No. 877,371. PATENTED JAN. 21, 1908.

R. S. REDFIELD.

REDUCING TANK.

APPLICATION FILED FEB. 8, 1907.

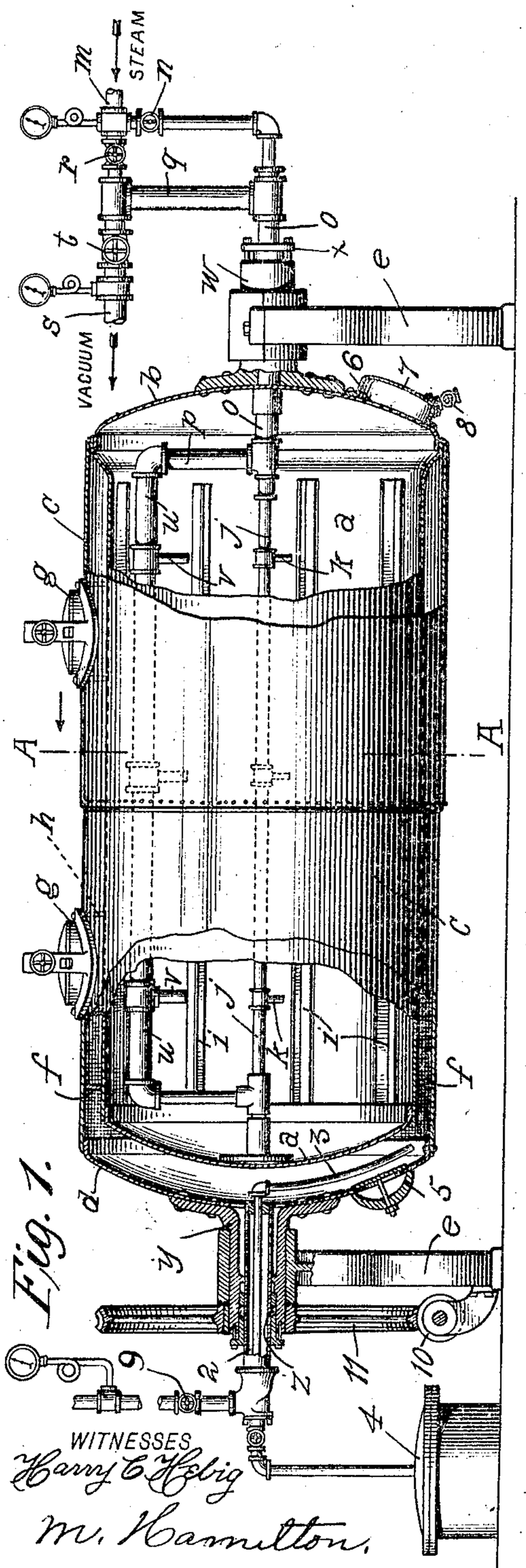

Fig. 1.

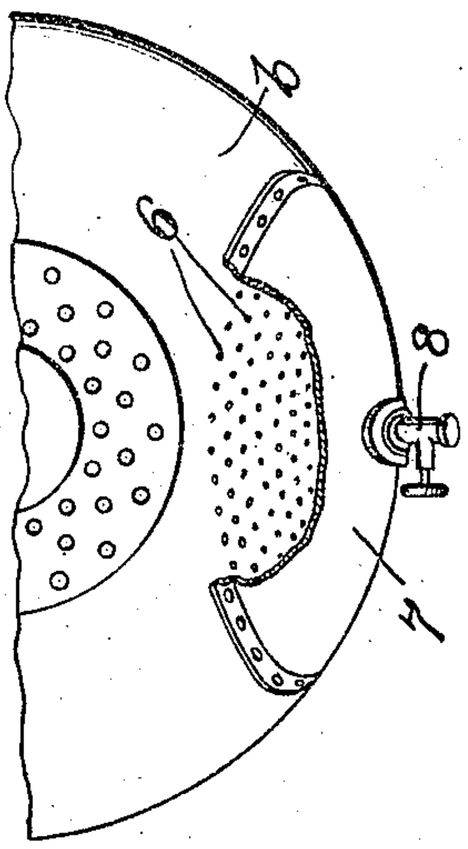

Fig. 3.

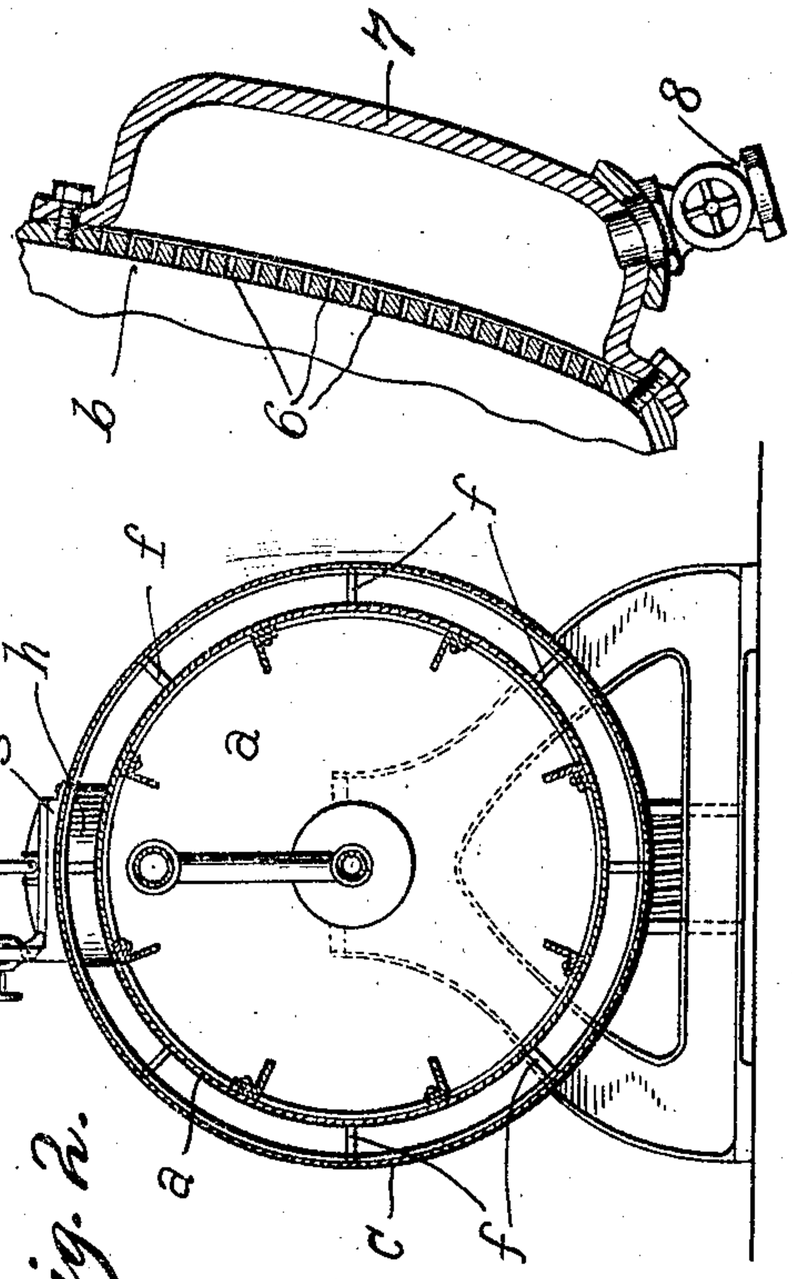

Fig. 4.

Fig. 2.

Witnesses
Harry C. Helbig
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BY

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UNITED STATES PATENT OFFICE.

ROBERT S. REDFIELD, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO ROBERT S. REDFIELD & COMPANY, A CORPORATION OF NEW YORK.

REDUCING-TANK.

No. 877,371. Specification of Letters Patent. Patented Jan. 21, 1908.

Application filed February 8, 1907. Serial No. 356,409.

To all whom it may concern:

Be it known that I, ROBERT S. REDFIELD, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Reducing-Tanks, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in reducing tanks for the treatment of offal, slaughter-house refuse and the like by means of steam or other suitable fluid; and an object of my invention is to provide a reducing tank or digester which will prove simple in construction, comparatively cheap in manufacture and efficient in operation.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, Figure 1 is an elevation of my new reducing tank, part of the tank being broken away to disclose the interior arrangement of the pipes; Fig. 2 is a sectional view on line A—A of Fig. 1; and Figs. 3 and 4 are details showing the filtering device.

The body portion of the digester consists of two cylinders one of which is mounted within the other, the space between the walls of the cylinders serving to provide means for jacketing the inner cylinder *a* with steam. The inner cylinder is closed at both ends and its outer end *b* serves to close one end of the outer cylinder *c*. The end *d* of the latter and the end *b* of the inner cylinder *a* are each provided with a hollow trunnion; and these trunnions are journaled in the upper ends of the standards *e*. Between the two cylinders *a* and *c* are mounted stays *f* which strengthen and give rigidity to the structure. The outer cylinder *c* is provided with manholes *g* through which the material is fed into and removed from the tank; and to prevent any of the material from finding a lodgment between the walls of the cylinders in the steam-jacket space, the manholes are each provided with inner walls or partitions *h*. The inner cylinder *a* is provided with the usual angle-irons or baffle-plates *i*.

Mounted axially in the inner cylinder *a* is a steam-pipe *j* provided with nozzles *k* and communicating with the steam-pipe *m*, a valve *n* being interposed between the pipes *j* and *m*. Near its point of emergence from the inner cylinder *a* the steam-pipe *j* passes through a larger pipe *o* the inner end of which is connected with the vertical pipe *p* and the outer end of which is connected with the vertical pipe *q*. The upper end of the latter communicates through the valve *r* with the steam-pipe *m* on the one side and with the air-exhaust or vacuum pipe *s* through the valve *t* on the other side. The upper end of the inside vertical pipe *p* is connected with the pipe *u* which extends parallel to the axial steam-pipe *j* and is provided with the nozzles *v*. It will be understood that both the pipes *j* and *o*, the former within the latter, pass through the hollow trunnion *w*, and a gland *x* is provided to insure a tight joint.

The hollow trunnion *y* is similarly provided with a stuffing-box *z* and through it extends a live-steam pipe 2 which communicates with the steam-jacket space between the cylinders *a* and *c*. Through the pipe 2 extends a pipe 3 which communicates with a steam-trap 4. By removing the hand-hole cover 5 access may be obtained to the steam-jacket space.

The outer wall *b* of the inner cylinder *a* is perforated (Figs. 3 and 4) and over the perforations 6 is removably fitted a cover 7 provided with a spigot 8.

The operation of the parts just described is as follows: The material having been introduced through the manholes *g* to the desired amount, the valve *r* is closed and the valves *n* and *t* are opened. Live steam flows from the pipe *m* into the pipe *j* through the valve *n* and issues in jets from the nozzles *k*. After the material has been "cooked" sufficiently, the valves *n* and *t* are closed, and the valve *r* is opened, thereby allowing live steam to flow from the pipe *m* past the valve *r* through the pipes *q*, *o*, *p* and *u* and the nozzles *v* into the inner cylinder *a*, where it exerts a pressure upon the "cooked" material and forces the juices therefrom. The latter are strained through the perforations 6 and drained from the tank by the spigot 8. The next step is to dry the residue which is done by closing the valve *r*, and the valve *n* remaining closed, the valve *t* is opened. The pipe is connected with a suitable exhaust pump (not shown) and the vapors and gases in the inner cylinder are exhausted therefrom through the nozzles *v* and the pipes *u*, *p*, *o*, *q* and *s* past the valve *t*. During the time the air-pump is being operated, the spigot 8 is closed. At

the same time the valve 9 is opened and live steam is allowed to flow through the pipe 2 into the steam-jacket space between the cylinders. After the residue has been sufficiently dried, the valves *t* and 9 are closed and the tank is rotated on its trunnions *w* and *y* by turning the worm 10 which meshes with the gear 11 keyed to the outer end of the trunnion *y*. The manholes having been brought near the floor, the dried residue is removed through the manholes *g*. The water of condensation is removed from the steam-jacket space by the steam-trap 4 through the pipe 3.

Since the pipe *q* is connected with the exhaust during the time of "cooking", the latter is done under a vacuum and, therefore, at a lower temperature than would be otherwise possible. This results in yielding an oil much lighter in color and for this reason more valuable to the trade. Further, during the time of "cooking", the vapors and gases in the tank are drawn off past the valve *t* through the pipe *s*, thereby eliminating all disagreeable odors. The live steam enters directly into the mass of the material through the nozzles *k* and by its intimate contact with the fats, cooks them in much less time. Further, this arrangement of the nozzles *k* insures that the fats will be cooked evenly and that there will be no cold spots and, therefore, no sour lard. By means of the filter, it is possible to recover ten per cent. more oil than could be obtained without it, a large percentage of the water is eliminated from the tankage and the residue is dried in a shorter time and with less steam owing to the fact that a large percentage of the water is pressed out and, therefore, does not have to be evaporated.

In my new digester the pipes for the live steam for cooking the material are separate from those through which the live steam is led for the purpose of pressing the material; and the steam for cooking is thereby brought into more intimate contact with the material with the result that less steam is required. Further, pipes of proper proportions for the introduction of the steam for the two purposes may be provided.

By removing the cover 7 access is readily obtained to the perforations 6 and the latter may be quickly cleaned in case they become stopped up.

I claim:

1. In apparatus of the character described, the combination of a tank; a main steam-pipe; an exhaust pipe; a pipe which is provided with outlets for steam and which extends axially through said tank and is connected with said main steam-pipe; a pipe which extends through said tank near the wall thereof and is connected with said exhaust pipe and main steam pipe; and valves which control the flow of the vapor through said pipes.

2. In an apparatus of the character described, the combination of a tank; a main steam pipe; an exhaust pipe; a pipe which extends through said tank near the wall thereof; a connecting pipe by which said last-named pipe is connected with said main steam pipe and said exhaust pipe; a steam pipe which extends through said connecting pipe and axially through said tank; and valves which control the flow of vapor through said pipes.

3. In an apparatus of the character described, the combination of a rotary tank provided with a hollow trunnion; a pipe which passes through said trunnion into said tank; a steam-pipe which passes through said pipe and extends axially of said tank; a pipe which is connected with the first-named pipe and extends near the wall of said tank and inside thereof; a main steam pipe; an exhaust pipe; and valves controlling the flow of vapor through said pipes; said first-named pipe being connected with said main steam pipe and exhaust pipe.

4. In an apparatus of the character described, the combination of a tank rotatable about a horizontal axis and having one of its end walls formed with holes through which the juices are strained, said holes lying in substantially a vertical plane; a cover detachably secured to said end wall over said holes and provided with a shaft-controlled outlet for the juices; and pipes for the introduction of steam into said tank to extract the juices from the material to be digested.

In testimony whereof I have hereunto set my hand at New York city, N. Y. this seventh day of February, A. D. 1907, in the presence of the two undersigned witnesses.

ROBERT S. REDFIELD.

Witnesses:
JAMES HAMILTON,
M. HAMILTON.