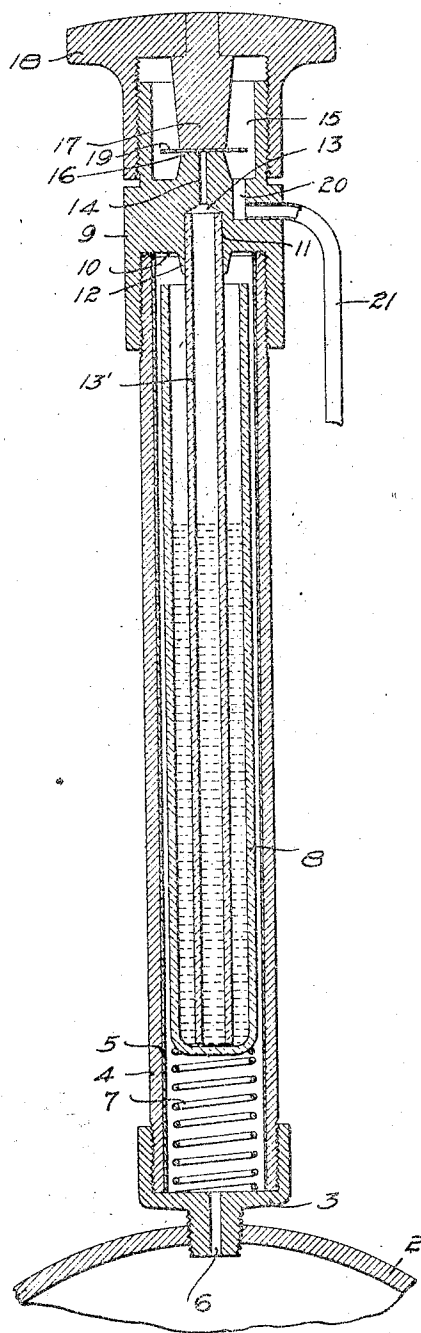


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W. P. LARSON
APPARATUS FOR MAKING VACCINE

Filed March 21, 1918



WITNESSES

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UNITED STATES PATENT OFFICE.

WINFORD P. LARSON, OF MINNEAPOLIS, MINNESOTA.

APPARATUS FOR MAKING VACCINE.

Application filed March 21, 1918. Serial No. 223,731.

To all whom it may concern:

Be it known that I, WINFORD P. LARSON, a citizen of the United States, resident of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Apparatus for Making Vaccine, of which the following is a specification.

The object of my invention is to provide an apparatus by means of which bacteria can be subjected to varying degrees of gas pressure or suddenly released for the purpose of killing all or certain bacteria for use as a vaccine.

The invention consists generally in the apparatus hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification,

The figure represents a longitudinal sectional view of the apparatus embodying my invention.

In the drawing, 2 represents a section of the wall of a tank in which a gas, suitable for the purpose, under a high pressure is contained. The gas which I prefer to employ for this purpose is CO₂. A cap 3 is tapped into this tank and is interiorly threaded to receive the exteriorly threaded end of a metal tube 4, preferably steel, having a lining 5 preferably of tin. A port 6 leads from the tank into the lower end of this tube. 7 is a compression spring seated in the bottom of the tube and 8 is an ordinary glass test tube that is seated on the spring and having its walls spaced from the lining of the tube and extending to a point near the top of the tube. This test tube is partially filled with fluid containing bacteria. 9 is a head having a recess 10 in its lower end, interiorly threaded to receive the exteriorly threaded upper end of the tube 4 and form a closed joint therewith. The bottom of the recess has a socket 11 therein with a flange 12 surrounding the open lower end of the socket and a concave seat 13 at the upper end of the socket, from which a port 14 leads to a chamber 15 that is formed in the upper end of the head 9, a seat 16 being provided around the open upper end of said port to receive a valve 17 that is carried by a cap 18 and projects downwardly into the chamber 15 and has a ground face for seating on the surface around the port 14 and effectually closing the passage therethrough. A tube 13 preferably

erably glass is fitted into the socket 11 and has its upper end seated in the bottom of the socket and its lower end resting upon the bottom of the test tube 8 but without forming a closed joint therewith so that the liquid in the test tube may flow up into the tube 13'. The passage may be further sealed by a suitable gasket 19. The cap 18 is interiorly threaded to receive the exteriorly threaded upper end of the head 9 and a sufficient number of threads are provided to insure a good connection between the head and the cap when the valve 17 contacts with the surface around and closes the port 14. A gravity outlet 20 is provided in the bottom of the chamber 15 to which a small spout 21 is connected for collecting the fluid from the chamber 15 into a sterile test tube.

In using the apparatus, the bacteria to be studied are placed in a sterile test tube resting on the coiled spring in the bottom of the tin lined steel tube, the receiving chamber in the head 9 being closed. The apparatus is then attached to the gas tank and allowed to remain for a suitable period. During this period the gas will flow into the test tube and being soluble in the water, will mix therewith. Upon the slight opening of the valve 17 the pressure of the gas will force the bacterial suspension up the glass tube 13' and through the port into the receiving chamber and as the fluid passes the valve, the pressure will be suddenly released within the chamber 15 and the bacteria will be destroyed either directly, by the pressure or its sudden release, or possibly by a combination of both. The valve is under such control that the fluid may be removed drop by drop as desired, and as it flows into the bottom of the chamber 15 it will settle by gravity through the port 20 into the spout 21 and thence to the test tube.

It is obvious that the details of the construction herein shown and described may be modified in many particulars without departing from my invention as set forth in the following claims.

In my co-pending application Serial No. 225,027, filed March 27, 1918, process of making vaccine, I have described and claimed a process which may be carried out by means of an apparatus or device like that disclosed and claimed herein.

I claim as my invention:

1. An apparatus of the class described comprising a receptacle for fluid containing

bacteria having means for connection with gas under pressure and soluble in said fluid, a gas expansion chamber having inlet and outlet ports and means for normally closing said inlet port, and means for conducting mingled gas and bacterial fluid to said inlet port for delivery to and release in said chamber when said closing means is opened.

2. An apparatus of the class described comprising a casing having means for connection with gas under high pressure, a test tube fitting within said casing to contain bacteria suspended in fluid in which gas is soluble, said casing having a gas releasing chamber and inlet and outlet ports therefor, and means for normally closing said inlet port, said inlet port having means submerged in said fluid for conducting the mingled gas and fluid to said port for release in said chamber when said closing means is opened.

3. An apparatus of the class described comprising a casing having means for connection with gas under high pressure, a test tube for fluid having bacteria suspended therein fitting within said casing and in which fluid said gas is soluble, said casing having a gas releasing chamber with inlet and outlet ports, a tube for said inlet port submerged in said fluid, means for normally closing said inlet port, the mingled fluid and gas flowing thereto and being released in

said chamber when said closing means is opened.

4. An apparatus of the class described comprising a metallic tube having means for connection with a suitable gas under high pressure, a test tube containing fluid having bacteria suspended therein fitting within said metallic tube, a spring normally holding said test tube in its raised position, a passage being provided between the walls of said test tube and said metallic tube for admitting the gas pressure to said fluid, a head mounted on said metallic tube and having a gas releasing chamber provided with inlet and outlet ports and means for normally closing said inlet port, and a tube communicating at its upper end with said inlet port and having its lower end seated in said test tube within the fluid therein, the mingled gas and fluid flowing through said inlet port and being released in said chamber when said closing means is opened.

5. An apparatus of the class described comprising a receptacle for fluid containing bacteria having means for connection with gas under pressure and soluble in said fluid, and a gas expansion chamber having means for admitting mingled gas and bacterial fluid thereto, for the purpose specified.

In witness whereof, I have hereunto set my hand this 12th day of March 1918.

WINFORD P. LARSON.