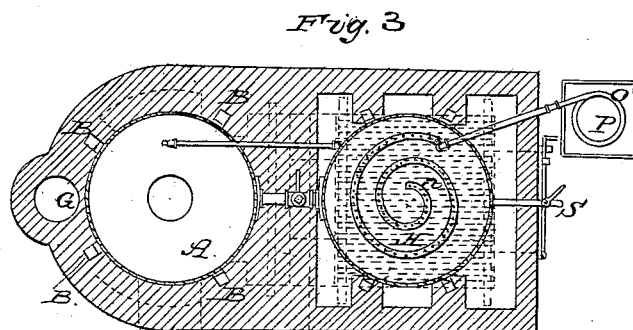
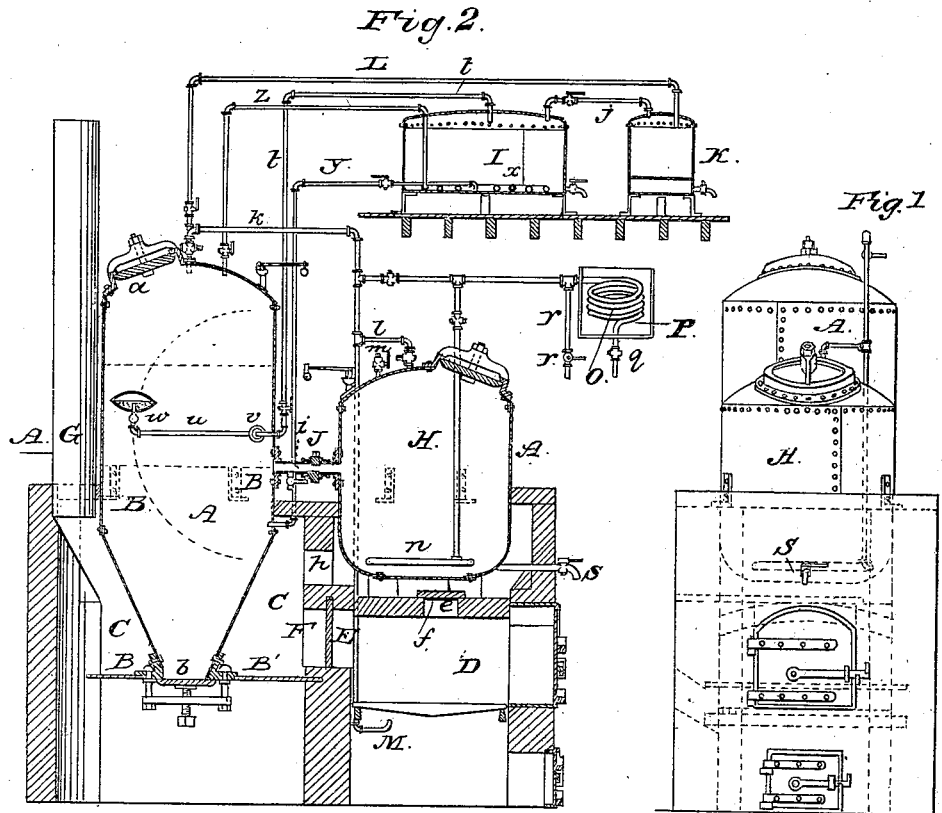


C. E. GRAY.  
Rendering Apparatus.

No. 46,793.

Patented March 14, 1865.



Witnesses  
E. B. Smith  
R. D. Kelly

Inventor  
C. E. Gray

# UNITED STATES PATENT OFFICE.

CARROLL E. GRAY, OF NEW YORK, N. Y.

## IMPROVED RENDERING APPARATUS.

Specification forming part of Letters Patent No. 46,793, dated March 14, 1865.

*To all whom it may concern:*

Be it known that I, CARROLL E. GRAY, of the city and county and State of New York, have invented certain new and useful Improvements in Rendering, Refining, and Preparing Tallow, Lard, and other Oleaginous Matter for Commercial and other Purposes; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a front elevation, Fig. 2 a vertical longitudinal section, and Fig. 3 a horizontal section on the line A', of an apparatus by which I carry my improvements into practice.

My invention relates to a novel method of rendering and refining lard, tallow, and other like fatty matters by the use of steam. The idea I have developed will best be understood by a description of the apparatus by which it may be practiced.

In the drawings, A represents a tank or digester set in masonry so constructed as to have a heating-chamber, C, about its lower end. Said digester is supported on brackets B and a plate, B', so arranged as to leave a pit beneath it in which a vessel can be introduced to catch the refuse drawn from the tank. Said heating-chamber communicates with a furnace, D, through the flue E, into which a throttle or damper, F, is introduced to stop or regulate the heat to the chamber. Said furnace is formed in the brick-work and on grate-bars in the usual way. From the top of said heating-chamber there is a chimney or flue, G, leading, by which the draft is maintained, and the heat drawn back around the lower end of the digester. Said digester is fitted at its upper end with a man-hole plate, a, and the lower end with a similar plate, b. The matter to be rendered is introduced through the hole a, and the refuse is drawn off through the hole b.

The above concludes a description of the rendering apparatus merely without any attachments whatever for drawing off or refining the rendered grease.

The operation of this part of the apparatus is as follows: First fill the digester with water up to just above the heating-surface, then introduce the fatty matter, and start the fire in the furnace and continue the heat until sufficient steam pressure and heat has been generated to completely render the fat.

This concludes a description of the rendering operation without regard to the manner in which the rendered fat or steam is drawn or blown out of the tank.

It will be seen that the steam for rendering the fat is generated in the tank containing it and in contact with it, thus avoiding the burning to which the fat is liable in the fire process, and the expensive apparatus that has hitherto been employed in steam rendering, while at the same time a gradual and effectual rendering is obtained, as well as a superior article of lard or tallow in at least as short a time as by any other method.

Now, this generating the steam and rendering the fat in one and the same vessel at one and the same time is novel to the best of my information and belief, and comprises the chief feature of my invention.

In the drawings, H represents a receiver arranged over the furnace in masonry, so constructed as to leave a heating-chamber around its lower end, which heating-chamber communicates with the furnace through the flue e, over which a damper, f, is placed to regulate the admission of heat to said chamber, which is also in communication with the chamber c and chimney G by means of the flue h. Said receiver is made to communicate with the digester by means of a pipe, i, fitted with a cock, J, by which said communication may be opened or closed at pleasure. The upper end of said receiver is also in steam communication with the upper end of the digester, through the agency of the pipes k and branch l, also fitted with cocks, in the manner shown, to regulate the admission of steam from one vessel to the other.

The object of the receiver is to take the fat, as fast as rendered, out of the digester, and by means of the upper and lower communications from the digester an equilibrium of pressure is established between the two vessels, so that the fat instead of being forced out of the digester by the pressure of the steam, will merely run sluggishly into the receiver as it is rendered; or the fat may be left in the digester until the whole of it is rendered and then drawn into the receiver.

The object of the receiver is not merely to act as a reservoir to receive the rendered grease, but in it the fat is to be purified, cooled, or medicated in a vacuum if desirable. This object I accomplish by first drawing the

condensed water and precipitated foreign matter out through the cock *s* and by applying an air-pump to the cock *m* and exhausting the air out of the receiver, after which I admit a gentle heat to the lower end thereof, by which the steam and gas contained in the fat is set free and exhausted by the air-pump, thus purifying the rendered fat of the water and any noxious gas or vapor there may be contained in it.

Now, to cool or medicate the fat, I introduce a coil of perforated pipe, *n*, in the bottom of the receiver, the upper end thereof communicating with a coil of pipe, *o*, set into a refrigerator consisting of a box, *P*, filled with any refrigerating matter, such as ice, ice and salt, and the like. Now, by exhausting the air out of the receiver and opening the cock *q*, the air will rush in through the refrigerator and perforated pipe *n* into the receiver, by which the fat is rapidly cooled. If it be desired to sweeten or medicate the fat, it may be done by introducing the medicating or perfuming gas or vapor through the pipe *r*, closing the cock *q* and exhausting the air from the receiver, as before. After the fat has been manipulated to the satisfaction of the operator, it is drawn through the cock *s*.

This completes a description of one plan of purifying used in my process and invention, and which may or may not be used in connection with the steam-generating digester, as experience and circumstances may dictate; but although it is not a necessary adjunct of the digester, in preparing fats for many purposes, it will be found an important one.

In the drawings, I represents a reservoir, arranged on a floor above the digester, from which there is a delivery-pipe leading to said reservoir, as shown by *t*. To the lower end of the said delivery-pipe there is what I denominate a "skimmer-pipe," *u*, attached by means of a swivel cock, *v*, and which is also provided with floats *w*, by which means said skimmer-pipe is made to float with its mouth near the surface of the rendered fat, and to raise and fall with it as the fluid fat in the tank is increased or diminished, thus delivering the fat into the reservoir as fast as rendered. To further purify and refine the rendered fat after it has been delivered in this reservoir, I introduce in the bottom thereof a coil of steam-pipe, *x*, and lead one end of it through the bottom of the reservoir to near the bottom of the digester, as shown by *y*, and the other end out of the top of the reservoir to the top of said digester, as shown by *z*, fitting both branches with cocks in the manner shown. By these means I can introduce steam out of the top of the digester into the coil, from whence I can draw the condensed water to the lower part of the digester through the pipe *y*. The pressure in the two ends of the pipe being equal, the water will descend through *y* by mere force of gravity, owing to the elevated position of the reservoir.

By heating the rendered fat in the reservoir, as described, the steam and gases contained in it will be driven off into the atmosphere in the case of an open tank, but in the case of a close vessel or reservoir, such as I propose to use, it will be driven off through a pipe, *j*, into a deodorizer, *K*, consisting of a vessel or tank, with a perforated bottom filled with lime or plaster and charcoal, the charcoal and lime or plaster taking up the gases, and the water filtering through the bottom of the vessel.

This concludes a description of another plan of purifying and refining the rendered fat, and also a plan for deodorizing the gases generated in rendering fatty matters.

It may, however, be desired to use the digester for rendering without either of the plans here described for refining and purifying. In which case it is desirable at all times, and in cities it is absolutely necessary, to avoid the offensive smell which arises in rendering and drawing off the melted fat, especially if the raw fat be partially spoiled. This difficulty I overcome by carrying a pipe directly from the digester to the deodorizer, as at *L*, to deodorize the gases, or to the bottom of the furnace under the grate-bars *M* to burn them.

Having now described the nature and operation of my improvements in rendering and refining fatty matters, together with an apparatus by which they may be carried into practice, what I claim, and desire to secure by Letters Patent, is—

1. Rendering fatty matter under pressure generated in the digester containing the fat by the direct application of heat thereto.

2. The combination of the digester with a heating chamber or furnace, for the purpose of generating steam therein to render the fatty substance contained in the tank, substantially in the manner described.

3. The combination of the receiver *H* with the steam-generating digester, so arranged in connection with said digester as to receive the melted fat therefrom, and so that the heat of the furnace used to generate the steam in the digester is accessible thereto for the supplemental operation of refining.

4. Refining and purifying the rendered fat in a reservoir, arranged in connection with the digester and fitted with a coil of pipe, so arranged in said reservoir and connected to said digester as to receive the steam therefrom and return the condensed water thereto, substantially in the manner described.

5. Deodorizing the gases generated in rendering the fat or driven off in refining and purifying it by passing said gases through a deodorizing-chamber, substantially in the manner described.

C. E. GRAY.

Witnesses:

R. D. WELLS,  
AMOS BROADNAX.