UNITED STATES PATENT OFFICE.

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STERILIZING AND PRESERVING APPARATUS.

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1,083,731.

To all whom it may concern:

Be it known that I, NEWTON J. DARDEL, a citizen of the United States, and a resident of Memphis, in the county of Shelby and State of Tennessee, have made certain new and useful Improvements in Sterilizing and Preserving Apparatus, of which the following is a specification.

My invention relates to improvements in devices for sterilizing and preserving food stuffs and other perishable articles, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of my invention is to provide a device by means of which articles which are to be preserved may have the surrounding air removed and replaced by a sterilizing medium, such as ozonated air, carbonic acid gas, etc., and in which the articles so treated may be sealed hermetically, so as to prevent the spoiling or decaying of the articles so treated.

A further object of my invention is to provide a device for insuring the thorough sterilization of all parts of the articles to be preserved by providing means for passing a current of sterilizing fluid first in one direction through the articles and then in the reverse direction.

A further object of my invention is to provide means whereby the articles to be sterilized or preserved may be treated with fluid under considerable pressure until thorough sterilization has taken place, when such pressure may be relieved in such a manner as to cause the sterilizing medium to pass away from the articles by a different path, thus insuring the complete permeation of the sterilizing fluid through the substances to be treated.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this application in which—

Figure 1 is a central vertical section through the device. Fig. 2 is a side view of a modified form of the device, certain parts being shown in section, Fig. 3 is a view of another modified form of the device, Fig. 4 shows a detail construction of the vessel closure for the receptacle in which the articles are to be treated, Fig. 5 is a sectional view showing a modified form of the closure, Fig. 6 is a sectional view showing another modified form of closure, and Fig. 7 is a section along the line 7-7 of Fig. 1, looking in the direction of the arrows.

In carrying out my invention I provide a receptacle 1 which may be made of any convenient shape, but is preferably a cylinder which is provided at its end with bosses 2 having threaded sockets 3 arranged to receive bolts 4 for securing the top 5 to the receptacle. The top 5 has a central opening 5a arranged to receive a tube 6, which is threaded externally and internally. The bottom portion of this tube has laterally extending branches such as those shown at 7 and 8. The tube is provided with a shoulder 9 which engages the under side of the top 5 to which it is firmly held by means of a nut 10. Each of the tubes 7 and 8 is provided with a cut-off valve 11 having a valve stem 12 which extends through the top and is provided with a suitable stuffing box 13. An inner tube 14 is provided, which extends around the interior of the receptacle. This tube is provided with perforations 14a in its bottom as clearly shown in the drawings. In Fig. 1 I have shown a central tube 15, which is screwed into the end of the tube 6, and which is provided with perforations in its sides, as shown at 15a. The bottom 1a of the receptacle 1 may also be provided with a tube 6' similar to the tube 6, and with a nut 10' for holding the tube in place. The laterally extending branches 7' and 8' are similar to the branches 7 and 8 already described and the valves 11' are similar to the valves 11. The bottom portion of the receptacle is also provided with a circular tube 14' having perforations 14a on its upper surface.

In Fig. 1, I have shown a portion of the device which is used with a receptacle for the purpose of exhausting the air from within the receptacle for permitting the passage of sterilizing fluid and for sealing the receptacle. The sealing feature forms no part of the present invention, being fully described and claimed in a copending application, and I have only shown enough of the apparatus to explain the operation of the device which forms the subject of the present invention. It will be sufficient to state that a chamber 16 is provided which is arranged to fit centrally over the end of the tube 6, a gasket 16' effectually sealing the chamber.
The pipe 17 leads to a suction pump (not shown) or other similar device for exhausting air while a pipe 18 leads to a source of ozonated air or other antiseptic fluid. At 10 I have shown a rod which may be fastened to a plug 20. This is disposed just above the tube 6 and may be screwed into the latter for sealing the contents of the receptacle, as explained later.

From the foregoing description of the various parts of the device the operation thereof may be readily understood. The receptacle is filled by unscrewing the bolts 4 and removing the top 5 (it being understood that the part of the apparatus which contains the chamber 16 has previously been removed). If the articles to be treated are such as will not permit the passage of fluids readily between them when they are disposed in the can then the device as illustrated in Fig. 1 is used. Thus garden seeds, cereals, etc., may be placed in the receptacle in bulk so as to substantially fill the receptacle. The lower valves 11 may now be turned so as to shut off communication between the interior of the receptacle and the tube 6. The valve 17 of the pipe 17 is now opened, while the valve 18 of the pipe 18 is closed. Exhaustion takes place through the pipe 17 and the air around the articles is conveyed away. When this has proceeded far enough then the valve 17 of the pipe 17 may be closed and the valve 18 of the pipe 18 may be opened, thus admitting ozonated air or other antiseptic fluid. The valves 12 may now be closed and the ozonated air or other sterilizing fluid may pass down through the central tube and through the seed. If necessary the sterilizing fluid may be put under pressure, so as to permeate all of the goods to be treated. Or the valves 12 may be opened, thus causing a passage of the sterilizing fluid from the center outwardly and downwardly. If it is desirable the pipe 6 may communicate with a chamber similar to that shown at 16 and having pipes similar to 17 and 18 for either admitting ozonated air or other sterilizing fluid, or permitting the passage of the air out of the chamber. Thus the sterilizing fluid may be passed backwardly and forwardly through the receptacle.

When it is passed into the pipe 6, it is desirable to turn the valve so as to permit the passage of the fluid in the manner shown by the arrows. The valve 17 of the pipe 17 is then opened, while the valves 11 are shut. This forces the sterilizing air through the seed in the opposite direction to that in which it was first introduced. When the seed has been thoroughly sterilized the valves 11 and 12 are closed and the rod 19 is lowered with the plug 20, the latter being screwed into the opening in the pipe 6. The rod 19 is drawn upwardly free from the plug 20 and the chamber 16 may then be removed.

In order to effectually seal the device I may provide a resilient gasket such as that shown at 21 in Fig. 4, this gasket being made of rubber or any other suitable material. A plug 22 may be screwed into the top 6, so as to force the gasket against the plug 20, thus securely sealing the receptacle at the upper end. The lower end, which, as stated above, has been shut off by means of the valves 11, may now be provided with closures like that shown in Fig. 4. After this the valves 11 and 11 may be opened but the closures in the tubes 6 and 6 will effectually seal the receptacle.

Instead of leaving the sterilizing fluid in the can it may be displaced by an inert gas such as nitrogen, before the sealing operation takes place.

In some cases it is desirable to use the top 5 with an ordinary receptacle, such as a glass or tin can. In Fig. 2 I have shown the top 5 as secured by means of bolts 4 to a base strip 24. In this form of the device there is, of course, no inlet in the bottom of the can. In sterilizing a substance such as a liquid with a can of this form, I provide a central tube 15 having perforations 15 near the bottom. The valves 11 may be closed when the sterilizing gas is forced in through the central tube 15, thus preventing the escape of the gas. The pressure may be considerable. If now the tube 13 is disconnected from the supply of gas and the valves 11 are opened then the gas pressure will be forced out through the valves, the liquid itself forming an effectual seal for preventing the passage of the gas back through the central tube. Thus the gas will be compelled to traverse the liquid from the perforations in the bottom of the tube up through the liquid and out through the valves.

In some instances, it is desirable to pass the gas in a continuous stream from the center outward, and I may use a construction like that shown in Fig. 3 in which the central tube 10 is provided having communication with the lower tube 6, while the upper tube 6 has no central tube. In this form the gas will pass through the central tube, out through the articles to be sterilized, and through the tube 6 by way of the valves 11 or by the reverse path, as explained above.

In Fig. 5 I have shown a modified form of closure in which the tube 6 is screwed onto an integral extension 7 of the branch pipes 7 and 8. The plug 20 is designed to enter the interior of this extension. The gasket 21 is held by the plug 22 firmly upon the plug 20, but the end of the extension 7 forms an additional seat for the gasket. In this form of the device I have shown a plug 30 inserted in the opening at
the junction of the pipes 7 and 8 instead of the pipe 15, for in some instances it is desirable not to use the pipe 15. Instead of using this form of closure, I may use one like that shown in Fig. 6 in which the tube 6 is thin enough to be crimped over a metal cap 27, which bears on its under side a resilient layer 28, this layer resting on the plug 20. In all of these forms of closures, it will be observed that there is a bottom plug which is designed to be screwed into the tube next to which there is a resilient member held by a metal cap or plug against the first named plug. This insures absolutely the hermetrical sealing of the can.

I claim:

1. The combination with a receptacle, of a top therefor arranged to be secured to the receptacle, said top being provided with a central opening, a tube arranged to extend through said central opening, said tube being threaded internally, a screw plug arranged to enter said tube, a sealing member disposed within said tube in contact with said plug, and a cap for holding said sealing member against said plug.

2. The combination with a receptacle, of a top therefor arranged to be secured to the receptacle, said top being provided with a central opening, a tube arranged to extend through said central opening, said tube being threaded internally, a screw plug arranged to enter said tube, a sealing member disposed within said tube in contact with said plug, and a second screw plug arranged to enter the tube and to hold said sealing member against said first named plug.

3. The combination with a receptacle, of a top therefor provided with a central opening, means for securing said top to said receptacle, a tube arranged to pass through said central opening, means for securing said tube to said top, a laterally extending pipe communicating with said tube, a perforated pipe extending around the interior of the receptacle adjacent to the side walls thereof and having communication with said laterally extending pipe, and a valve for said laterally extending pipe having a valve stem arranged to extend through said top.

4. The combination with a receptacle, of a top therefor provided with a central opening, means for securing said top to said receptacle, a tube arranged to pass through said central opening, means for securing said tube to said top, laterally extending pipes disposed within the receptacle and arranged to communicate with said tube, a perforated pipe arranged to communicate with said laterally extending pipes at the ends thereof, said perforated pipe being disposed within the receptacle near the side walls thereof, and a valve for each of said laterally extending pipes for cutting off communication between said perforated pipe and the central tube.

5. The combination with a receptacle, of a top therefor provided with a central opening, means for securing said top to said receptacle, a tube arranged to pass through said central opening, means for securing said tube to said top, laterally extending pipes disposed within the receptacle and arranged to communicate with said tube, a perforated pipe arranged to communicate with said laterally extending pipes at the ends thereof, said perforated pipe being disposed within the receptacle near the side walls thereof, a valve for each of said laterally extending pipes for cutting off communication between said perforated pipe and the central tube.

6. The combination with a receptacle top having a central opening, of a central tube arranged to extend through said central opening, said tube being provided with a shoulder arranged to engage the under side of the top, a nut disposed on the opposite side of said top from the shoulder for securing the tube to the top, a screw plug arranged to be inserted in said tube, a gasket disposed adjacent to said screw plug, and a second screw plug arranged to enter said tube for holding said gasket upon said first named plug.

7. The combination with a receptacle, of a top therefor having an inlet tube, a pipe disposed centrally of the receptacle and communicating with said inlet tube, a perforated tube disposed within the receptacle near the walls thereof, and means for cutting off communication between said inlet tube and said perforated tube.

8. The combination with a receptacle, of a plurality of openings therein, a tube disposed in each opening, said tubes being arranged for the inlet or outlet of fluid, perforated pipes disposed within the receptacle near the side walls thereof, each of said perforated pipes having communication with one of said tubes, and means for cutting off communication between each perforated pipe and its individual tube.

9. The combination with a receptacle, of a plurality of openings therein, a tube disposed in each opening, said tubes being arranged for the inlet or outlet of fluid, perforated pipes disposed within the receptacle near the side walls thereof, laterally extending pipes establishing communication between said perforated pipes and said tubes, and a cut-off valve in each of said laterally extending pipes.

10. The combination with a receptacle, of a top therefor arranged to be secured to the
10 receptacle, said top being provided with an opening, a tube arranged to extend through the opening, said tube being threaded internally, a screw plug arranged to enter said tube, a sealing member disposed within said tube in contact with said plug, and means carried by the tube for holding said sealing member against said plug.

11. The combination with a receptacle, of a top therefor arranged to be secured to the receptacle, said top being provided with an opening, a tube arranged to extend through the opening, a closure arranged to enter said tube, means carried by the tube for limiting the movement of the closure, a sealing member disposed within the tube in contact with said closure, and means carried by said tube for holding said sealing member against said closure.

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Witnesses:

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