

STERILE FACIAL MASK FILLING MACHINE

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims the priority to the Chinese patent application No. CN201720026978.4, filed with the Chinese Patent Office on January 11, 2017, and entitled “Sterile Facial Mask Filling Machine”, the content of which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

The present disclosure relates to a sterile facial mask filling machine (sterile filling machine for a facial mask), belonging to an innovative technology of using a sterile facial mask filling machine in the field of cosmetics.

BACKGROUND ART

At present, in the existing technologies in the field of cosmetics, the method for achieving preservation of the materials at the inner side of a facial mask mainly comprises adding a preservative or substances with a preservation function. However, such substances may cause irritation, allergy, cell damage and even long-term accumulated chronic injuries to a human body. The materials at the inner side of a facial mask that are completely free of preservatives or preservative substances are very likely to have bacterial contamination. For the step of filling in aseptic production, since the materials may come into contact with air at the moment when the filling is performed, it is technically difficult to achieve sterility, especially to achieve safe and stable large-scale production.

SUMMARY

An object of the present disclosure is to provide a sterile facial mask filling machine in view of the above problems. In the present disclosure, filling is performed under sterile conditions, which provides stable and reliable large-scale production conditions for the production of facial masks free of preservatives.

The above object of the present disclosure is achieved by the following technical solution: the sterile facial mask filling machine of the present disclosure, comprising a filling machine main body, ultraviolet sterilization systems, a high-temperature-resistant pipeline system and an alcohol circulation system, wherein the ultraviolet sterilization system comprises an ultraviolet-proof machine body cover, an ultraviolet lamp sterilization system

and an ultraviolet-proof porous top cover, the high-temperature-resistant pipeline system comprises a heat-resistant material conveying pipe, a heat-resistant magnetic pump, a drainage pipe, heat-resistant filling heads and a heat-resistant feeding pipe, and the alcohol circulation system comprises the heat-resistant magnetic pump, an alcohol feeding valve and an alcohol circulation tank, wherein the ultraviolet-proof machine body cover is mounted within the filling machine main body, the ultraviolet lamp sterilization system is mounted inside the ultraviolet-proof machine body cover, the ultraviolet-proof porous top cover is arranged at the top of the filling machine main body, and the heat-resistant material conveying pipe is mounted inside the ultraviolet-proof machine body cover, one end of the heat-resistant material conveying pipe is connected, through the heat-resistant magnetic pump, with the heat-resistant feeding pipe and the alcohol feeding valve, the alcohol feeding valve is connected with the alcohol circulation tank, and the other end of the heat-resistant material conveying pipe is connected with the heat-resistant filling heads.

For the sterile facial mask filling machine of the present disclosure, the pipes in contact with a material liquid are sterilized using high-temperature steam. The high-temperature steam enters the heat-resistant material conveying pipe from the heat-resistant feeding pipe, goes through the heat-resistant magnetic pump and the heat-resistant filling heads, and is discharged from the drainage pipe. After the steam becomes stable, with the pressure of the steam kept at 0.2-0.3 MPa, sterilization is performed for 20-30 minutes to ensure thorough sterilization. In addition, in the present disclosure, the machine body environment is sterilized using the combination of ultraviolet lamps and disinfectants, wherein a disinfectant is sprayed to the environment and the machine body, the ultraviolet lamp systems inside the machine are powered on, and the ultraviolet lamp for environmental sterilization in the filling department is turned on, for sterilization for 20 minutes, so as to achieve the effect of sterilization. The sterilized environment needs to be kept under a positive pressure, and the air therein needs to be periodically sampled for bacteria content detection. In addition, the sterilization protection during the filling process in the present disclosure is achieved by a sterile air flow and an ultraviolet sterilization system, wherein the sterile air is provided by a laminar flow hood and the like, and blows in vertically from the top, and enters the filling machine through the ultraviolet-proof porous top cover to form a local positive pressure; the ultraviolet lamp systems inside the filling machine are kept in the turn-on state in the filling process so as to ensure the sterile environment in the filling machine; and the ultraviolet-proof machine body cover and the ultraviolet-proof porous top cover provide safety

protection for operators. A positive pressure is ensured in the filling environment, and hundred-class cleanliness is locally realized at the location of the filling machine using a laminar flow hood. When the machine of the present disclosure is not in service, sterilization protection is achieved using 75% alcohol for disinfection. The formulated alcohol for disinfection is added into the alcohol circulation tank and pumped into the alcohol feeding pipe by the heat-resistant magnetic pump, and then flows back to the alcohol circulation tank from an alcohol discharging pipe, and this process is repeated to form a circulation which is kept for more than 15 minutes, then an alcohol meter is placed in the alcohol circulation tank, to measure the alcohol content anytime, alcohol is timely supplemented to maintain content of the alcohol in the alcohol circulation tank at 75%, and finally the pipeline system of the filling machine is stored in the alcohol for disinfection.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a schematic diagram showing a structural principle of a sterile filling machine of the present disclosure.

In the figure, 1-filling machine main body; 2-ultraviolet-proof machine body cover; 3-ultraviolet lamp system inside the filling machine; 4-ultraviolet-proof porous machine top cover; 5-heat-resistant material conveying pipe; 6-heat-resistant magnetic pump; 7-pressure gauge; 8-feeding valve; 9-drainage valve; 10-alcohol feeding valve; 11-alcohol circulation tank; 12-alcohol discharging valve; 13-drainage pipe; 14-heat-resistant filling head; 15-heat-resistant feeding pipe; and 16-laminar flow hood.

DETAILED DESCRIPTION OF EMBODIMENTS

Below, the specific structures, principles and technological processes of the present disclosure are further described with reference to the accompanying drawing.

The principle diagram of the sterile filling machine of the present disclosure is as shown in FIG. 1, which comprises a filling machine main body 1, an ultraviolet sterilization system, a high-temperature-resistant pipeline system and an alcohol circulation system, wherein the ultraviolet sterilization system comprises an ultraviolet-proof machine body cover 2, ultraviolet lamp sterilization systems 3 and an ultraviolet-proof porous top cover 4, the high-temperature-resistant pipeline system comprises a heat-resistant material conveying pipe 5, a heat-resistant magnetic pump 6, a drainage pipe 13, heat-resistant filling heads 14 and a heat-resistant feeding pipe 15, and the alcohol circulation system comprises the heat-resistant

magnetic pump 6, an alcohol feeding valve 10 and an alcohol circulation tank 11, wherein the ultraviolet-proof machine body cover 2 is mounted within the filling machine main body 1, the ultraviolet lamp sterilization systems 3 are mounted inside the ultraviolet-proof machine body cover 2, the ultraviolet-proof porous top cover 4 is arranged at the top of the filling machine main body 1, and the heat-resistant material conveying pipe 5 is mounted inside the ultraviolet-proof machine body cover 2, one end of the heat-resistant material conveying pipe 5 is connected, through the heat-resistant magnetic pump 6, with the heat-resistant feeding pipe 15 and the alcohol feeding valve 10, the alcohol feeding valve 10 is connected with the alcohol circulation tank 11, and the other end of the heat-resistant material conveying pipe 5 is connected with the heat-resistant filling head 14.

In the present embodiment, the heat-resistant material conveying pipe 5 is further connected with the drainage pipe 13, and the drainage pipe 13 is connected with the drainage valve 9.

In the present embodiment, the drainage pipe 13 is further connected with an alcohol discharging valve 12.

In the present embodiment, a feeding valve 8 is mounted between the heat-resistant magnetic pump 6 and the heat-resistant feeding pipe 15.

In the present embodiment, a pressure gauge 7 for observation is further mounted between the heat-resistant magnetic pump 6 and the feeding valve 8.

In the present embodiment, a laminar flow hood 16 is further mounted above the ultraviolet-proof porous top cover 4.

For the sterile facial mask filling machine of the present disclosure, the pipes in contact with the material liquid are sterilized using high-temperature steam. The high-temperature steam enters the heat-resistant material conveying pipe from the heat-resistant feeding pipe, goes through the heat-resistant magnetic pump and the heat-resistant filling heads, and is discharged from the drainage pipe. After the steam becomes stable, with the pressure of the steam kept at 0.2-0.3 MPa, sterilization is performed for 20-30 minutes to ensure thorough sterilization. In addition, in the present disclosure, the machine body environment is sterilized using combination of ultraviolet lamps and disinfectants, wherein a disinfectant is sprayed to the environment and the machine body, the ultraviolet lamp systems

inside the machine are powered on, and the ultraviolet lamp for environmental sterilization in the filling department is turned on, for sterilization for 20 minutes, so as to achieve the effect of sterilization. The sterilized environment needs to be kept under a positive pressure, and the air therein needs to be periodically sampled for bacteria content detection. In addition, the sterilization protection during the filling process in the present disclosure is achieved by a sterile air flow and an ultraviolet sterilization system, wherein the sterile air is provided by a laminar flow hood and the like, and blows in vertically from the top, and enters the filling machine through the ultraviolet-proof porous top cover to form a local positive pressure; the ultraviolet lamp systems inside the filling machine are kept in the turn-on state in the filling process so as to ensure the sterile environment inside the filling machine; and the ultraviolet-proof machine body cover and the ultraviolet-proof porous top cover provide safety protection for operators. A positive pressure is ensured in the filling environment, and hundred-class cleanliness is locally realized at the location of the filling machine using a laminar flow hood, i.e. in the big environment of ten thousand-class clean area, hundred-class cleanliness level is achieved in specific areas using FFU (Fan Filter Unit, an air filtering and purifying unit). When the machine of the present disclosure is not in service, sterilization protection is achieved using alcohol for disinfection. The formulated alcohol for disinfection is added into the alcohol circulation tank and pumped into the alcohol feeding pipe by the heat-resistant magnetic pump, and then flows back to the alcohol circulation tank from an alcohol discharging pipe, and this process is repeated to form a circulation which is kept for more than 15 minutes, then an alcohol meter is placed in the alcohol circulation tank, to measure the alcohol content anytime, alcohol is timely supplemented to maintain content of the alcohol in the alcohol circulation tank at 75%, and finally the pipeline system of the filling machine is stored in the rubbing alcohol.

The production process for carrying out sterile filling in the present disclosure comprises steps of:

1) introducing high-temperature steam from the heat-resistant feeding pipe 15, turning on the heat-resistant magnetic pump 6, switching on the heat-resistant filling heads 14, and opening the drainage valve 9 to allow the steam to pass through all pipes in contact with materials;

2) adjusting the feeding valve 8 and the drainage valve 9, and observing the pressure gauge 7, to stabilize the pressure of the steam at 0.2-0.3 MPa, starting timing for sterilization

and finishing sterilization 20-30 minutes later, and turning off the heat-resistant filling heads 14, closing the drainage valve 9, turning off the magnetic pump 6 and closing the feeding valve 8 sequentially, to seal the entire pipeline system;

5 3) spraying a disinfectant into the filling space and onto the outer side of the machine body, turning on the ultraviolet sterilization systems 3 inside the machine, and turning on the ultraviolet lamp in the filling department, for sterilization for more than 20 minutes;

4) introducing sterile air into the filling department, observing a differential pressure gauge, and turning off the ultraviolet lamp in the filling department and turning off the ultraviolet lamp in the machine when a desired pressure difference is reached;

10 5) opening the laminar flow hood 16 above the filling machine, maintaining a positive pressure in the filling machine, performing the operation of bagging, closing, after completion of the operation of bagging, the ultraviolet-proof porous top cover 4, closing the ultraviolet-proof machine body cover 2, and turning on the ultraviolet lamp system 3 inside the filling machine for sterilization for 15 minutes;

15 6) opening the feeding valve 8, turning on the heat-resistant magnetic pump 6, turning on the heat-resistant filling heads 14, and starting the operation of filling;

7) introducing, after completion of filling, steam to wash the pipes for 10 minutes according to the sterilization procedures of the pipes in contact with the materials, and sealing the pipeline system;

20 8) pouring 75% alcohol into the alcohol circulation tank 11, opening the alcohol feeding valve 10, turning on the heat-resistant magnetic pump 6 and opening the alcohol discharging valve 12 to start alcohol circulation, wherein the alcohol content in the alcohol circulation tank 11 is detected using an alcohol meter during the circulation, and timely adjusted, and the circulation is carried out for 15 minutes after the alcohol content is stabilized
25 at 75%; and closing the alcohol discharging valve 12, turning off the heat-resistant magnetic pump 6, closing the alcohol feeding valve 10 sequentially, to seal the pipeline system in contact with the materials; and

9) turning off a power supply to finish the operation of sterile filling.

CLAIMS

1. A sterile facial mask filling machine, characterized by comprising a filling machine main body (1), an ultraviolet sterilization system, a high-temperature-resistant pipeline system and an alcohol circulation system, wherein the ultraviolet sterilization system comprises an ultraviolet-proof machine body cover (2), ultraviolet lamp sterilization systems (3) and an ultraviolet-proof porous top cover (4), the high-temperature-resistant pipeline system comprises a heat-resistant material conveying pipe (5), a heat-resistant magnetic pump (6), a drainage pipe (13), heat-resistant filling heads (14) and a heat-resistant feeding pipe (15), the alcohol circulation system comprises the heat-resistant magnetic pump (6), an alcohol feeding valve (10) and an alcohol circulation tank (11), wherein the ultraviolet-proof machine body cover (2) is mounted within the filling machine main body (1), the ultraviolet lamp sterilization systems (3) are mounted inside the ultraviolet-proof machine body cover (2), the ultraviolet-proof porous top cover (4) is provided at a top of the filling machine main body (1), and the heat-resistant material conveying pipe (5) is mounted inside the ultraviolet-proof machine body cover (2), one end of the heat-resistant material conveying pipe (5) is connected, through the heat-resistant magnetic pump (6), with the heat-resistant feeding pipe (15) and the alcohol feeding valve (10), the alcohol feeding valve (10) is connected with the alcohol circulation tank (11), and other end of the heat-resistant material conveying pipe (5) is connected with the heat-resistant filling head (14).
2. The sterile facial mask filling machine according to claim 1, characterized in that the heat-resistant material conveying pipe (5) is further connected with the drainage pipe (13), and the drainage pipe (13) is connected with the drainage valve (9).
3. The sterile facial mask filling machine according to claim 1, characterized in that the drainage pipe (13) is further connected with an alcohol discharging valve (12).
4. The sterile facial mask filling machine according to any one of claims 1-3, characterized in that a feeding valve (8) is mounted between the heat-resistant magnetic pump (6) and the heat-resistant feeding pipe (15).
5. The sterile facial mask filling machine according to claim 4, characterized in that a pressure gauge (7) for observation is further mounted between the heat-resistant magnetic pump (6) and the feeding valve (8).

6. The sterile facial mask filling machine according to claim 4, characterized in that a laminar flow hood (16) is further mounted above the ultraviolet-proof porous top cover (4).