

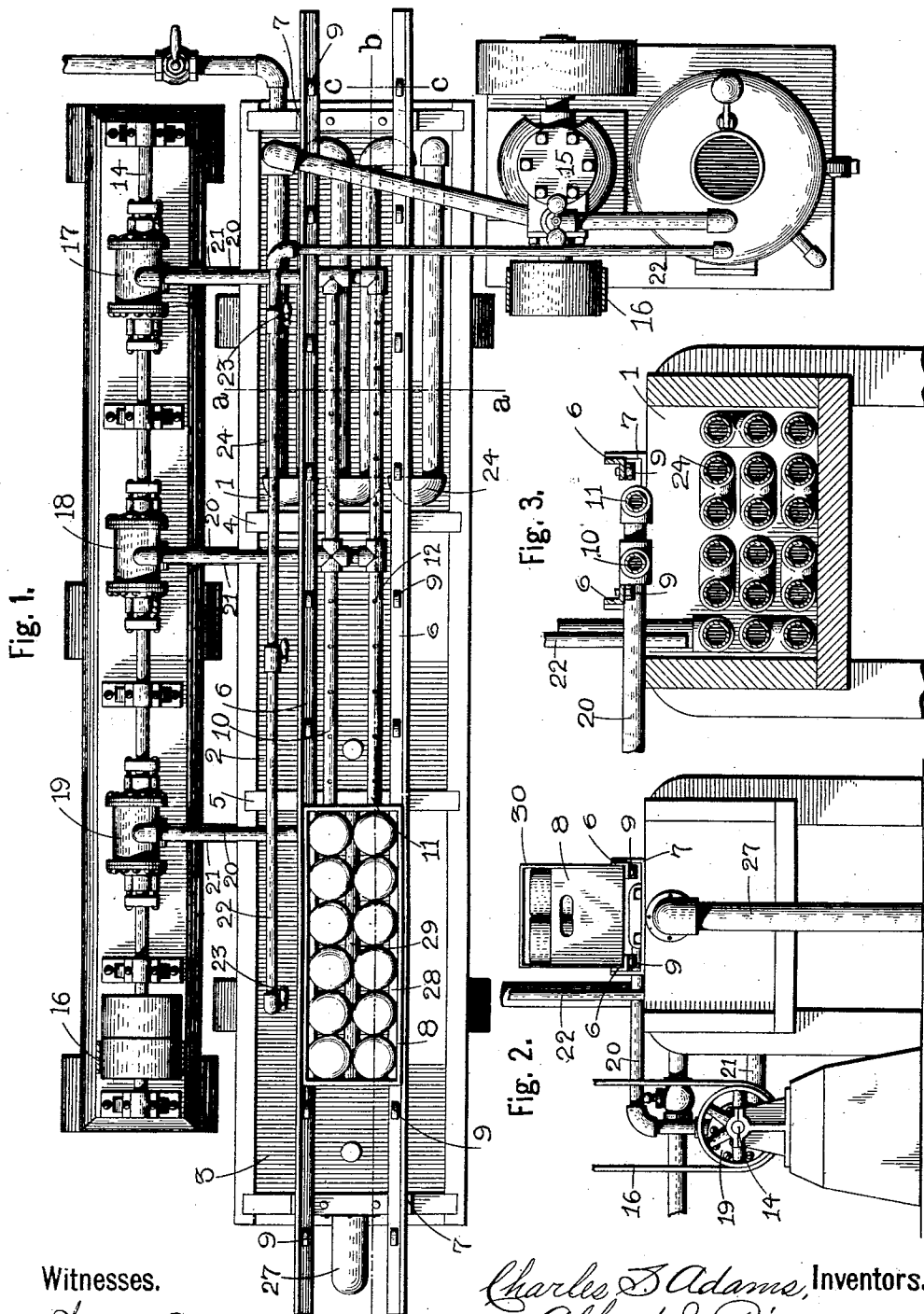
C. S. ADAMS & A. J. RICE.

METHOD OF CLEANING AND STERILIZING MILK BOTTLES, &c.

APPLICATION FILED AUG. 1, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses.

L. M. Grainger
Pro. A. Neubauer.

Charles S. Adams, Inventors.
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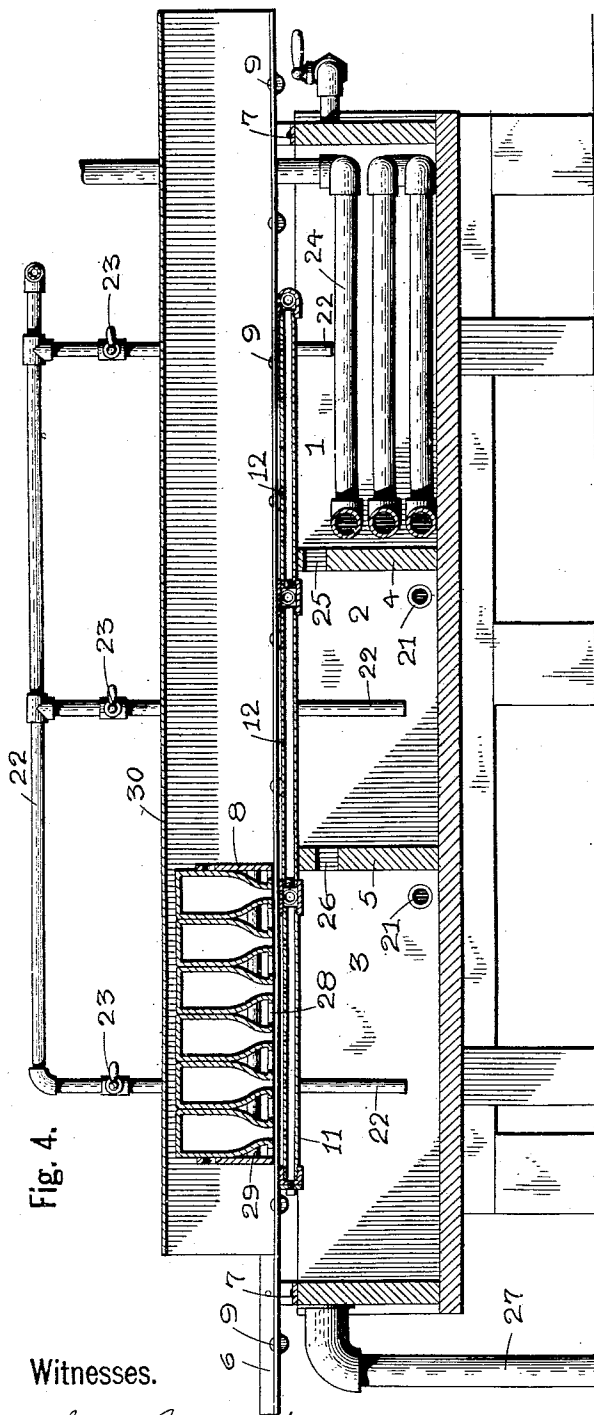


Fig. 4.

Witnesses.

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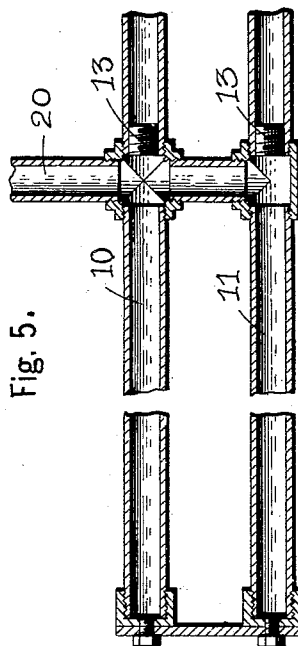


Fig. 5.

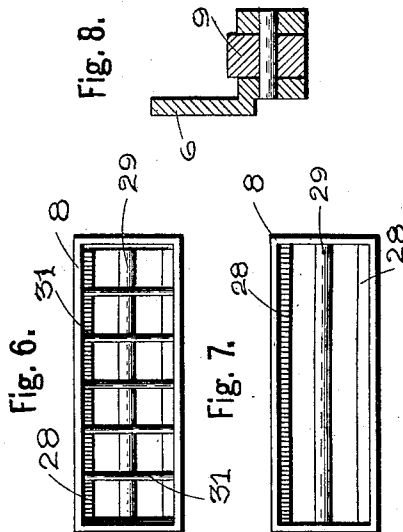


Fig. 6.

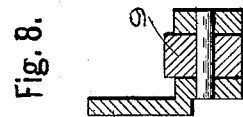


Fig. 7.

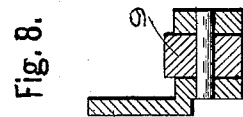


Fig. 8.

UNITED STATES PATENT OFFICE.

CHARLES S. ADAMS AND ALBERT J. RICE, OF BUFFALO, NEW YORK.

METHOD OF CLEANING AND STERILIZING MILK-BOTTLES, &c.

SPECIFICATION forming part of Letters Patent No. 745,752, dated December 1, 1903.

Application filed August 1, 1903. Serial No. 167,893. (No model.)

To all whom it may concern:

Be it known that we, CHARLES S. ADAMS and ALBERT J. RICE, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a certain new and useful Improved Method of Cleaning and Sterilizing Milk-Bottles and Similar Articles, of which the following is a specification.

10 This invention relates to an improved method of cleaning and sterilizing milk-bottles and similar articles, which consists in exposing the bottles to be cleaned to a plurality of jets of water under strong pressure which
15 successively increase in temperature.

The object of the invention is to thoroughly clean and sterilize bottles or the like in a simple and comparatively rapid manner and to obviate the danger of breakage by heating
20 the bottles gradually.

For a description of the preferred form of apparatus employed reference is to be had to the accompanying drawings, in which—

Figure 1 represents a plan view of the apparatus. Fig. 2 is an end elevation of the apparatus looking in the direction of the arrow V, Fig. 1, with the boiler and engine omitted. Fig. 3 is an enlarged cross-section through the tank on line *a a*, Fig. 1. Fig.
30 4 is a vertical longitudinal section on line *b b*, Fig. 1. Fig. 5 is a central longitudinal section through a fragment of the cleaning-pipes. Fig. 6 is a detached plan view of the box for holding pint bottles. Fig. 7 is a detached
35 plan view of the box for holding quart bottles. Fig. 8 is a section on line *c c*, Fig. 1, through one of the angle-iron tracks.

In the preferred apparatus shown like numerals designate like parts.

40 The preferred type of apparatus herein shown forms the subject of a companion application, Serial No. 114,871, filed July 9, 1902.

A long rectangular-shaped tank or trough is divided into three compartments 1, 2, and
45 3 by transverse partitions 4 and 5. Two parallel angle-irons 6 are supported above the top of the trough and extend longitudinally throughout its length, being attached to the

cross-irons 7, which extend transversely across the top of the trough. These angle-irons 6
form tracks on which boxes 8, containing bottles in inverted position, are moved and are arranged in opposed position with their horizontal portions extending inwardly toward each other and from the lower extremity of
55 their vertical portions. Rollers 9 may be placed in the horizontal portions of the angle-irons to facilitate the moving of the boxes. Two pipes 10 and 11 are supported on the trough beneath the tracks and extend longi-
60 tudinally thereof and are each provided with a series of vertical openings 12, which are arranged at regular intervals in the pipes. These pipes 10 and 11 extend throughout the length of the trough and are each divided
65 into three separate and non-communicating parts by plugs 13. A horizontal shaft 14 is arranged at one side of the trough and is connected to an engine 15 of any well-known form by a belt 16 or other power-transmit-
70 ting means. Three rotary pumps 17, 18, and 19 are mounted so that the shaft 14 passes through them. An outlet-pipe 20 is connected at the top of each rotary pump and extends into connection with one part of the pipes
75 10 and 11. An inlet-pipe 21 connects at its respective ends to the lower portion of each compartment and the lower portion of each pump. The water in the compartments is first heated by means of steam-pipes 22, which
80 extend from the boiler of the engine and have their outer ends projecting into the compartments beneath the surface of the water to discharge the steam therein. These pipes
85 are provided with shut-off valves 23, which are opened when the compartments are first filled with water to heat the same. After the water in the compartments reaches the de-
90 sired temperature the valves 23 are closed, and the succeeding water as it enters is main-
tained in heated condition by means of a coil of pipe 24, placed in the compartment 1 and connected to the exhaust of the engine.

The jets are spaced or separated according to the articles to be cleaned. For instance,
95 the jets used for washing milk-bottles or the

like, which have their mouths separated equally from each other, are arranged at regular intervals, so that all the jets will be vertically below the center of the bottle-mouths when the bottles are moved into a position vertically above said jets. By this means the interior of all of the bottles is thoroughly washed. The exterior surface of the bottles is washed by the jets as the bottles are moving from a position above one compartment to a position above another compartment.

The partition 4 between compartments 1 and 2 is provided with an opening 25 near the top, which permits the water to flow into compartment 2, and the partition 5 between compartments 2 and 3 has a similar opening 26, which permits the water to pass into compartment 3. The water as it flows from compartment 1 through compartments 2 and 3 is gradually cooled by atmospheric temperature, and substantially the same water is used in each compartment, thereby economizing in the volume of water used. The arrangement of the compartments is such that the water is in its cleanest and hottest conditions when used in compartment 1, into which it first passes, as before described, and over which the bottles receive their last washing. The water is in its coolest condition in compartment 3, where the bottles receive the first cleaning. The advantage of this is that as the bottles advance over the jets they become gradually cleaner and are exposed successively to water which becomes gradually cleaner and hotter, and thus are thoroughly cleaned and sterilized without danger of breakage by sudden expansion.

A washing compound of any well-known composition may be used, if desired, in compartment 3 and perhaps compartment 2 to assist in cleaning unusually dirty bottles.

The object in using pumps is to secure strong pressure of water in the cleaning-pipes 10 and 11, and thus secure sufficient hydraulic force to thoroughly clean off the surface of the bottles.

The waste water is conducted from compartment 3 by a pipe 27.

The boxes for containing the large bottles, such as quart bottles, are each provided with two cleats 28, secured to the interior thereof, and a central brace 29, so that two rows of bottles can be supported in inverted position in each box. A long rectangular cover 30 is placed over the trough to prevent the water spurting out over the top. The boxes for containing small bottles, such as pint bottles, are provided with a series of additional transversely-extending cleats or braces 21, substantially as shown in Fig. 6, to separate the bottles of each row from each other, and thus arrange their mouths at substantially the same distance from each other that the large bottles occupy in the boxes for containing said large bottles.

This improved method of cleaning and sterilizing is preferably carried out as follows: The dirty bottles are arranged in the boxes in inverted position and the boxes are placed on the tracks and pushed through between the trough and cover 30, passing successively above the various jets of water. The boxes are placed one by one on the tracks and stand for a short interval above each compartment, the movement of a new box on the tracks moving the preceding boxes one step forward. By this means the boxes successively stop over each series of jets, which enables the water to thoroughly clean both the inside and outside of the bottles. The bottles are first moved over compartment 3, where they are washed by jets of moderately-warm water, then advanced over compartment 2, where they are subjected to jets of still hotter water, and finally moved above compartment 1, where the washing is finished and the bottles sterilized by jets of water of a temperature at or near the boiling-point. In some instances jets of live steam may be employed in lieu of the water-jets in compartment 1 in order to make absolutely certain of the sterilization of the bottles. From this arrangement of the compartments of the trough the bottles are exposed to water of increasing temperature as they pass through, as before described. The bottles are thus gradually heated and expanded, which prevents breakage. The water is spurted through the openings 12 with sufficient force by the pumps 17, 18, and 19 to completely clean both the inside and outside of the bottles, and the boiling condition of the water in compartment 1 thoroughly sterilizes the same.

By this improved method the bottles are thoroughly and rapidly cleaned by the action of water all over without the aid of brushes, and are sterilized without danger of breakage, owing to the manner in which they are gradually heated by successive exposures to increasing temperatures.

We claim as our invention—

1. An improved process for cleaning and sterilizing milk-bottles or the like, which consists in exposing the bottles to be cleaned to a plurality of jets of water under strong pressure which successively increase in temperature, substantially as set forth.

2. An improved process for cleaning and sterilizing milk-bottles and the like, which consists in slowly passing the bottles in inverted position above a series of jets of water under strong pressure, the temperature of the successive jets gradually increasing from moderately-hot water to boiling water as the bottles move forward, substantially as set forth.

3. An improved process for cleaning and sterilizing milk-bottles and the like, which consists in moving the bottles in inverted position over a long trough and exposing them

to jets of heated water under strong pressure, the temperature of the water gradually increasing from one end of the trough to the other, substantially as set forth.

- 5 4. An improved process for cleaning and sterilizing milk-bottles or the like, which consists in exposing the bottles to be cleaned to a plurality of heated jets of successively-in-

creasing temperature, substantially as set forth.

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Witnesses:

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