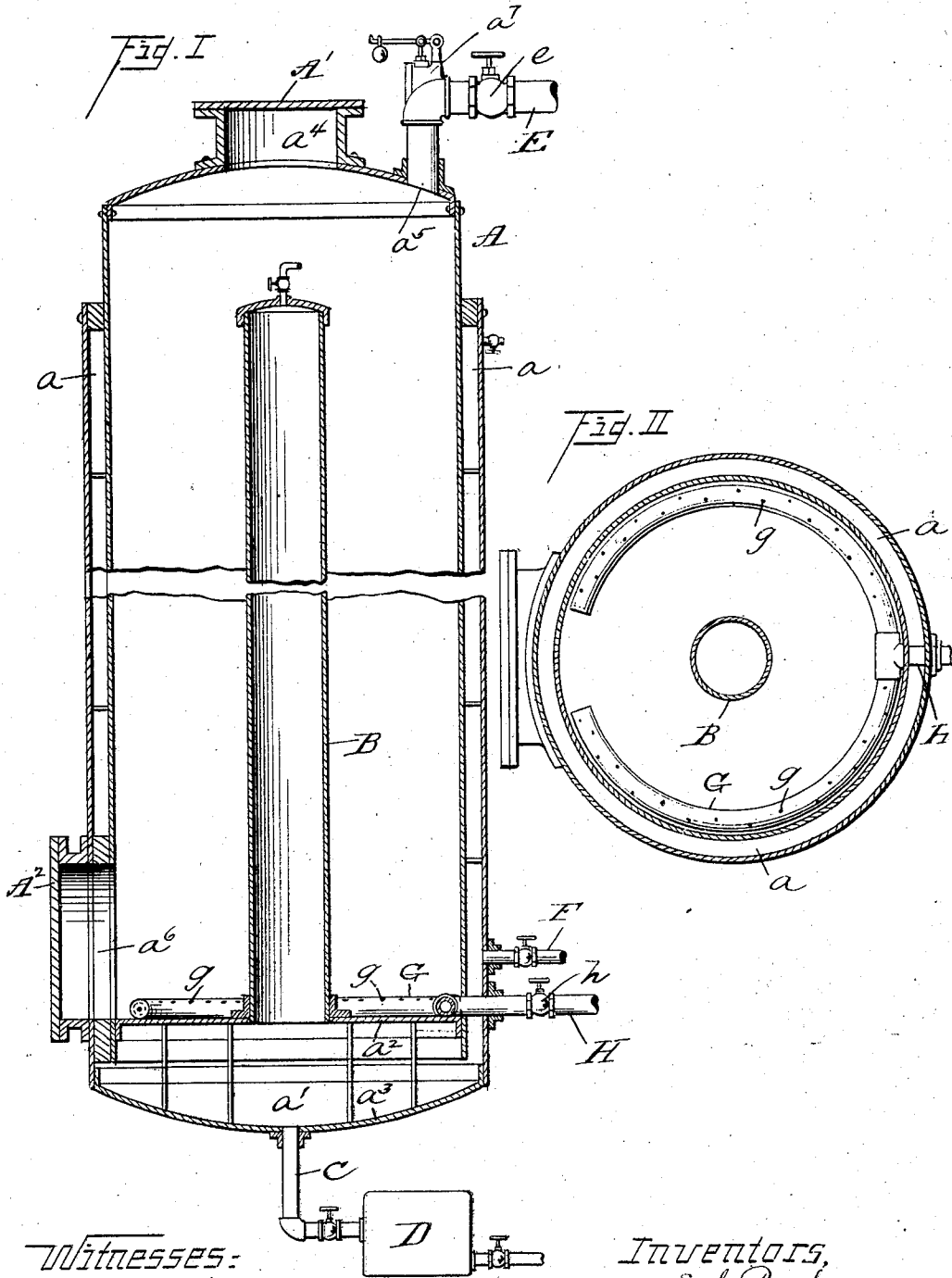


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E. S. PECK & W. M. SCOTT.
PROCESS OF TREATING GARBAGE.
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NO MODEL.



Witnesses:

G. W. Saywell
A. Merkel

Inventors,
E. S. Peck,
and
W. M. Scott,
by J. D. Fay
Attorney.

UNITED STATES PATENT OFFICE.

ERNEST S. PECK AND WALTER M. SCOTT, OF NEWBURG, OHIO.

PROCESS OF TREATING GARBAGE.

SPECIFICATION forming part of Letters Patent No. 742,226, dated October 27, 1903.

Application filed December 1, 1902. Serial No. 133,340. (No specimens.)

To all whom it may concern:

Be it known that we, ERNEST S. PECK and WALTER M. SCOTT, citizens of the United States, and residents of Newburg, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Processes of Treating Garbage, of which the following is a specification, the principle of the invention being herein explained and the best mode in which we have contemplated applying that principle, so as to distinguish it from other inventions.

Our improved process relates to methods of treating garbage, its object being to recover therefrom all the valuable ingredients contained therein in an economical and efficient manner. Heretofore in processes of this character a large part of the desirable material has been lost, due to the imperfect or usually total lack of utilization of those liquid products which contain this material in solution. It is the remedy of this imperfection that is the especial object of this invention.

Said improved process consists of steps hereinafter fully described, and specifically set forth in the claims.

The annexed drawings illustrate one form of apparatus for carrying out our said process, the disclosed form, however, constituting but one of various forms of apparatus which may be used in carrying out the principle of said invention.

In said annexed drawings, Figure I represents a vertical section of said apparatus, and Fig. II represents a horizontal section of same.

A digester is provided and comprises a cylindrical receptacle A, provided with a double shell forming a surrounding steam-jacket *a*. This jacket communicates with a chamber *a'*, formed at the bottom of the receptacle A between a diaphragm *a²* and a head *a³*. Upon the middle of the diaphragm *a²* is supported a steam-dome B, closed at the top and open at the bottom to communicate with chamber *a'*. A discharge-pipe C connects with an opening in the bottom of chamber *a'*, which discharges into a steam-trap D. This trap is preferably connected with the boiler used for generating the steam utilized in our process.

The top of the receptacle is provided with

an opening *a⁴* and a door A', forming an air-tight closure therewith, and an opening *a⁵*, which is connected to a pipe or conduit E, containing a valve *e* for cutting off communication with the interior of the receptacle. This conduit E is connected with a condensing or vacuum pump. (Not shown.)

A steam-supply pipe F connects with and supplies steam from a suitable source and at a suitable pressure to the interior of the jacket *a*. An air-tight door A² is provided for removing the solid matter from the receptacle's interior and forms an air-tight closure with an opening *a⁶*. A safety-valve *a⁷* is placed at a convenient position, such as in the conduit E, as shown, and arranged to blow off at about fifty pounds' pressure. Beneath the receptacle A and communicating with the same by means of a coil G, provided with perforations *g g*, is the pipe H, connected to a suitable source of hot air or superheated steam, whereby the latter may be forced up through the contents of the receptacle. The said pipe H is provided with a valve *h*, whereby communication between the receptacle A and the said pipe may be cut off.

In carrying out our process the garbage and a quantity of liquid which has been expressed from the tankage of previous cookings are introduced into the digester through the opening *a⁴*. Inasmuch as some liquid material must necessarily be introduced into the digester before the garbage can be cooked, it is of great advantage to have this liquid consist of the garbage-saturated water expressed from the tankage of previous cookings, for in such water there is much valuable material which can be thus saved in an economical manner, and, furthermore, it obviates the inconvenience and expense of later removing a large amount of moisture, which must necessarily be done when clear water is used as the auxiliary means for cooking. The opening *a⁷* is then tightly closed and the valve *e* shut to cut off communication through conduit E. The digester is thus rendered air-tight. Steam is now admitted into the interior of the receptacle by means of the coil, thereby thoroughly heating the garbage. After such heating has been effected the

steam is preferably shut off from the coil. This prior cooking by direct heat greatly facilitates the subsequent process of cooking the garbage by radiated heat and reduces time of completing such cooking operation. Steam being admitted into the jacket *a* and the dome *B*, the garbage is now thoroughly cooked by radiated heat, while thus excluded from the atmosphere. This cooking converts part of the uncombined and combined water into vapor, the remainder becoming very highly heated. When the cooking has progressed sufficiently, the valve *e* is opened, whereupon the vaporous content of the digester is exhausted from its interior by means of the condensing or vacuum pump. Such vaporous content, as well as all of the free water, which now is given an opportunity to volatilize by reason of the constant vacuum produced in the receptacle by the continuous withdrawing of the vapors and by reason of the high temperature maintained in the receptacle by the steam which is still heating the jacket, is thus removed without removing any of the solid matter in the receptacle. By "free water" we mean the liquid contents of the receptacle which contain none of the oleaginous matter nor of the garbage, which water would normally drain slowly off from the tankage and which does not adhere to the garbage with enough pertinacity to require mechanical pressure to separate it from the same. Our method of exhausting expeditiously and effectively removes this part of the liquid content. Although such part of the liquid might be removed by the compression to which the garbage is subjected after the cooking, still by the method of exhausting nearly all of the undesirable material is thus disposed of during and immediately following the time of cooking, and the subsequent operation of evaporating down to stick that part of the liquid product which is pressed out of the tankage is made much shorter and more economical. Should the pressure in the receptacle during the cooking rise above fifty pounds, the safety-valve blows off and part of the vaporous content escapes and is so removed automatically. This solid matter, or "tankage," as it is now called, is then removed and compressed into what is technically known as "cheese." The expressed liquid resulting from this compression is recovered, allowed to stand in a suitable receptacle, and the oleaginous matter skimmed off the top and preserved. The remaining liquid is added to raw garbage and serves the purpose in a new cooking which has been heretofore described. The compressed cheese is dried in a suitable drying apparatus. A fine mealy homogeneous product results, which represents substantially the total initial weight of the garbage less its combined water and the oleaginous content, and which has a greater weight and

value than those products resulting from processes in which liquid is permitted to drain off after the cooking operation and in which much valuable material is thus lost.

We have found that by the use of our above-described process nearly all of the valuable oleaginous matter is recovered, only a very small percentage of it remaining in the tankage.

By the term "garbage" we mean to include not only kitchen refuse, both animal and vegetable, but also slaughter-house and packing-house offal, and refuse and offal of analogous character.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the means herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention—

1. The improved subprocess for treating garbage which consists in expressing liquid from tankage, cooking such expressed liquid and raw garbage in a closed air-tight receptacle by radiated heat, and then separating from such receptacle vaporous and free-water content by exhausting both the normal vapors and also those that result from the water which is volatilizing.

2. The improved subprocess for treating garbage which consists in expressing liquid from tankage, cooking such expressed liquid and raw garbage in a closed air-tight receptacle by radiated heat, maintaining the heat and then separating from such receptacle all of its vaporous and free-water content by exhausting both the normal vapors and also continuously exhausting those vapors that result from the water which is volatilizing by reason of the high temperature maintained in the receptacle by the radiating heat.

3. The improved subprocess for treating garbage which consists in expressing liquid from tankage, cooking such expressed liquid and raw garbage in a closed air-tight receptacle by heat radiating from and toward the center of said receptacle maintaining the heat and then separating from such receptacle all of its vaporous and free-water content by exhausting both the normal vapors and also continuously exhausting those vapors that result from the water which is volatilizing by reason of the high temperature maintained in the receptacle by the radiating heat.

4. The improved subprocess for treating garbage which consists in expressing liquid from tankage, cooking such expressed liquid and raw garbage in a closed air-tight receptacle by radiated heat and also independently by direct heat, maintaining the heat and then separating from such receptacle its vaporous and free-water content by exhaust.

5 5. The improved subprocess for treating garbage which consists in expressing liquid from tankage, cooking such expressed liquid and raw garbage in a closed air-tight receptacle by radiated heat, and also independently by direct heat, maintaining the heat and then separating from such receptacle its vaporous and free-water content by exhaust, removing the tankage from the receptacle,

compressing the tankage, and drying the resultant product.

Signed by us this 17th day of November, 1902.

ERNEST S. PECK.
WALTER M. SCOTT.

Attest:

D. T. DAVIES,
A. E. MERKEL.