

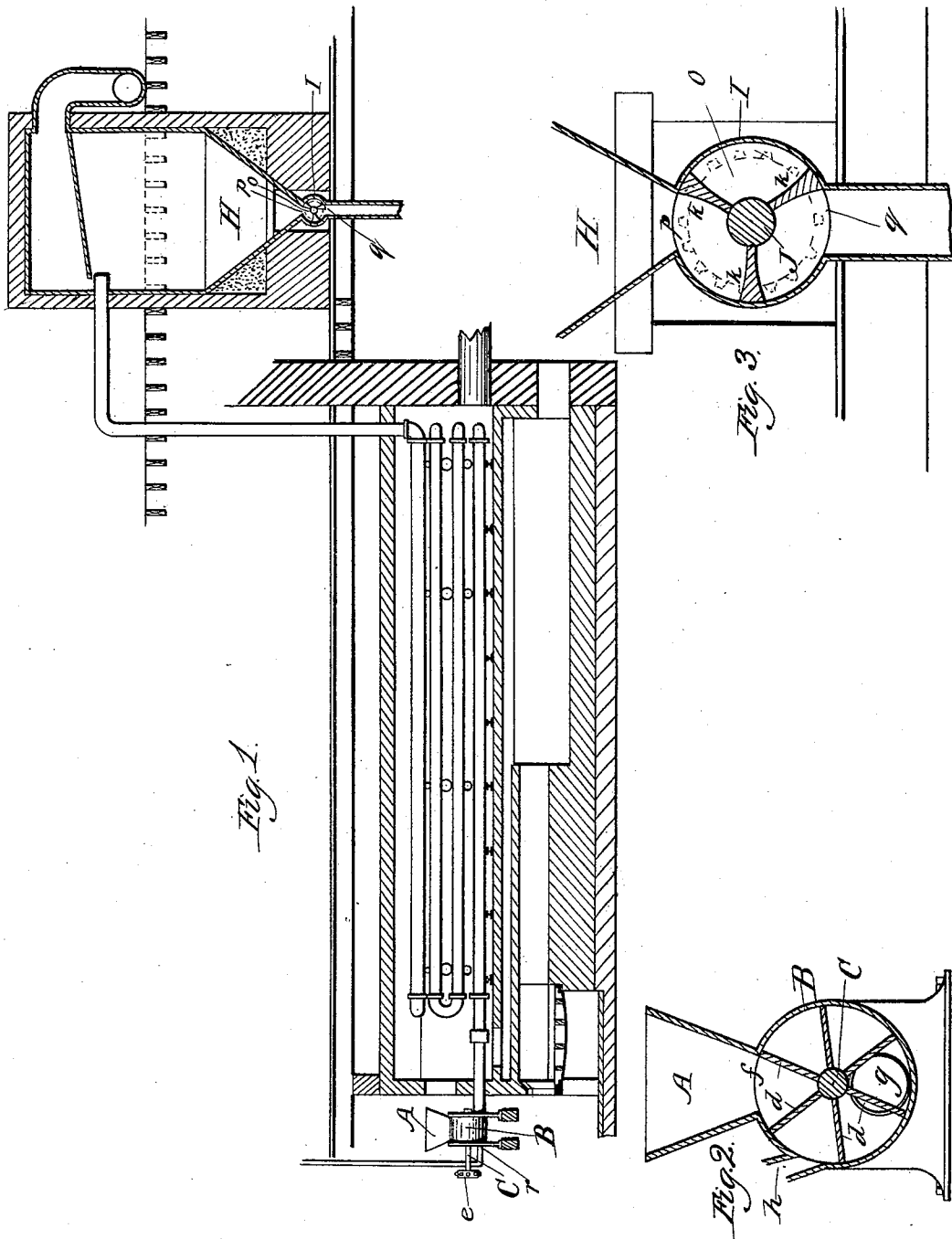
(No Model.)

R. D. FOWLER & R. NEILL.

APPARATUS FOR EXPELLING VOLATILE MATTER FROM THE REFUSE  
FROM RENDERING TANKS.

No. 251,105.

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WITNESSES -  
F. B. Townsend  
John V. Hair

INVENTOR -  
Robert D. Fowler  
Robert Neill  
By Offield + Towle  
their Attorneys.

# UNITED STATES PATENT OFFICE.

ROBERT D. FOWLER AND ROBERT NEILL, OF CHICAGO, ILLINOIS.

APPARATUS FOR EXPELLING VOLATILE MATTER FROM THE REFUSE FROM RENDERING-TANKS.

SPECIFICATION forming part of Letters Patent No. 251,105, dated December 20, 1881.

Application filed May 12, 1881. (No model.)

*To all whom it may concern:*

Be it known that we, ROBERT D. FOWLER and ROBERT NEILL, alien subjects of the Queen of Great Britain and Ireland, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in an Apparatus for Expelling Volatile Matter from the Refuse from Rendering-Tanks and from other Substances, of which the following is a specification.

We are aware that patents have been issued for expelling volatile matter from peat, clay, and other substances by means of a current of superheated steam, and that this same method has been to some extent applied to the treatment of refuse from slaughter-house tanks. We have reference more particularly to Letters Patent of the United States granted Thomas George Walker, No. 99,733, dated February 8, 1870; No. 108,853, dated November 1, 1870, and No. 236,739, dated January 18, 1881. The Walker devices have been modified, and an attempt has been made to use them for expelling the moisture and obnoxious gases from the refuse from rendering-tanks, and for reducing the same to a dry disintegrated state, suitable for use for fertilizing purposes. The Walker method has not, however, been found to be adapted to the treatment of such refuse, and its attempted use has been a failure, principally because of the insufficiency of the plan used for feeding the refuse or other matter into the apparatus, and because of a like defect in the manner of discharging the dried substances.

A screw-feeder and a pug-mill have both been used for feeding the matter to be dried and deodorized, but neither plan has prevented clogging nor stopped the steam from escaping back through the feed-chamber with sufficient volume and force to greatly retard the feeding and to expel a portion of the material thrown therein, and the dried matter, after passing through the pipes, has been subject to currents of air which have caused no inconsiderable portion of the same to pass off into the chimney with the escape-steam.

Our invention consists of a feed-wheel so constructed as to work inside of a tight cylinder and to both prevent clogging and the escape of steam up through the feed-chamber, and the use of a somewhat similar wheel device for discharging the dried material, so as

to prevent any portion of it from being carried up into the chimney.

Our improved feeding and discharging devices can be used in connection with any system of drying refuse by forcing the same through a series of pipes by means of currents of superheated steam, and are not necessarily to be confined to an apparatus such as we have shown in our drawings.

In the accompanying drawings, making a part of this specification, we have shown our invention as applied to what is commonly known as the "Walker superheated steam drying apparatus."

Figure 1 is a view of the apparatus set up and ready for use with our improved feeding and discharging devices applied thereto. Fig. 2 is an end view of our improved wheel feeding device with one of the cylinder-heads removed. Fig. 3 is an end view of our improved discharge device with one of the cylinder-heads removed.

Like letters refer to like parts throughout the several views.

In the drawings, A indicates the feed-chamber; B, the cylinder in which the feed-wheel revolves. C is the shaft of the feed-wheel, and *d* are the arms of the same. *e* is the pulley on the shaft outside of the cylinder, around which an endless chain or belt passes to operate the wheel. *f* is the opening in the upper part of the cylinder through which the refuse or other substances pass from the feed-chamber. *r* is the opening by which steam is admitted to the cylinder. *g* is the opening into the main pipe into which the refuse is forced or driven by means of the steam-current. *h* is the escape-pipe, which permits the steam carried around by the sections of the wheel to escape before the sections come under the feed-chamber. H is the receptacle into which the dried substances pass when discharged from the superheated-steam pipe. I is the cylinder inside of which the discharge-wheel revolves. J is the shaft of the discharge-wheel. *k k k* are the arms of this wheel. *o* is the pulley on the outer end of the shaft of the wheel, to which power is applied by means of an endless chain or belt. *p* is the opening into the cylinder from above, and *q* the opening through which the dried substances pass from the cylinder.

The feed-chamber A may be of any suitable dimensions corresponding with the capacity of

the apparatus. The cylinder B may also be made of a size corresponding with the capacity required, but we prefer to make the same of dimensions sufficient for the free action therein of a wheel eighteen inches in length and eight-  
 5 inches in diameter, measuring from the ends of the arms. This cylinder we prefer to construct with steam-tight ends. The advantages in making this cylinder steam-tight and in fitting and adjusting the arms of the feed-wheel  
 10 to the inside with great accuracy are that the steam is thus prevented from passing from one section of the wheel to another, and, by returning back up through the feed-chamber, retarding the operation of feeding, and from the consequent  
 15 loss of steam lessening the capacity of the apparatus, and, further, that the sections, when they come under the feed-opening, are free from steam.

20 The feed-wheel, which we make of the dimensions stated, we prefer to construct with six solid feed-arms, extending the entire length of the wheel, and equally distant from each other. No exact number of arms is required, provided  
 25 the number used is sufficient to feed without clogging to prevent the steam from escaping back up through the feed-chamber, and so that the steam remaining in the sections shall escape, as provided for before the sections come  
 30 under the feed-chamber. The number of the arms will have to be governed somewhat by the dimensions of the cylinder and feed-wheel.

We make the opening *f*, through which the refuse passes into the feed-wheel, of about the  
 35 dimensions of fourteen by eight inches, the object in not having this opening extend the entire length of the wheel being to prevent clogging at the ends.

The opening *r*, by means of which the steam is admitted into the cylinder B, we make about  
 40 one and one-half inch in diameter, and the opening *g*, through which the refuse is forced out of the cylinder and into the drying-pipes by means of the current of steam, should have  
 45 a diameter of about six inches. The size of these openings may be varied according to the capacity desired, but the proportion between the two should remain about the same.

The escape-pipe opening *h* is for the purpose  
 50 of preventing the passage of steam back up through the feed-chamber. This escape-pipe opening may be of any suitable size, and should be at a point about sixty-seven degrees distant from the center of the opening through which  
 55 the refuse is conveyed into the superheated-steam pipe; but in any event it should be so placed as to let the steam carried around by the wheel escape from each section before the feed-opening *f* is reached. The quantity of  
 60 steam used being about sixty pounds, the force of the same, if not allowed to escape, would seriously retard the operation of feeding. The escape thus provided for leaves the sections free from steam when they come around to the  
 65 point where they receive the refuse or other material from the feed-chamber.

The shaft C of the wheel and the pulley *e* are sufficiently shown in the drawings, and require no explanation.

The receptacle H, into which the dried matter passes after leaving the superheated-steam  
 70 pipes, may be of any suitable or convenient size or shape. For the discharge of this dried refuse or other material we also use a cylinder, I, with a wheel, J, separated into sections by  
 75 solid arms. We prefer to make this cylinder I likewise air and steam tight, and to so fit the discharge-wheel J therein that there shall be no circulation of air between the sections. The opening *p* into the cylinder I may be of any  
 80 suitable size; but in an apparatus of the dimensions hereinbefore specified we make this opening into the cylinder six by thirty-six inches. In this discharge-wheel we prefer to  
 85 only use three solid arms, *k k k*, as with openings only on two sides of the cylinder three sections operate to effectually cut off all air-currents, because when one section is being  
 90 filled at the opening above the arms separating the same from the other two sections are in such a position as to prevent any upward current of air.

We prefer to make the discharge-opening *q* of about the same dimensions as the opening *h*.

The shaft J, on which the discharge-wheel  
 95 revolves, and the pulley *o*, around which a chain or belt passes to operate the same, require no description, as they are sufficiently shown in the drawings.

We construct our improved feeding and  
 100 discharging devices of iron or other suitable metal.

The operation of an apparatus with our improvements attached is simple, and the construction is such that there is no liability to  
 105 get out of order or break. The tank-refuse or other material to be dried is thrown into the feed-chamber, and passes through the opening into the sections of the feed-wheel, each section being filled as it comes under the opening from  
 110 the feed-chamber. As the filled sections come between the opening, admitting the steam on one side and the opening into the drying-pipe on the opposite side, the pressure of the steam forces the material to be dried into this drying-  
 115 pipe, the steam confined within the sections of the feed-wheel escaping as each section comes around to the escape-opening in the cylinder. When the dried matter is forced from the pipe it is carried off by means of the  
 120 action of the discharge-wheel, before described.

While our improvements are more particularly intended for use in the drying of tank-refuse, they are also adapted to the drying of hair and other material by the use of pipes and  
 125 superheated steam.

The problem of how to dispose of the offensive refuse from slaughter-houses being one of much public interest and concern, especially  
 130 in large cities, our invention cannot but be possessed of value, if, as we are fully satisfied, we have invented improvements in the drying of

refuse and other material which overcome the defects heretofore known to exist in the use of superheated steam.

5 Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

10 1. The cylinder B, the shaft C, and the arms *d*, in combination with an apparatus for expelling volatile matter from refuse, hair, or other substances by forcing the same through pipes containing superheated steam.

15 2. The cylinder B, the shaft C, the arms *d*, the pulley *e*, the steam-escape pipe *h*, the feed-opening *f*, and the opening *g* into the superheated-steam pipe, arranged and operated substantially as and for the purpose specified.

3. The cylinder I, the shaft J, and the arms *k*, in combination with an apparatus for expelling volatile matter from refuse, hair, or other substance by forcing the same through pipes containing superheated steam. 20

4. The cylinder I, the shaft J, the arms *k*, the pulley *o*, the opening *p* into the discharge-wheel cylinder, and the discharge-opening *q*, all arranged and operated substantially as and 25 for the purpose specified.

ROBERT D. FOWLER.  
ROBT. NEILL.

Witnesses:

FREDERICK C. GOODWIN,  
ABEL BOND.