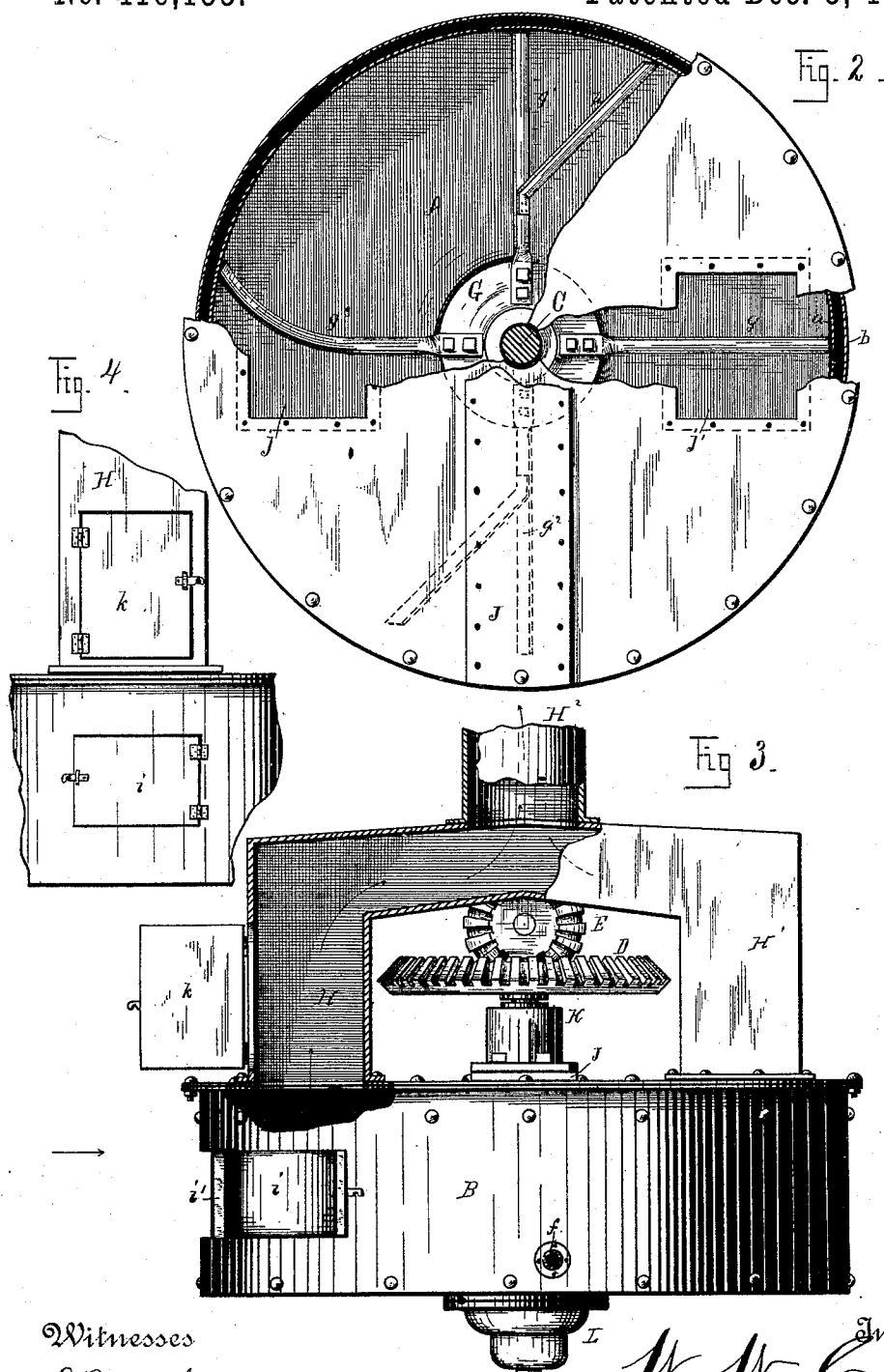
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UNITED STATES PATENT OFFICE.

WILLIAM W. COWLEY, OF CLEVELAND, OHIO, ASSIGNOR OF TWO-THIRDS TO JOHN J. FLICK, GEORGE A. ROSE, AND HERBERT E. ROSE, ALL OF SAME PLACE.

APPARATUS FOR MAKING FERTILIZERS.

SPECIFICATION forming part of Letters Patent No. 416,155, dated December 3, 1889.

Application filed June 2, 1887. Serial No. 240,036. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. COWLEY, a citizen of the United States, residing at Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Apparatus for Making Fertilizers; and I do hereby declare the following to be a description of the same, and of the manner of constructing and using the invention, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, forming a part of this specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

The object of my invention is to provide an apparatus for making fertilizer, which will synchronously dry and pulverize the material which it is desired to convert into fertilizer, and will automatically discharge its contents.

Referring to the drawings, Figure 1 is a vertical central section, certain parts being shown in side elevation. Fig. 2 is a plan view of the converting-chamber with a portion of the top broken away. Fig. 3 is an elevation view of the converting-chamber, certain parts of the cylinder and stink-pipe being broken away. Fig. 4 is an elevation view of a portion of the converting-chamber and stink-pipe, showing the doors opening into each.

A is a cylindrical converting-chamber provided with a steam-jacket B, the peripheral side *a* of said converting-chamber being concentric with and within the side *b* of said jacket, the bottom *c* of said jacket being below the bottom *d* of said chamber and stayed thereto by the stay-bolts *e*. A steam-pipe *f* leads into said jacket, and a drip-pipe *f'*, placed in the floor, leads therefrom. C is a vertical shaft journaled beneath said jacket and above said chamber and passing centrally through the same. This shaft is furnished at its upper end with the bevel-wheel D, meshing in the bevel-pinion E, the latter mounted on the inner end of the horizontal rotary shaft E', said shaft being journaled in the vertical bearing E² and provided at its outer extremity with tight and loose belt-pul-

leys F F'. Secured to the hub G, which is attached to said shaft C near the bottom of said chamber, is a series of radial arms *g g'* *g*² *g*³. These arms, preferably made of metal, are bolted to the hub and then given a twist, which causes the blades to be formed at an angle of about forty-five degrees to the floor of the cylinder. Certain of these arms are formed at different angles relative to the radius, in order that when rotating they may agitate the contents of the converting-chamber in an irregular manner and more quickly and evenly dry and break up the contents when the latter consists of hard substances, like bones, into a finely-pulverized state. For instance, the arm *g* is straight and forms a true radius. The arms *g'* and *g*² are also straight; but each is provided with a second arm *h*, secured at about its central portion and projecting at an angle to the straight portion of the arm and in the direction of rotation, while the arm *g*³ is radially curved in the direction in which it rotates.

A door-opening *i* is formed on one side of the chamber, its lower portion being about on a level with the bottom of said chamber. By means of said door being practically on a level with the floor of said chamber I am enabled to eject the contents of the same automatically by the centrifugal motion exerted by the rotary arms. This effects a considerable saving of labor, as heretofore it has been necessary to remove the contents by manual labor after the agitator had been stopped. The casing *i'* of this door-opening is boxed in and extends across said jacket to prevent the escape of the heated air contained in the jacket. Two rectangular openings *j j'* opposite one another are formed in the top of said chamber, and respectively covering these and rising on either side of the bevel-gearing are the two branches H H' of the stink-pipe H², in which they combine. This pipe may be extended, so as to discharge its contents under the furnace which generates the steam for operating the apparatus, thereby utterly consuming and destroying all stench which may arise in the operation of the apparatus.

In the pipe H is a door *k*, which I use for charging the converting-chamber. Across

the top of said converting-chamber is placed a stay-bar J, to which the journal-bearing K of the upper end of shaft C is secured. The converting-chamber and jacket is made of any suitable metal, and is constructed in the ordinary manner of tanks. The bottom of shaft C rests on a steel circular plate l, situated in the bottom of a cylindrical opening l' of bearing L, which is secured to the bottom of said cylinder. Threaded through the bottom of said bearing L is the set-screw M, which may be turned, and thus raise the shaft as it wears down. By this means I control the wear and prevent the radial arms from coming in contact with the floor of the converting-chamber. Disk N is secured to shaft C by set-screw m, immediately beneath the floor of the jacket B, forming a joint with the floor to prevent any leakage from the jacket into the bearings below.

The operation of the apparatus is as follows: The rotating mechanism is connected up with the power which drives it, thus causing the series of arms to rotate, preferably making about eighty revolutions per minute. Steam is then turned into the steam-jacket through the pipe f. The door k of the stink-pipe is opened, and the refuse which it is desired to dry and break up is thrown into said pipe and passes down through the opening j into the converting-chamber. It is here caught by the arms and moved in divers directions as it comes in contact with the different arms of the series. The door is then closed to prevent the escape of the foul odors arising from the contents of the chamber. The refuse matter is kept in the chamber for a length of time varying with the requirements of the different kinds of matter to be converted, the arms continuously revolving and steam being forced into the jacket. As the steam condenses, the drip is allowed to escape into the drip-pipe f'. When the contents of the cylinder have been sufficiently dried and disintegrated, the door-opening i is opened and the contents are automatically ejected by the centrifugal force of the arms. The operation may then be repeated.

By means of this apparatus I am enabled to utilize all the waste products of slaughter-houses, such as bones, blood, and entrails. The refuse matter is all cooked previous to being thrown into the converting-chamber, and is here thoroughly dried and pulverized in a comparatively short time by means of the heat furnished by the steam, and by the rapid revolutions of the arms throwing the matter in different directions, one arm acting centrifugally to force it out against the side of the chamber, another being bent at a dif-

ferent angle, exerting centripetal force to throw it toward the center. No other grinding is required, as the bones and blood are thoroughly pulverized. Thus by one operation and in a single machine, and simultaneously, I heat, dry, and pulverize all kinds of slaughter-house refuse usually considered worthless and make it over into good commercial fertilizer.

What I claim is—

1. In an apparatus for making fertilizers, the combination of converting-chamber A, provided with door-opening i, and one or more rotating arms located within said chamber, said door-opening i being in the same plane with the plane of rotation of said arms, whereby at proper time the door of said opening may be opened and said arms in their rotations sweep the contents from out said chamber, substantially as set forth.

2. In an apparatus for making fertilizers, the combination of the horizontal converting-chamber A, provided with the lateral door-opening i, and the series of radially-continuous and horizontally-rotating arms located close to the chamber-floor, said door i having its bottom close to said chamber-floor and in the same horizontal plane with the plane of rotation of said arms, substantially as set forth.

3. In an apparatus for making fertilizers, the combination, with the converting-chamber A, provided with heating-chamber B, of the series of rotary arms g g' g² g³, located horizontally in said chamber, said chamber provided with door i opening horizontally, practically on a level with the bottom of said chamber and in the same plane with the plane of rotation of said arms, said chamber further provided with upwardly-projecting pipe H, having filling-door k, substantially as set forth.

4. In an apparatus for making fertilizers, the combination of converting-chamber A, provided with jacket B, for heating the same, a series of rotary arms g g' g² g³ located therein, shaft C, passing through the same, and to which said arms are secured, bearing L, in which said shaft is supported, and disk N, secured to said shaft and forming a tight joint with the floor of said jacket B, substantially as set forth.

In testimony that I claim the foregoing to be my own invention I have hereunto set my hand this 23d day of May, A. D. 1887.

WILLIAM W. COWLEY.

Witnesses:

J. B. FAY,

E. J. CLIMO.