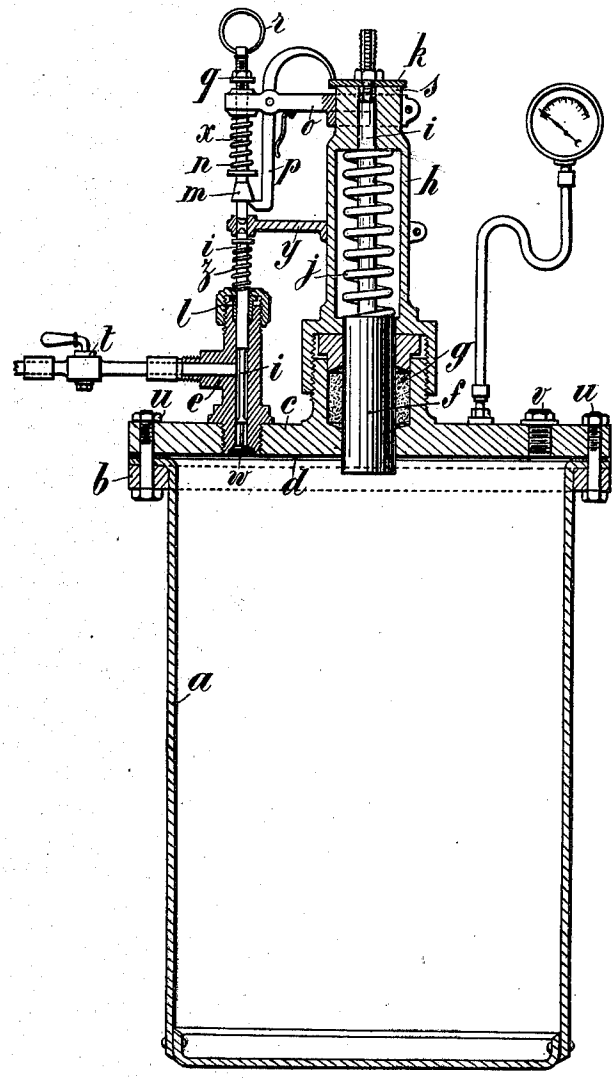
No. 734,698. PATENTED JULY 28, 1903.

A. GHIRELLI.

APPARATUS FOR DISINFECTION.

APPLICATION FILED MAR. 25, 1903.

NO MODEL.



Witnesses

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No. 734,698. Patented July 28, 1903.

UNITED STATES PATENT OFFICE.

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APPARATUS FOR DISINFECTION.

SPECIFICATION forming part of Letters Patent No. 734,698, dated July 28, 1903.

Application filed March 25, 1903. Serial No. 149,458. (No model.)

To all whom it may concern:

Be it known that I, ANGELO GHIRELLI, a subject of the King of Italy, at present residing at Paris, France, have invented a new or Improved Process for Disinfection by Means of Gaseous Formaldehyde and Apparatus Therefor, of which the following is a specification.

This invention relates to a new or improved apparatus for disinfection by means of gaseous formaldehyde.

The mode of operation of said apparatus consists in the transformation by means of heat and under pressure in a closed vessel of trioxymethylene into formaldehyde in the gaseous condition. As soon as the transformation is completed, the gaseous formaldehyde is automatically liberated and is expelled by its own pressure through a suitable pipe or conduit directly to the locality or space to be disinfected. The gas issues in a single continuous jet in order that the maximum penetration and expansion may be insured. It can be instantly ascertained by a simple calculation when the transformation of the trioxymethylene is completed, using as a factor the pressure indicated by a pressure-gage with which the apparatus is fitted and the fact that one gram of chemically-pure trioxymethylene will produce one liter of formaldehyde gas and taking into account the capacity of the closed vessel.

The apparatus which constitutes my invention comprises a closed vessel fitted with a pressure-gage, a valve-controlled outlet, means of access to the interior, and a device for opening the valve of the outlet when a predetermined pressure is reached in the closed vessel. A suitable and convenient source of heat is combined with the apparatus, if desired.

The means for opening the valve can be actuated by a plunger or piston, one end of which is exposed to the interior of the vessel. Between the opposite end of the piston or plunger and a fixed abutment there is a spiral spring coiled around the piston-rod which passes through the abutment, outside which it is screw-threaded and fitted with a nut, by means of which the tension of the spring may be regulated. Outside the abutment also the piston-rod has a fixed collar or equivalent projecting part on which one end of a curved lever rests. The other end of this curved lever supports a vertical rod fitted with a spring tending to urge it in a downward direction. Immediately below this vertical rod is the upper end of the stem of the valve which controls the outlet from the closed vessel. As soon as the predetermined pressure is reached the plunger or piston lifts, and thereby the curved lever is moved and ceases to support the vertical rod, which is thereupon forced down by its spring upon the stem of the valve, and the latter is opened and liberates the gaseous formaldehyde, which thereupon escapes through a pipe controlled by a tap. The valve-stem is fitted with a spiral or other spring, which tends to maintain the valve in a closed position; but since this stem has to be displaced by the action of the spring on the vertical rod the latter spring must be the stronger.

The invention is illustrated in vertical section in the accompanying drawing.

The apparatus is provided with a boiler or other shell of suitable strength *a*, closed by means of a lid or cover *c*, which is firmly fixed by the bolts *u* and ring *b* to a flange formed on the upper edge of the boiler or shell. *d* is an asbestos or other packing-ring, by means of which a tight joint is insured. The cover *c* has passing through its center the small piston *f*, which also passes through the packing *g*. The external end of the piston is furnished with an extension or rod *i*, which passes through the casing *h* and has a spring *j* disposed upon it, this spring being arranged to bear with its ends, respectively, against the piston and the top of the casing *h*, so as to force the piston downward in the direction of the boiler *a*. The tension of the spring may be regulated by a small nut on the piston-rod, so that it allows the piston to lift only when the desired or predetermined pressure has been attained in the boiler. The collar *k* on the piston-rod limits the downward movement. The collar *k* is further combined with a locking or engaging device or mechanism operating automatically by the lift or movement of the piston *f* to open the valve *w*, also placed in the cover. This valve opens or closes a tap-controlled pipe *t*, by means of which the gaseous formaldehyde may be dis-

tributed or directed into the space or locality to be disinfected.

The device or mechanism referred to comprises a rod x, having a shoulder m adapted to engage with a projection or beak formed on one end of a lever p, the other end of which is curved to rest upon the collar k of the rod i, the collar and rod of course being firmly connected together. The lever p has a spring combined with it, normally forcing it into engagement with x. The rod x, which is capable of sliding longitudinally, is surrounded by a spring n, tending to force it into its lowest position, the movement, however, being limited by an adjustable screw-nut q coming into contact with the bracket o, which serves to support both the rod x and the lever p. The upper end of the rod is furnished with a ring r, by which it can be raised for the engagement of its shoulder m with the end of the lever p in the position illustrated. Its lower end passes into a guide y, which also contains the upper end of the rod i of the valve w. This rod i also passes through the stuffing-box l, formed in the valve-casing e. The rod i is forced in an upward direction by a spring z, which is weaker than the spring n on the rod x. The spring z tends to keep the valve w closed. The cover c may also carry a pressure-gage and be formed with a charging-opening closed by the screw v. To permit the tension of the spring to be easily adjusted upon the piston f, so that this latter will be moved upon any predetermined pressure being reached in the boiler, the screw-nut on the top of the piston-rod may be turned and moved up and down to certain marks on the rod, or the nut itself or the collar k attached to it may be graduated.

In operation the boiler a is charged with the necessary or required quantity of trioxymethylene, (CH_2O_3,) upon the basis that a gram of this substance corresponds to a liter of formaldehyde, (CH_2O.) Thus if one heats a boiler containing or having a capacity of ten liters and charged with one hundred grams of the trioxymethylene it will be known that when the pressure-gage shall have marked ten kilograms all the trioxymethylene is transformed into formaldehyde. The tension of the spring j is thus adjusted for this quantity by adjusting the screw-nut to the division 10 of the rod i and the tap t is opened. The valve w is closed, its controlling apparatus being in the position shown in the drawings. When a pressure of ten kilos is attained in the boiler, (this being the regulated tension of the spring,) the piston f will be lifted and through the collar, carried by its rod i, will tilt the lever p and disengage the end of it from the shoulder m of the rod x. Forced down by its spring the rod x will then sharply descend, and its lower end will strike the upper end of the stem of the valve w, the strength or tension of the spring n being sufficiently superior to that of the spring z to overcome the resistance of the latter. The stem i will thus be pushed down and the valve w opened, so that the automatic liberation of the gaseous formaldehyde is effected through the pipe t at the moment when the transformation of the trioxymethylene into formaldehyde is completed. The discharge being ended, the rod x may be returned to engagement with the lever p by lifting it with the ring r, and the valve w again closes under the influence of the spring upon its stem. The apparatus is then recharged and is ready for a new operation.

Having described my invention, what I claim is—

1. The combination with a vessel, of an outlet therefor, a valve for closing said outlet, a spring tending to open said valve, a catch holding said valve closed, and an abutment movable by the pressure in said vessel and adapted to trip said catch.

2. The combination with a vessel, of an outlet therefor, a spring-actuated valve normally closing said outlet, a spring-actuated rod tending to open said valve, a lever engaging with said rod and holding it out of operation, and a spring-pressed abutment movable by the fluid-pressure in said vessel and arranged to trip said lever.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ANGELO GHIRELLI.

Witnesses:
HENRY DEANBER,
LUCIEN CRESPIN.