The invention relates to an aseptic filler system for big containers having an outlet. The system comprises an outlet (1) which in turn comprises an outlet body (1b) and a cap (1a), which is inserted in a hole (2) of a filler head (3) provided with a pair of semicircular jaws (4), which lock about an annular cavity (5) provided externally of the outlet in order to block the outlet (1) to the hole (2). The system has seal means which operate between the outlet body (1b) and the periphery of the hole (2) to hermetically close the inside of the filler head when the outlet body is locked between the jaws (4). The seal means are realised by means of a first seal ring (2a), fashioned below the perimeter of the hole (2) and having an internal diameter which defuses the passage diameter of the hole (2), and a second seal ring (6), fashioned externally of the outlet body (1b) above the annular cavity (5), the diameter of the upper part thereof being greater than the passage diameter of the hole (2).
SYSTEM FOR ASEPTIC FILLING OF BIG CONTAINERS WITH AN OUTLET

[0001] The present invention relates to an aseptic filling system for big containers with an outlet. The system is applicable in particular for filling containers, preferably constituted by bags made of a multilayer material an inside of which is accessible via a closing outlet made of a plastic material, destined to contain fluid products such as for example fruit pulps and juices, vegetables and the like.

[0002] The above-described containers are supplied internally pre-sterilised to a user, which is normally a company producing fruit and vegetable juices and pulps; to fill them, the outlet is inserted in the hole of a filler head which has a pair of semi-circular jaws which lock about an annular cavity provided externally of the outlet and block the outlet to the hole; thereafter a pliers, provided inside the filler head, removes the cap from the outlet, thus freeing the mouth through which the product is introduced into the container by means of a feeder tube which opens in the filler head; the container is then closed by means of the cap. Steam is introduced into the filler head which, as the jaws are not able to ensure a seal, cannot be pressurised and therefore has a maximum temperature of 100°C.

[0003] A known filler head of this type, in which the known outlet of a container is inserted, is illustrated in FIG. 1.

[0004] The steam introduced into the filler head is able to destroy a large part of the germs present internally of the filler head; some germs can survive that, in the presence of products that are not sufficiently acid, can develop into pathogens and thus damage the product contained in the container.

[0005] For this reason, filler systems of this type known at present are suitable for packing products having a pH of less than 4.5 (such as for example tomato juice or concentrate), but cannot be used for products having a higher pH, such as for example pulps and juices of some fruits and vegetables (bananas, carrots, pumpkins, sweet potatoes, etc.) which have a higher pH1 and which might be damaged by pathogen germs developing in an environment having a pH of greater than 4.5 and which are destroyed only at temperatures of around 130°C; in known systems these temperatures obviously cannot be reached internally of the filler heads as in known systems filler heads cannot be pressurised.

[0006] The aim of the present invention is to obviate the drawbacks of the known filler systems, by making it possible to pressurise the filler heads and consequently introduce steam at temperatures of greater than 100°C internally thereof.

[0007] An advantage of the present invention is that it attains the desired aim while making small modifications to the known systems and thus enabling use of the filler heads of known type, to which only small modifications have to be made.

[0008] These aims and advantages and more besides are all attained by the invention, as it is characterised in the claims appended hereto.

[0009] Further characteristics and advantages will more fully emerge from the detailed description that follows of a preferred but not exclusive embodiment of the system, illustrated by way of non-limiting example in the accompanying figures.

[0010] FIG. 1 shows a vertical elevation section of a filler head-outlet system in a passage hole of which an outlet of a known type is inserted;

[0011] FIG. 2 shows an enlarged section of the zone of the hole of the filler head of FIG. 1, in which an outlet of known type is inserted;

[0012] FIG. 3 shows an enlarged section of the zone of the hole of the filler head, made according to the present device, in which an outlet of the present system is inserted.

[0013] The aseptic filler system of the invention is of a type to be used to fill large containers, generally bags made of a multi-layer material an inside of which is accessible via a closing outlet made of a plastic material, which are destined to contain fluid products such as for example pulps and juices of fruit, vegetables and the like.

[0014] The outlet 1 of these containers normally comprises an outlet body 1b which is connected to the container (not illustrated) usually by heat-welding of a lower ring 1c present in the outlet body, in which a cap 1a is inserted; these containers are supplied to the packing companies closed and is internally pre-sterilised.

[0015] To fill them, the outlet of the container is inserted in a hole 2 of a filler head 3 which exhibits an internal chamber 11 that is closed and accessible from outside via the hole 2; the cap 1a, which is positioned below a conduit from which the product to be packed descends, is gripped by extractor means 10 provided internally of the filler head, which extract it from the body of the outlet and then re-insert it in the body of the outlet once the container has been filled.

[0016] The filler heads are further provided with a pair of semi-circular metal jaws 4, which are arranged at the hole 2, are mobile in a radial direction to the outlet and move radially such as to lock against an annular cavity 5 provided externally of the outlet; in this way the jaws block the outlet 1 to the hole 2 once the outlet has been inserted in the hole. When the outlet is locked between the jaws, water steam is introduced in the filler head, which fills the filler head and strikes the cap and the outside of the body of the outlet which, having come into contact with the outside environment, might be polluted by the presence of pathogen bacteria.

[0017] All of these elements are of known type and are present also in known filler systems. In the known systems the jaws slide on metal elements of the filler heads, and upon closure face one another; however precise the specified operations, it is not possible to obtain a seal between the jaws and the elements of the filler head. For this reason, the inside of the filler head cannot be pressurised and the steam contained therein has a maximum temperature of 100°C.

[0018] Primarily it is specified that the terms “upper” and “lower” which will be used in the description of the system of the invention relate to the outlet positioned internally of the filler head.

[0019] Differently to known systems, the system of the invention comprises seal means which operate between the outlet body 1b and the periphery of the hole 2 of the filler head and which enable hermetic closure of the inside of the filler head when the outlet body is locked between the jaws 4; this is made possible because the body of the outlet is continuous and is made of plastic material, which enables obtaining a good seal if combined to the periphery of the hole 2 of the filler head which is made of metal but which is also continuous and does not exhibit axial slits which are present in the locked jaws.

[0020] For realisation of the seal of the system of the invention, the hole 2 of the filler head comprises a first seal ring 2a which is fashioned below the perimeter of the hole 2 itself and which has an internal diameter that defines the passage diam-
eter of the hole 2; the first seal ring 2a is, briefly, an annular surface lying on a plane that is perpendicular to the axis of the hole 2, the internal diameter of which defines the opening of the hole 2 itself.

[0021] The outlet 1 comprises a second seal ring 6 which is fashioned externally of the outlet body 1b above the annular cavity 5 in which the jaws 4 present in the filler head are locked; the diameter of the upper part of the second seal ring is greater than the passage diameter of the hole 2. The second seal ring 6 defines in the upper part thereof the annular cavity 5 of the outlet body.

[0022] In other words, the second seal ring 6 is delimited by two parallel surfaces that are perpendicular to the axis of the outlet; the upper surface thereof, which has an external diameter greater than the passage diameter of the hole 2, abuts against the lower surface of the first seal ring 2a fashioned in the filler head when the outlet is inserted in the filler head; the lower surface delimits in the upper part thereof the annular cavity 5 of the outlet body.

[0023] The thickness, in the axial direction, of the second seal ring is about equal to (preferably, for reasons which will better emerge in the following, slightly greater than) the axial distance existing between the lower surface of the first seal ring 2a and the upper surface of the semi-circular jaws 4.

[0024] The diameter of the second seal ring 6 is greater than the diameter of all the remaining elements of the outlet 1 which are in a higher position than the second seal ring; further, all the last-named elements of the outlet (with the exclusion therefore of the second seal ring which, as mentioned, has a diameter greater than the passage diameter of the hole 2 and therefore than those below it) have a diameter smaller than the internal diameter of the hole 2 of the filler head. With this configuration, with the jaws 4 open, the outlet of the filler head can be introduced up to when the second seal ring contacts with the first seal ring.

[0025] The second seal ring 6 exhibits the external radial part of which is tapered such as to define an upper external lip 6a which has a smaller thickness than the remaining part of the second seal ring; this configuration gives the external part of the second seal ring a certain flexibility which facilitates sealed insertion of the second seal ring below the first seal ring.

[0026] The system of the invention functions as described below.

[0027] The outlet, closed and applied to the container destined to contain the product to be packed, is inserted in the filler head, which has the pair of jaws 4 open, up to when the second seal ring abuts against the first seal ring; this operation is enabled by the fact that the diameter of the second seal ring 6 is greater than the diameter of all the remaining elements of the outlet 1 which are in a higher position than the second seal ring.

[0028] The jaws 4 are then locked such as to solidly fasten the outlet to the filler head and to press the second seal ring against the first seal ring; this is enabled by the fact that the thickness of the second seal ring is equal to or preferably slightly greater than the axial distance existing between the lower surface of the first seal ring 2a and the upper surface of the semi-circular jaws 4.

[0029] Following these operations the internal chamber of the filler head is completely sealedly insulated from outside. It is therefore possible to pressurise the chamber by introducing therein steam at a pressure greater than atmospheric pressure, i.e. greater than 100° C. The optimal temperature of the steam for complete elimination of eventual pathogen germs present internally of the filler head is about 130° C.

[0030] Once these operations have been performed, the cap 1a is removed from the body of the outlet by the extracting means 10 present in the internal chamber of the filler head, thus making the container accessible, in which the product to be packed can be introduced. On completion of the filling of the container, the extracting means reinserts the cap on the outlet body and thus close the container.

[0031] All of these operations are performed in the presence of steam at a temperature of about 130° C.; at these temperatures the pathogen germs do not survive and it is therefore not possible that any germs present on the outlet can enter inside the container during the opening of the outlet or in any case come into contact with the product.

[0032] The possibility that the system of the invention affords, of obtaining pressurisation of the internal chamber of the filler head and the consequent possibility that there can be in the internal chamber a temperature greater than 100° C., which can be maintained during the steps of filling the container, enable the filling machines to be used also with products which can deteriorate due to pathogen germs that can be eliminated only with temperatures of greater than 100° C.

[0033] From the above it is also clear that the system of the invention can, with small but significant modifications, be applied to the complex known machines which perform the filling of containers provided with the above-described outlets.

1) An aseptic filler system for big containers having an outlet, of a type comprising an outlet (1) made of a plastic material which comprises an outlet body (1b) connected to the container, in which a cap (1a) is inserted; said outlet is inserted in a hole (2) of a filler head (3), closed and accessible from outside through the hole (2), provided with a pair of semicircular jaws (4), mobile in a radial direction of the outlet and destined to lock, about an annular cavity (5) provided externally of the outlet and to block the outlet (1) to the hole (2), the filler head being further provided with means for extracting the cap (1a) from the outlet body and for newly introducing it into the outlet body when filling is completed, when the outlet body is locked between the jaws (4), characterised in that it comprises seal means, operating between the outlet body (1b) and the periphery of the hole (2) of the filler head, destined to hermetically close an inside of the filler head when the outlet body is locked between the jaws (4).

2) The system of claim 1, characterised in that: the hole (2) of the filler head comprises a first seal ring (2a), fashioned below the perimeter of the hole (2) itself, the internal diameter of which defines the passage diameter of the hole (2); the outlet body (1b) comprises a second seal ring (6), fashioned externally of the outlet body (1b) above the annular cavity (5), the diameter of the upper part thereof being greater than the diameter of the passage of the hole (2).

3) The system of claim 2, characterised in that the second seal ring (6) defines in the upper part thereof the annular cavity (5) of the outlet body and has a thickness, in an axial direction, equal to about half the axial distance existing between the lower surface of the first seal ring (2a) and the upper surface of the semi-circular jaws (4).

4) The system of claim 2, characterised in that the diameter of the second seal ring (6) is greater than the diameter of all the remaining outlet elements (1) which are in a higher posi-
tion than the second seal ring and which have a smaller diameter than the internal diameter of the hole (2) of the filler head.

5) The system of claim 1, characterised in that said second seal ring (6) has the external radial part tapered such as to define an upper external lip having a smaller thickness than the remaining part of the second seal ring.

6) The system of claim 1, characterised in that the temperature of the steam present in the internal chamber of the filler head when the outlet (1) is locked between the jaws (4) is about 130°C.