[0012] Referring to Figs. 1 and 2, the cooling liquid reservoir 6 is connected to the cooling liquid tank 7 via the cooling liquid supply pipe 8. The cooling liquid tank 7 stores a cooling liquid 49. The cooling liquid 49 is also referred to as a solidifying liquid or a coagulating liquid. The cooling liquid 49 is pumped from the cooling liquid tank 7 to the cooling liquid reservoir 6 via the cooling liquid supply pipe 8 by the pump 13 and cooled by the cooling device 9 in the process. The cooling liquid 49 is contained in an internal space of the cooling liquid reservoir 6. The cooling liquid reservoir 6 stores the cooling liquid 49 flowing into the forming tube 10 in the internal space, in a state where part of the nozzle 1 (an inclined portion 25 described later) and an upper end portion of the forming tube 10 are arranged in the internal space of the cooling liquid reservoir 6. The cooling liquid reservoir 6 has a hollow structure, and an inner surface of the cooling liquid reservoir 6 defines the internal space. Specifically, the cooling liquid reservoir 6 has a bottom wall 6a, an upper wall 6b, and a peripheral wall 6c, and the inner surfaces of these walls define the internal space. The bottom wall 6a and the upper wall 6b are substantially horizontal and separated from each other in a vertical direction. The peripheral wall 6c extends upward from a peripheral edge portion of the bottom wall 6a. A peripheral edge portion of the upper wall 6b is located above the peripheral wall 6c, and a spacer 6e is provided between the peripheral edge portion of the upper wall 6b and an upper end portion of the peripheral wall 6c. The spacer 6e is a member that defines a distance between the upper wall 6b and the peripheral wall 6c, and is replaceable. The cooling liquid reservoir 6 is provided with a cooling liquid inflow port 6d through which the cooling liquid 49 flows into the internal space. A downstream end of the cooling liquid supply pipe 8 is connected to the cooling liquid inflow port 6d. The upper wall 6b is configured to allow a space above a liquid level 49L of the cooling liquid 49 to be open to the atmosphere. The cooling liquid 49 is returned from the cooling liquid reservoir 6 to the cooling liquid tank 7 via the forming tube 10. The forming tube 10 is open at both ends and forms a flow path through which the cooling liquid 49 flows. In the examples of Figs. 1 and 2, the cooling liquid 49 flows through the flow path within the forming tube 10 under hydraulic head pressure. In a modification of the present embodiment, the cooling

liquid 49 can flow through the flow path within the forming tube 10 using discharge pressure of the pump 13. In such a modification, the cooling liquid reservoir 6 in which the internal space is sealed may be used.

[0013] The spacer 6e only needs to be able to separate the upper wall 6b and the peripheral wall 6c, and a material and a shape of the spacer 6e can be arbitrarily selected according to the purpose at the time of manufacturing. Examples of the material of the spacer 6e include resin, metal, natural rubber, and synthetic rubber. In plan view as viewed in the vertical direction, the spacer 6e can have a shape covering the entire portion facing the peripheral wall 6c in the peripheral edge portion of the upper wall 6b, or a shape in which part of the portion facing the peripheral wall 6c is interrupted.

[0014] An upper end 10a (one end, upstream end) of the forming tube 10 is open in the internal space of the cooling liquid reservoir 6. A central axis of the forming tube 10 is oriented vertically at an upper end portion of the forming tube 10, and the upper end 10a of the forming tube 10 is oriented horizontally. A cross section of the forming tube 10 typically has a circular shape. The forming tube 10 extends downward from the upper end 10a, passes through the bottom wall 6a of the cooling liquid reservoir 6, is bent upward once, is bent downward again, and terminates. A distance H between the upper end 10a and the inner surface of the bottom wall 6a can be changed, and a sealing 6f that prevents the cooling liquid 49 from flowing out is provided between the forming tube 10 and the bottom wall 6a. An opening at the other end (downstream end) of the forming tube 10 is located above the cooling liquid tank 7 and directed downward. The cooling liquid 49 is discharged from the opening at the other end of the forming tube 10 and collected in the cooling liquid tank 7. The upper end portion of the forming tube 10 is a portion of the forming tube 10 protruding upward from the inner surface, particularly an inner lower surface, of the cooling liquid reservoir 6 defining the internal space. The inner lower surface of the cooling liquid reservoir 6 is the inner surface of the bottom wall 6a.

[0015] The sealing 6f only needs to be able to prevent the cooling liquid 49 from flowing out, and a material of the sealing 6f can be arbitrarily selected according to the purpose at the time of manufacturing. Examples of the material of the sealing 6f

includes not only the content liquid 41 and the film liquid 42 but also the intermediate liquid 43 interposed therebetween. When the composite jet 59 breaks up into droplets, a seamless capsule 50 including the content 51, the intermediate layer 53, and the film layer 52 is formed in the forming tube 10.

[0047] Fig. 6A illustrates a second modification, and Fig. 6B illustrates a third modification. The shape of the horizontal cross section of the outer surface of the inclined portion 25 of the nozzle 1 is not limited to a circular shape. As illustrated in Fig. 6A, the horizontal cross section may be elliptical. As illustrated in Fig. 6B, the horizontal cross section may be polygonal. In Fig. 6B, the polygonal shape is a square shape as a mere example, but the polygonal shape may be a quadrangular shape other than a square shape. Further, the number of corners or sides of the polygonal shape is not limited to four.

[0048] Fig. 7 illustrates a fourth modification. The nozzle 1 may include a cylindrical nozzle main body 31 and a cap 32 that covers a distal end (see a broken line portion) of the nozzle main body 31. The cap 32 forms the inclined portion 25 and the distal end 1a, and is detachably attached to the nozzle main body 31. A plurality of caps 32 having different angles θ may be prepared for one nozzle main body 31, and one cap 32 selected from the plurality of caps 32 may be attached to the nozzle main body 31. This makes it possible to select the cap 32 having an appropriate configuration according to the content liquid or the film liquid.

[0049] Fig. 8A illustrates a fifth modification, and Fig. 8B illustrates a sixth modification. In the vertical cross section of the nozzle 1 passing through the central axis A of the nozzle 1, in the example illustrated in Figs. 2 and 7, the outline of the outer surface 25a of the inclined portion 25 is one straight line, but the outline is not limited to one straight line. In the fifth modification of Fig. 8A, the outline of the outer surface 25a may be a wavy line or a line similar thereto. In a case where the outline of the outer surface 25a is a wavy line, or the like, the intersection where the downward extension lines of the pair of straight lines 25b intersect each other on the central axis A does not have to coincide with the apex 27 of the space defined by the virtual surface 26.

[0050] In the sixth modification of Fig. 8B, the outline of the outer surface 25a may be a bent line or a curved line. In a case where the outline of the outer surface 25a is a curved line, or the like, a portion of the inclined portion 25 primarily involved in control of the flow of the cooling liquid is defined as a main body of the inclined portion 25, a straight line connecting an upper end and a lower end of the outer surface of the main body is defined as the straight line 25b, and a virtual surface obtained by extending the outer surface of the inclined portion 25 downward is defined as the virtual surface 26.

[0051] Although detailed illustration is omitted, the second modification or the third modification may be applied to the first modification, and the fourth modification may be applied to the first modification. The second modification or the third modification and the fourth modification may be simultaneously applied to the above embodiment or the first modification. The second modification or the third modification and the fifth modification or the sixth modification may be simultaneously applied to the above embodiment or the first modification.

[0052] Hereinafter, the present invention will be described more specifically with reference to Examples and Comparative Examples (Experimental Classifications 1 to 28); however, the present invention is not limited thereto. Note that in the following description, “part” and “%” are by mass unless otherwise specified.

[0053] (Experimental Classification 1)

A content liquid consisting of 80 parts by mass of MCT (manufactured by Kao Corporation) was prepared. A film liquid was prepared by mixing 16 parts by mass of gelatin (manufactured by PB Leiner Argentina), 4 parts by mass of sorbitol (manufactured by Roquette China Co., Ltd.), and 300 parts by mass of purified water. A bloom value of the gelatin was 240, and the viscosity of the film liquid was 50 mPa·s at 60°C. A cooling liquid consisting of 100% MCT (manufactured by Kao Corporation) was prepared. Regarding the preparation of these liquids, the same applies to other Experimental Classifications 2 to 28.

[0054] Using a seamless capsule manufacturing machine (manufactured by Morishita Jintan Co., Ltd.) having a structure as exemplified in Fig. 1, the content liquid and the film liquid were simultaneously discharged from a central nozzle and an outermost