

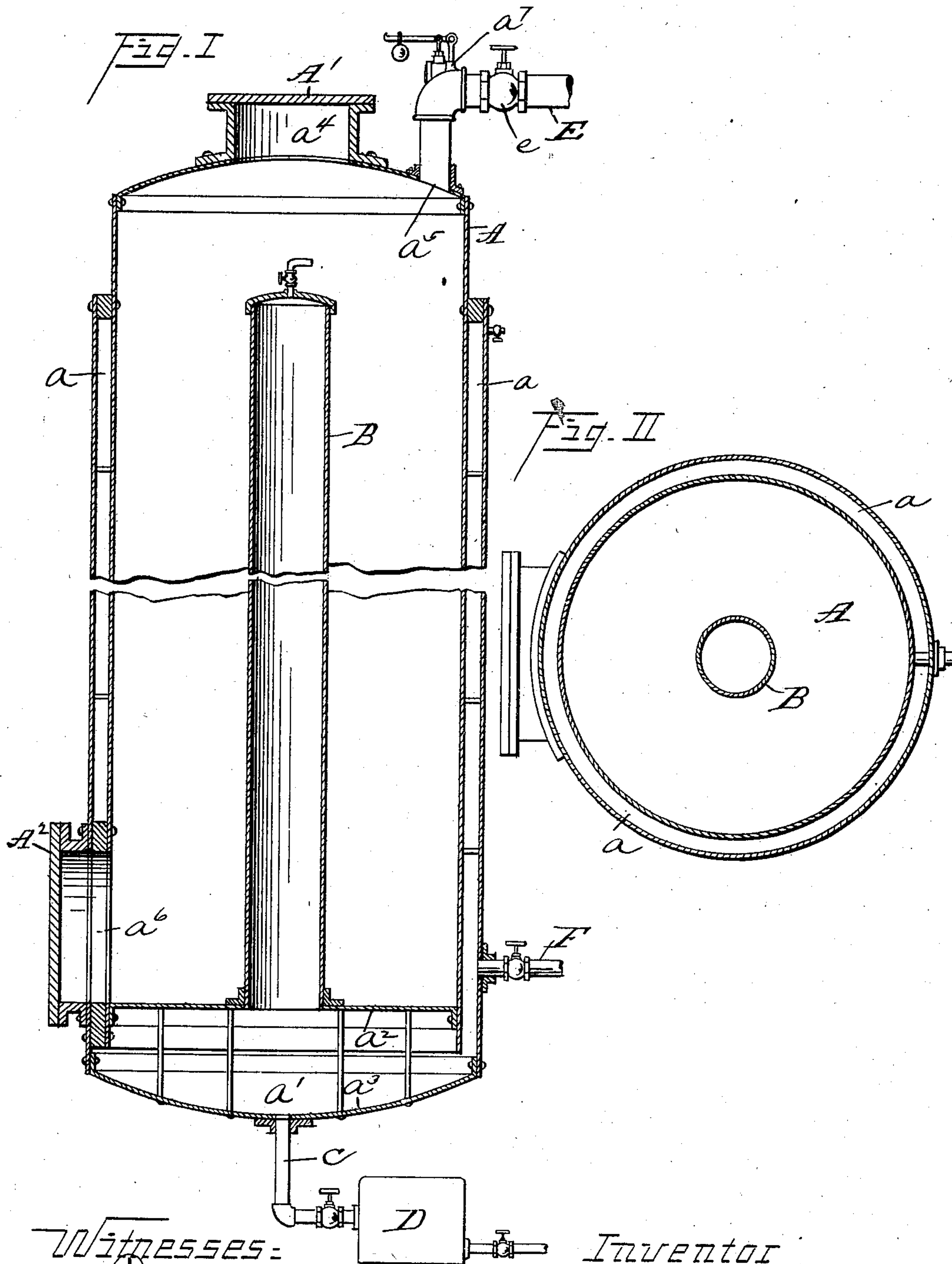
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E. S. PECK.
PROCESS OF TREATING GARBAGE.

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NO MODEL.



Witnesses:
D. Davies

A. E. Merkel.

Inventor
E. S. Peck,

by J. D. Fay
ATTORNEY.

UNITED STATES PATENT OFFICE.

ERNEST S. PECK, OF NEWBURG, OHIO.

PROCESS OF TREATING GARBAGE.

SPECIFICATION forming part of Letters Patent No. 742,225, dated October 27, 1903.

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To all whom it may concern:

Be it known that I, ERNEST S. PECK, a citizen of the United States, and a resident 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 I have contemplated applying that principle, so as to distinguish it from other inventions.

My 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 my 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 α . This jacket communicates with a chamber α' , formed at the bottom of the receptacle A between a diaphragm α^2 and a head α^3 . Upon the middle of the diaphragm α^2 is supported a steam-dome B, closed at the top and open at the bottom to communicate with the chamber α' . A discharge-pipe C connects with an opening in the bottom of chamber α' , which discharges into a steam-trap D. This trap is preferably connected with the boiler used for generating steam utilized in my process. The top of the receptacle is provided with an opening α^4 and a door A', forming an air-tight closure therewith, and an opening

α^5 , 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 is connected with a condensing or vacuum pump. (Not shown.) A suitable supply-pipe F connects with and supplies steam from a suitable source and at a suitable pressure to the interior of the jacket α . 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 α^6 . A safety-valve α^7 is placed at a convenient location, such as in the conduit E, as shown, and arranged to blow off at about fifty pounds pressure.

In carrying out my process the garbage and a quantity of water are introduced into the digester, whereupon the valve e is shut to cut off communication through conduit E. The digester is thus rendered air-tight. Steam being admitted into the jacket α and the dome B, the garbage is now thoroughly cooked, 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 permanently removed and carried away from the receptacle without removing any of the solid matter contained therein. By "free water" I 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 pressure to separate it from the same. My method of exhausting expeditiously and effectively removes this part of the liquid content. Although such part of the liquid content 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 disposed of during
 5 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.
 10 Should the pressure in the receptacle rise during the cooking 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,"
 15 as it is now called, is then removed and compressed into what is technically known as "cheese." The expressed liquid resulting from this operation is recovered, allowed to stand in a suitable receptacle, and the oleaginous matter then skimmed off from the top and preserved. The remaining liquid is now condensed to stick by evaporation. The cheese is disintegrated by means of a suitable crusher, and the stick is poured upon
 20 such disintegrated material, which absorbs it, and the resultant product 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 during the cooking operation and in which
 25 much valuable material is lost.

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

40 I have found by the use of my above-described process that—

First. A percentage of oleaginous matter is recovered which is much greater than that which I have heretofore been able to recover
 45 by other processes. This has been shown by the fact that where heretofore I have found that the cheese contained about twelve per cent. of oleaginous matter it now contains as low as three and one-half per cent.

50 Second. The weight of the resultant product is about twice that formerly obtained, thereby increasing its value.

Third. Such product contains a larger percentage of the more valuable ingredients, so
 55 that its value is still further increased.

Fourth. The process may be carried out to completion by the consumption of about half the quantity of coal which I have heretofore found necessary.

60 Fifth. The time necessary to complete the process is much less than that heretofore required.

Sixth. The labor required in carrying out the process is much less than that heretofore
 65 required.

By the term "garbage" I 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 my invention may be employed instead of the one explained, change being made as regards the process herein disclosed, provided the means stated by any one of the following
 75 claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention—

1. The improved subprocess for treating
 80 raw garbage which consists in cooking such garbage in a closed air-tight receptacle by radiated heat, and then exhausting, and permanently carrying away, the vaporous content of the receptacle's interior.

2. The improved subprocess for treating
 85 raw garbage which consists in cooking such garbage in a closed air-tight receptacle by radiated heat, and then exhausting, and permanently carrying away, the vaporous content of the receptacle's interior, reducing the pressure and continuing the heating.

3. The improved subprocess for treating
 90 raw garbage which consists in cooking such garbage in a closed air-tight receptacle by radiated heat, exhausting the receptacle's interior of its vaporous content, removing the tankage and compressing it to remove the remaining liquid, evaporating the liquid thus expressed to stick, adding the stick to the
 95 compressed tankage, and drying the resultant product.

4. The improved subprocess for treating
 100 raw garbage which consists in cooking such garbage in a closed air-tight receptacle by radiated heat, 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, removing the tankage and compressing it to remove the remaining liquid, evaporating the liquid thus expressed to stick, adding the stick to the compressed tankage and drying the resultant product.

5. The improved subprocess for treating
 115 raw garbage which consists in cooking such garbage in a closed air-tight receptacle by radiated heat, maintaining the heat, separating from such receptacle all of its vaporous and free-water content by exhausting both
 120 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, removing the tankage and compressing
 125 it to remove the remaining liquid, evaporating the liquid thus expressed to stick, adding the stick to the compressed tankage and drying the resultant product.

6. The improved subprocess for treating
 130 raw garbage which consists in cooking such garbage in a closed air-tight receptacle by

heat radiating from and toward the center, maintaining the heat after cooking, separating from such receptacle all of its vaporous and free-water content by exhausting both
5 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, removing the tankage and compressing
10 it to remove the remaining liquid, evaporating the liquid thus expressed to stick, adding the stick to the compressed tankage and drying the resultant product.

7. The improved subprocess for treating
15 raw garbage which consists in cooking such garbage in a closed air-tight receptacle by radiated heat, separating from such receptacle all of its vaporous and free-water content by exhausting both the normal vapors and
20 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, removing the tankage and compressing it to

remove the remaining liquid, removing the 25
oleaginous matter from the expressed liquid, evaporating the remaining liquid to stick, adding the stick to the compressed tankage, and drying the resultant product.

8. The improved subprocess for treating 30
raw garbage which consists in cooking such garbage in a closed air-tight receptacle by heat radiating radially and peripherally from and toward the center of the receptacle, separating from such receptacle all of its vaporous 35
and free-water content by exhaust, removing the tankage and compressing it to remove the remaining liquid, removing the oleaginous matter from the expressed liquid, evaporating the remaining liquid to stick, 40
adding the stick to the compressed tankage, and drying the resultant product.

Signed by me this 11th day of November, 1902.

ERNEST S. PECK.

Attest:

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