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APPARATUS FOR STERILIZING BOTTLE CAPS BEFORE DELIVERY TO A BOTTLE CAPPING APPARATUS

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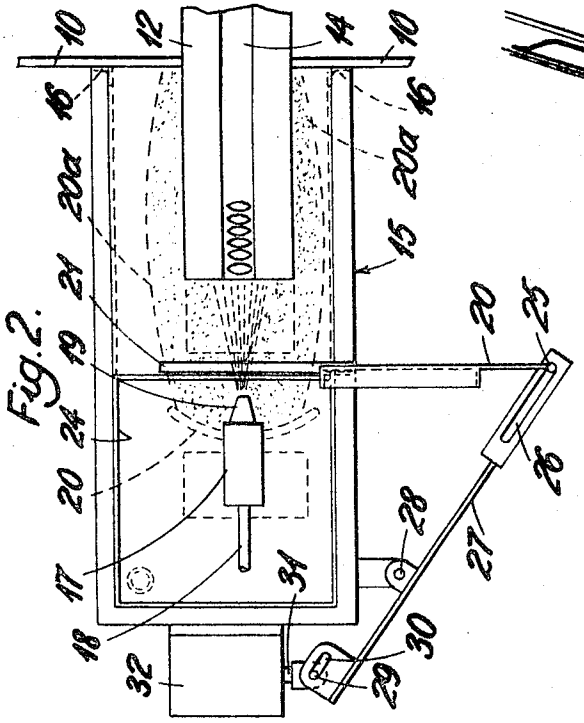


Fig. 2.

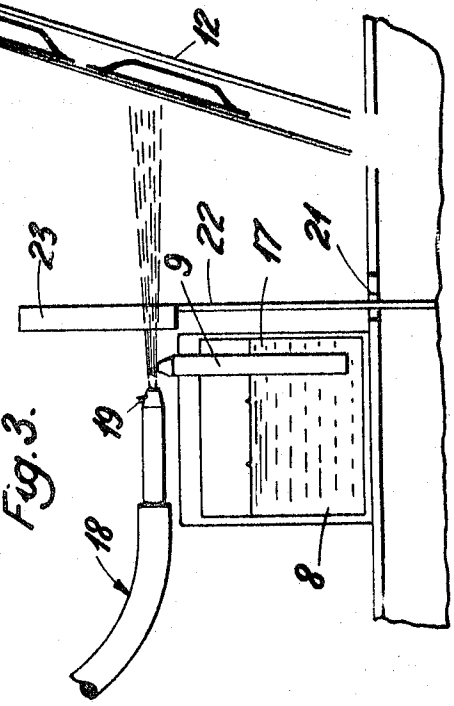


Fig. 3.

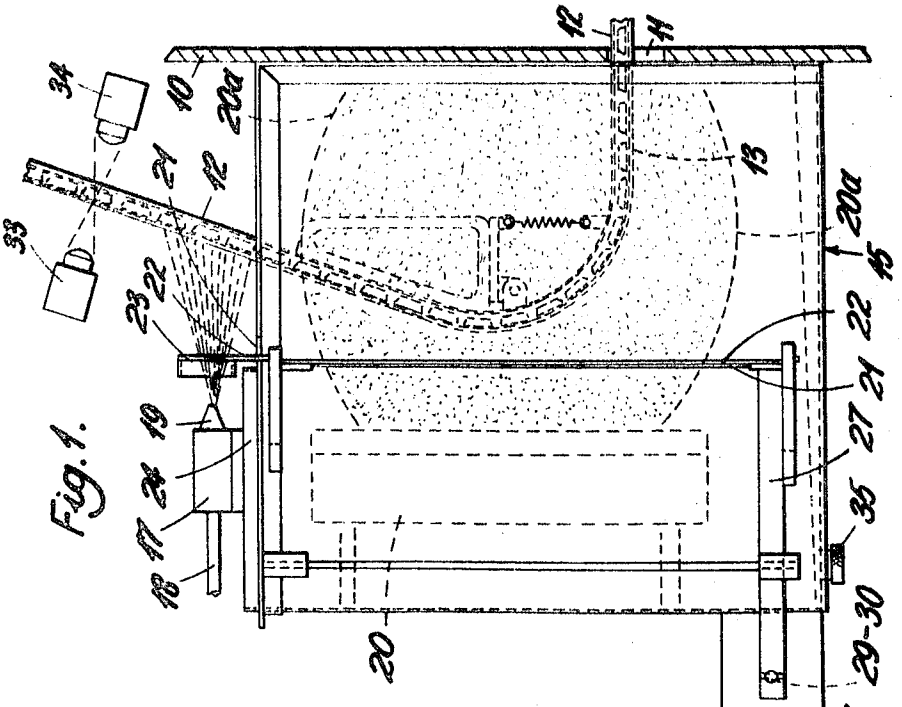


Fig. 1.

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APPARATUS FOR STERILIZING BOTTLE CAPS BEFORE DELIVERY TO A BOTTLE CAPPING APPARATUS

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U.S. Cl. 21—93 10 Claims

ABSTRACT OF THE DISCLOSURE

A device which sprays bottle caps with sterilizing liquid and passes them through a closed casing in which is disposed an infra-red heater which dries the caps and creates a sterile atmosphere within the casing. The caps are then delivered from the closed casing into a substantially air tight casing which contains a bottle capping apparatus.

The invention relates to apparatus for sterilising bottle caps before delivery to a bottle capping apparatus for example a bottle capping apparatus such as is described in British patent specification No. 1,011,782.

According to the invention a bottle capping apparatus is located in a substantially air tight casing outside which is disposed means for applying sterilising liquid to the caps and means for delivering the sterilised caps through a hole in the casing to the capping apparatus which delivery means, together with means for heating and drying the caps to which the sterilising liquid has been applied, are located in a second substantially closed casing.

The means for heating and drying the caps is sufficient to produce in said second enclosed casing a sterile atmosphere comprising a mixture of sterilising liquid vapour and air which may have entered the casing both of which are maintained at a temperature in excess of that required to obtain sterile conditions thus any inward flow of air from the atmosphere to the first casing will be sterilised during its passing through the second casing.

Preferably the means for applying the sterilising liquid to the caps is disposed outside both said casings.

The aforesaid means for delivering the caps may comprise a chute which extends into the second casing through a hole therein past the heating means within the second casing and then through the hole in the first said casing so as to deliver the dried sterilised caps to the capping apparatus.

The said heating means may comprise an infra-red heater.

The aforesaid chute may be open sided and the means for applying the sterilising liquid may comprise means for generating a spray jet and directing it into the open side of the chute.

The open side of the chute may be directed towards the heating means.

Means may be provided for rendering the heating means and the means for applying the sterilising liquid inoperative upon the caps should the caps not be moving along the chute.

In one such arrangement a movable shutter is disposed between the chute and the means for generating said spray and between the chute and said heater so that they are rendered inoperative upon the caps should the movement of caps along the chute cease.

Means responsive to the movement of the caps in the chute may be arranged automatically to move the shutter from a position between the heater and the chute and between the means for generating the spray and the chute.

The following is a description of a sterilising apparatus

suitable for use with a bottle capping apparatus such as is described in British patent specification No. 1,011,782, reference being made to the accompanying drawings in which:

FIGURE 1 is a side elevation of the sterilising mechanism;

FIGURE 2 is a plan of the arrangement shown in FIGURE 1; and

FIGURE 3 is a side elevation of alternative and preferred means for generating a spray of sterilising liquid.

The bottle capping apparatus which may be similar to that described in British patent specification No. 1,011,782, and which is not shown in the drawings, is disposed in a substantially airtight casing, a wall of which is shown at **10** and is provided with a hole **11** through which extends the lower end of a cap delivery chute **12**. Crown corks **13** are introduced into the upper end of the chute by a feed mechanism, for example a feed mechanism such as is described in British patent specification No. 1,011,782.

One side of the chute is open as indicated at **14** in FIGURE 2.

A second closed casing **15** is provided having an open front which is flanked by flanges **16** which abut against the wall **10** of the first casing. A hole is formed in the top wall of the second casing through which hole the upper end of the chute extends. Mounted on the top wall of the second casing are means for generating a spray comprising a jet **17** which is fed with a sterilising liquid under pressure through a pipe **18** so that the liquid is atomised. The nozzle **19** of the spray jet is directed towards the open side **14** of the chute outside the second casing. Alternative and preferred spray generating means are shown in FIGURE 3 in which the pipe **18** is connected to a source of compressed air and the jet **19** is directed over the top of a pipe **9** dipping into a reservoir **8** for sterilising liquid whereby a spray is produced by ejector action of the air.

Mounted within the second casing is an infra-red heater **20** shaped to provide a heat and vapour zone indicated by the dotted lines **20***a* within which is located that part of the chute which is disposed within the second casing, and which zone also extends over the hole **11** through which the chute extends.

Extending through adjoining slots **21** in a side wall and top wall of the second casing **15** is a shutter **22** which may be brought into position between the source of radiant heat and the chute and a part **23** of which shutter, outside the casing may, be brought into a location between the spray generator **19** and the upper part of the chute.

The upper part **23** of the shutter is cup-shaped so that when it is between the spray generator **19** and the upper part of the chute it collects the sterilising liquid which flows into a shallow tray **24** from which it may be delivered back to the main supply of the liquid.

The shutter **22** is connected by a pin and slot connection **25**, **26** to an arm **27** which is pivoted at **28** to the second casing so as to swing about a vertical axis and the extremity of which arm remote from the shutter and beyond the pivot **28** is connected through a pin and slot connection **29**, **30** to the armature **31** of a solenoid **32**, which solenoid is energised by means responsive to the movement of the crown cork caps through the chute. The responsive means may comprise a light source **33** and a light sensitive device **34** arranged on opposite sides of the chute outside the second casing. The light sensitive device **34** controls a supply of electricity to the solenoid. Thus should the caps be stationary the shutter is swung by the armature into the position between the heater and chute and between the spray nozzle and the chute whereas so long as the caps are moving the armature is moved by

a spring to the other limit of its movement so that the shutter is clear of the heater and nozzle.

The bottom wall of the second casing is provided with a drain hole with which is associated a removable plug 35.

I claim:

1. Apparatus for sterilising bottle caps before delivery to a bottle capping apparatus, and comprising:

(a) a substantially airtight casing for the bottle capping apparatus;

(b) means, disposed outside said casing, for applying sterilising liquid to the caps;

(c) a second, substantially closed casing;

(d) means, within said second casing, for heating and drying the caps to which the sterilising liquid has been applied;

(e) delivery means for delivering caps from said second casing through a hole in the first said casing to the capping apparatus.

2. Apparatus according to claim 1 wherein said means for heating and drying the caps produces within said second casing a sterile atmosphere comprising a mixture of sterilising liquid vapour and air which may have entered the casing, and maintains said atmosphere at a temperature in excess of that required to obtain sterile conditions.

3. Apparatus according to claim 1 wherein said means for applying sterilising liquid to the caps is disposed outside both said casings.

4. Apparatus according to claim 1 wherein said heating means comprises an infra-red heater.

5. Apparatus according to claim 1 wherein said delivery means comprises a chute which extends into the second casing through a hole therein, past said heating means, and through said hole in the first casing to deliver the dried sterilised caps to the capping apparatus.

6. Apparatus according to claim 5 wherein said chute is open-sided and the means for applying sterilising liquid to the caps comprises means for generating a spray jet of sterilising liquid and generating it into the open side of the chute.

7. Apparatus according to claim 6 wherein the open side of the chute is directed towards said heating means.

8. Apparatus according to claim 5 and further comprising means which render inoperative the heating means and the means for applying sterilising liquid should the caps not be moving along the chute.

9. Apparatus according to claim 8 wherein means are provided to dispose a movable shutter between the chute and the means for applying sterilising liquid and between the chute and the heating means should the movement of caps along the chute cease.

10. Apparatus according to claim 9 wherein said shutter is electrically operated and is controlled by a photo-electric device responsive to the movement of caps along the chute.

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