No. 832,581. PATENTED OCT. 2, 1906.

A. KOWARSCH.

APPARATUS FOR STERILIZING BOTTLED CARBONATED LIQUIDS.

APPLICATION FILED MAR. 13, 1905.

2 SHEETS—SHEET 1

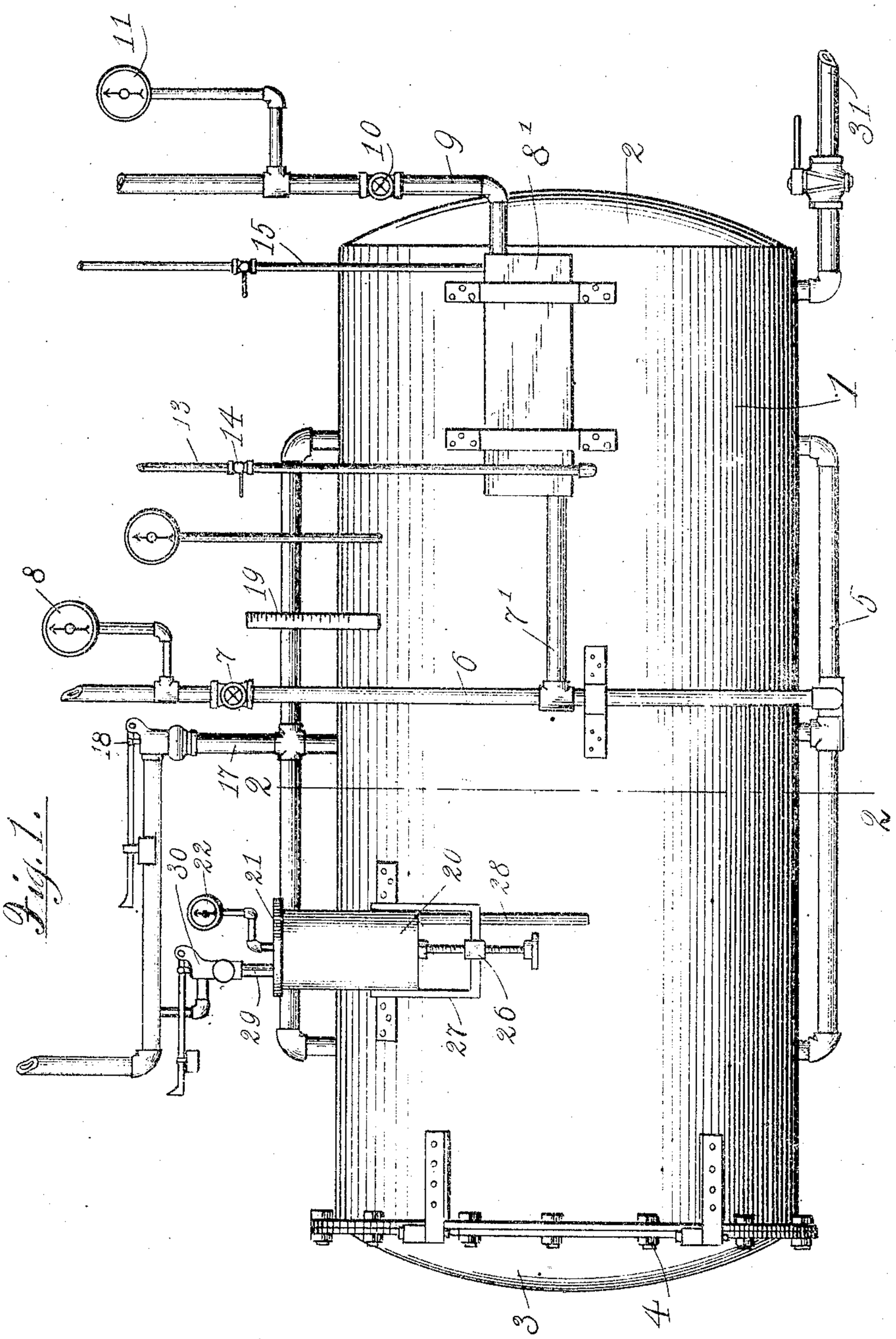

Fig. 1.

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2 SHEETS--SHEET 2

Fig. 2

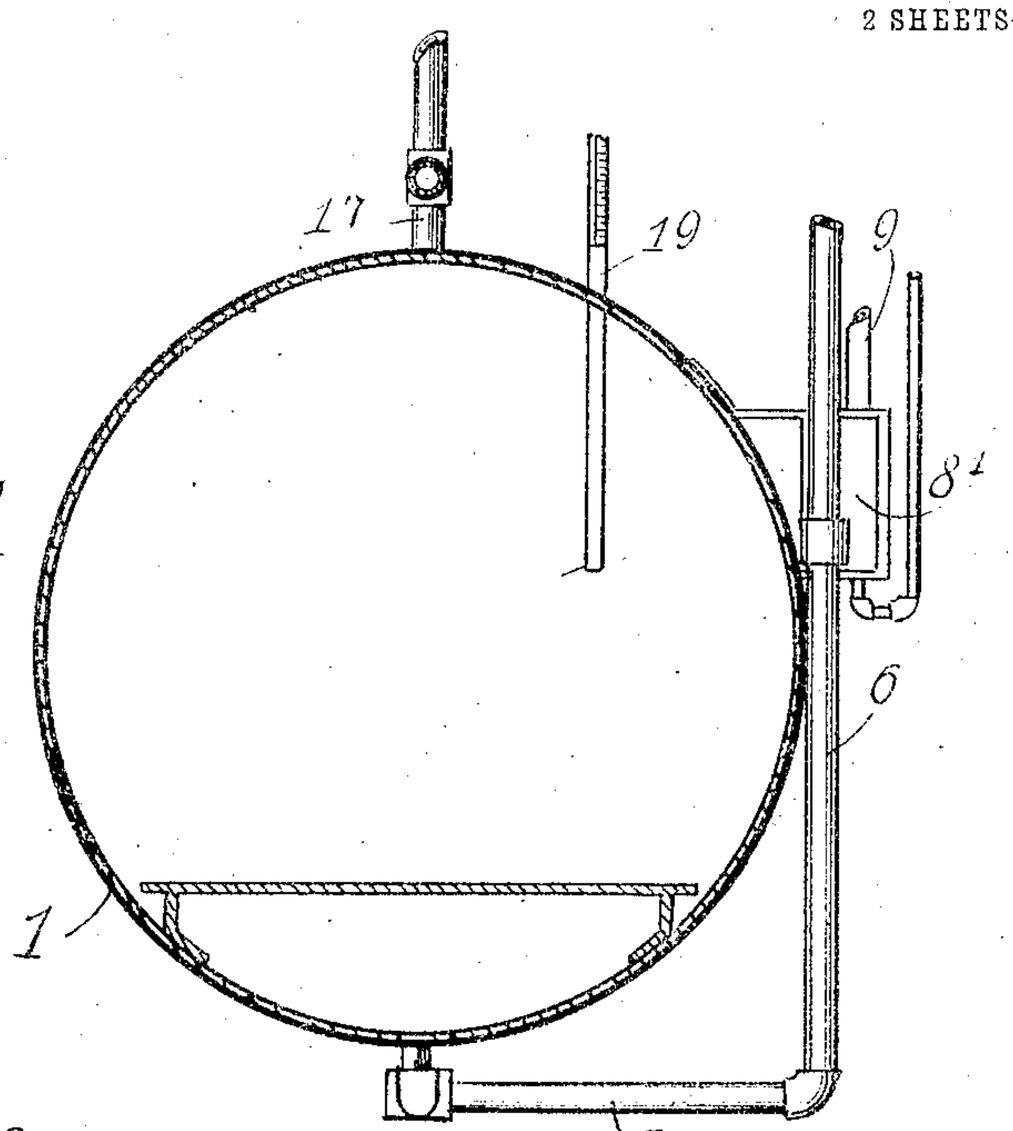


Fig. 3.

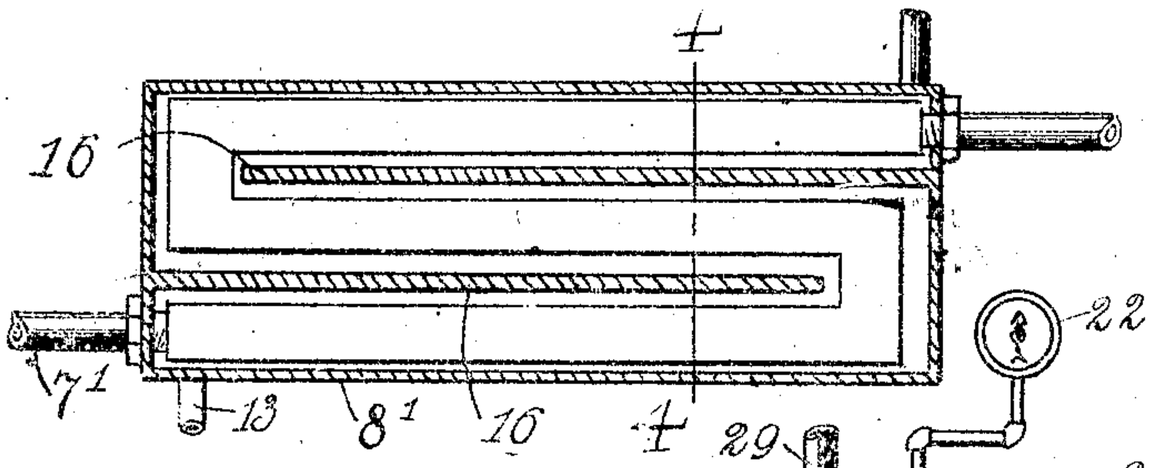


Fig. 4.

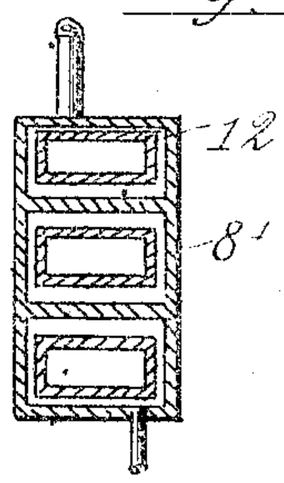
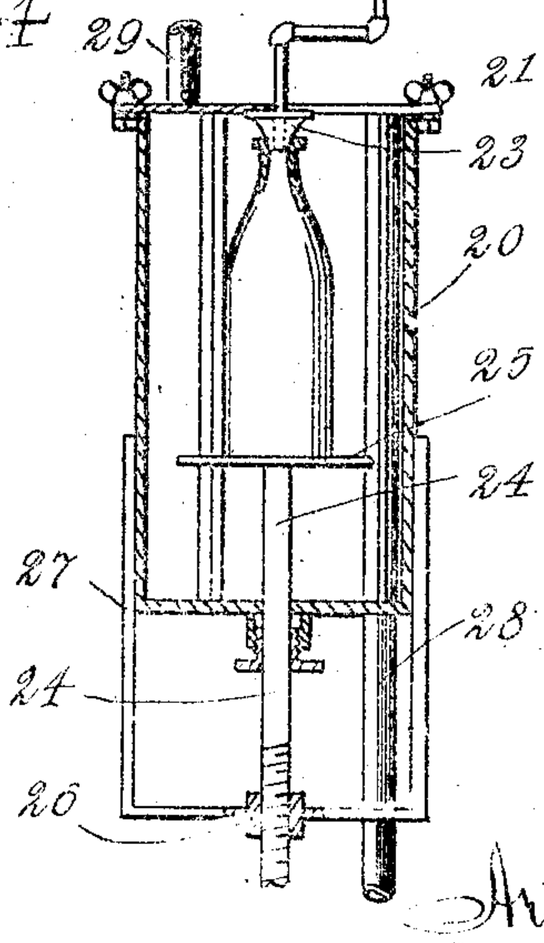


Fig. 5.



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APPARATUS FOR STERILIZING BOTTLED CARBONATED LIQUIDS.

No. 832,581. Specification of Letters Patent. Patented Oct. 2, 1906.

Original application filed December 12, 1904, Serial No. 236,605. Divided and this application filed March 13, 1905. Serial No. 249,933.

To all whom it may concern:

Be it known that I, ARTHUR KOWARSCH, a citizen of Austria-Hungary, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Sterilizing Bottled Carbonated Liquids; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a novel apparatus for sterilizing bottled carbonated liquids, the object being to provide an apparatus in which the contents of the bottles may be heated to a sufficiently high temperature to thoroughly effect sterilization without danger of explosion by reason of the high pressure resulting from such high temperature.

My invention consists in the features of construction of such apparatus, as hereinafter fully described and claimed.

In the accompanying drawings, illustrating an apparatus constructed in accordance with my invention, Figure 1 is a side elevation of an apparatus constructed in accordance with my invention. Fig. 2 is a vertical transverse section of same on the line 2 2 of Fig. 1. Fig. 3 is a detail vertical section, on an enlarged scale, of a cooler for compressed air introduced into my said apparatus. Fig. 4 is a vertical transverse section on the line 4 4 of Fig. 3. Fig. 5 is a central vertical section of an auxiliary chamber for registering the pressure attained in the bottles and enabling the pressure in said apparatus to be regulated accordingly.

This is a division of my application for Letters Patent, Serial No. 236,605, filed December 12, 1904, for improvements in sterilizing apparatus and method.

In sterilizing or pasteurizing carbonated liquids, such as beer and the like, great loss is sustained by reason of explosion of bottles, due to the high pressure resulting from heat applied, and consequently to avoid excessive loss from this source the temperature employed is frequently insufficiently high to completely effect such sterilization.

The present methods generally employed consist in immersing the bottles in hot water, but by reason of the fact that the bottles when introduced into the water are generally very cold renders such sterilization very expensive by reason of the large quantities of hot water required and, furthermore, as hereinbefore stated, by reason of the bursting of a relatively large percentage thereof. To overcome these difficulties, I provide a sterilizing apparatus comprising a chamber 1, which is preferably cylindrical in form and horizontally disposed and is provided at its ends with dished heads 2 and 3, the head 3 being preferably hinged thereto and secured in place to seal said vessel by means of suitable fastening devices, such as the bolts 4 indicated or the like. Entering said chamber 1 at a plurality of points in the bottom thereof is a steam-supply 5, connected, by means of the pipe 6, with a source of supply of steam under pressure, there being a valve 7 interposed in said pipe and a pressure-gage 8 connected therewith. Connecting with said pipes 6 is a pipe 7′, which communicates, through a cooler 8′, with a source of supply of compressed air by means of the pipe 9, controlled by a valve 10 and having a pressure-gage 11 connected therewith. The said pipes 7′ and 9 communicate with a zigzag passage 12 in said cooler 8′, and connected with the said cooler by means of a pipe 13 is a source of supply of cold water controlled by a valve 14, introduced in said pipe 13. An exhaust or waste pipe 15 is connected with the other end of said cooler, the water introduced being caused to flow in a direction opposite to the flow of the air through the zigzag passage 12 by means of two walls 16, introduced in said cooler 8′ in a well-known manner. Connected with said chamber 1 at its upper end at a plurality of points is an exhaust-pipe 17, in which a safety-valve 18 of any suitable construction is interposed, said valve being adapted to maintain a given pressure in said chamber 1 in a well-known manner. Entering into said chamber 1 through the wall thereof at any suitable point is a thermometer 19, on which the temperature within said chamber may be read from the exterior thereof. Connected with the interior of said chamber, but disposed on the exterior thereof, is a cylindrical vessel 20, which is vertically disposed and is provided with a removable head 21, on which a pressure-gage 22 is mounted, the pipe connecting same with said head projecting through the latter and being provided on said projecting end with a conical plug 23, of rubber or similar yielding material. Entering said vessel through the bottom thereof is a vertically-disposed shaft 24, carrying a platform 25 at its upper end, the lower end portion of said

shaft being threaded and passing through the threaded sleeve 26, mounted in a suitable frame 27, supported on said cylinder 20. Said vessel or chamber 20 is connected with the interior of said chamber 1 by means of the pipe 28 and is connected with the exhaust by means of the pipe 29, having flexible connection with said head or cover 21, there being a similar pressure-regulating valve 30 interposed in said connection, so that the pressure in said cylinder 20 will be maintained equal to the pressure within said chamber 1. Connected with the bottom of said chamber 1 is a valve-controlled drain-pipe 31, through which water from condensed steam is drained off.

My method of sterilizing as carried out in the above-described apparatus consists, primarily, in equalizing pressures on both sides of the walls of the bottles, so that the danger of bursting of said bottles or forcing out of stoppers or caps thereof is entirely obviated, thereby enabling the contents of such bottles to be heated to any desirable degree within reasonable limits, and thus thoroughly effect sterilization. Upon applying heat to carbonated liquids, which are generally bottled under pressure, the expansion of the contained gases is very great, and the result is that a very high pressure is contained in such bottles.

In carrying out my method it is essential, primarily, to carefully watch and ascertain as nearly as possible the pressure contained in the bottles and to so regulate the pressure without correspondingly increasing the temperature within the sterilizing vessel and on the exterior of the bottles as to substantially equalize such pressure, and thereby prevent loss. In carrying out the said method in the apparatus above described the bottles in large numbers are introduced into the chamber 1, so as to practically fill the same, and one of said bottles is opened and inserted in the cylinder 20, where it is supported on the platform 25, and the latter is raised so as to firmly insert the plug 23 in the neck of said bottle to seal the same. This bottle now communicates with the pressure-gage 22, and the pressure resulting from the applied heat will thus be indicated on said pressure-gage, as will be obvious.

If steam under pressure only were introduced in the chamber 1, it will be obvious that the heat corresponding to high pressure would be necessarily too intense and could at no time equalize the pressure in the bottles, by reason of the fact that the primary pressure therein exceeds steam-pressure at the boiling-point of water. In order to attain the desired temperature with a pressure in excess of the steam-pressure at such temperature, I introduce with or prior to the introduction of steam into said chamber 1 cold compressed air, so as to attain a pressure in said chamber 1 primarily which exceeds the normal pressure within the said bottle. I then introduce steam into said chamber, and as the same becomes heated I watch carefully the increase in pressure in the bottles indicated on the gage 22, and as the temperature increases I increase the pressure proportionately by partially opening the valve 10 to admit a further supply of compressed air, this operation being continued until the desired temperature and proportionate high pressure has been attained in said compartment 1, and this high temperature and pressure are maintained for a period sufficiently long to effect complete sterilization. The supply of steam is then shut off and the pressure maintained and gradually reduced by gradually exhausting the compressed air, the pressure of the latter being, however, always maintained slightly in excess of the pressure in the bottles and the latter being cooled to their original temperature before being removed from the apparatus. In this manner I am enabled to sterilize a large number of bottles of carbonated beverages at each operation at the expense of only a single bottle from each lot, which is required to indicate the increase in pressure for such lot by reason of the increase in temperature.

My said apparatus is exceedingly simple and efficient.

I claim as my invention—

An apparatus for sterilizing packed carbonated liquids, comprising a sealed vessel adapted to receive the package and communicating independently with sources of supply of air under pressure, steam and water, valves controlling all of said connections, an independent chamber communicating with said first-named chamber and adapted to receive an open package, an adjustable platform within said chamber supporting said open package, a pipe extending through the upper wall of said chamber and carrying a flexible stopper adapted to seal the said package, and a pressure-gage disposed on said pipe and indicating variations in pressure in said package due to variations in temperature of the contents thereof.

In testimony whereof I have signed my name in presence of two subscribing witnesses.

ARTHUR KOWARSCH.

Witnesses:

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