The invention relates to a device for holding a flexible tube, sealed at one end, and intended to contain a viscous product. It comprises a central cavity capable of receiving the sealed bottom end of the tube, and the opening of which is mouth-shaped.
DEVICE FOR HOLDING A FLEXIBLE TUBE, SEALED AT ONE END, AND INTENDED TO CONTAIN A VISCOS PRODUCT

The invention relates to a device for holding, with a view to filling, a flexible tube, sealed at one end, and intended to contain a viscous product, in the form of a paste or gel, for example.

Sealed tubes are filled by the neck. Filling by the neck makes it possible to avoid the dead volume observed in tubes filled by the bottom before sealing. This results in a dual advantage: firstly, an optimization of the useful volume in the tube and secondly a better preservation of the product contained in the tube. By virtue of their shape, sealed tubes are generally filled manually or in a semi-automated manner.

For certain applications, flexible tubes with integral emptying are proposed.

These tubes comprise a deformable pocket which accompanies the product as it is being extracted by manual pumping, with the result that external air does not enter the tube.

The technical problem to be solved so that the filling of the sealed tubes is automated is that of holding the tubes and centering them in the vertical position with the neck at the top. Specifically, at the start, the tube is cylindrical with an upper end bearing a neck capable of receiving a cap, which is screwed for example, and an open lower end. When the open lower end is sealed by clamping for example, the length of the closure is greater than the diameter of the tube. On the one hand, the closure is in a straight or curved line and cannot, alone, serve as a seat for stably holding the tube in a vertical position and, on the other hand, the guiding of the tube by a cylindrical clamp, even partially open, cannot ensure with certainty and security the free passage of the closed end of the tube. Moreover, if the tube is carried by a clamp, holding it imposes a lateral constraint to the detriment of its filling.

One object of the invention is to provide a device for holding and centering a flexible tube, sealed at one end, and intended to contain a viscous product, which does not have at least one of the aforementioned drawbacks and which is simple and practical to use.

Another object of the invention is to provide a device for holding a flexible tube, sealed at one end, in a vertical position, the device being able to be moved on a common automatic filling chain for conventional bottles or tubes.

Another object is to facilitate the production of the device which may be in one piece, unlike a device with clamps, and for which one particular production method is molding with a template.

The subject of the invention is a device for holding a flexible tube, sealed at one end, and intended to contain a viscous product, the tube being of general cylindrical shape and held substantially vertically with its sealed lower end, characterized in that it comprises a central cavity of which the bottom consists of a groove capable of receiving the sealed lower end of the tube and of which the opening is mouth-shaped.

Advantageously, the opening in its largest dimension receives the sealed end of the tube, and in its smallest dimension receives the cylindrical part of the tube.

In an advantageous manner, the opening is composed of two symmetrical circular arcs connected to two commissures placed at the ends of the largest dimension of the opening.

Advantageously, the largest horizontal dimension of the cavity remains substantially constant between the opening and the bottom so that the sealed lower end of the tube descends to the bottom and bears against it.

In an advantageous manner, in the plane passing through the smallest dimension of the opening, the outline of the cavity descends from the opening in two lines which are at first parallel and then approach one another to join up at the bottom of the cavity.

The invention will be better understood, and other aims, details, features and advantages thereof will become more clearly apparent, from the following description of a particular embodiment of the invention given purely by way of nonlimiting illustrative example, with reference to the appended drawings.

In the drawings:

FIG. 1 is a perspective view of an embodiment of the device for holding the flexible tube according to the invention;

FIG. 2 is a view in section along the plane of symmetry passing through the groove of the bottom of the device of FIG. 1;

FIG. 3 is a view in section along the plane of symmetry perpendicular to the groove of the bottom of the device, that is to say perpendicular to the plane of FIG. 2;

FIG. 4 is a plan view of the device for holding the flexible tube of FIG. 1.

In the exemplary embodiment of the figures, the device for holding the flexible tube 2 has a cylindrical outer shape and a substantially elliptical base 3, but these geometrical shapes are not imperative. The upper face 4 of the device 1 has a mouth-shaped opening 5 of which the largest dimension receives the sealed end 6 of the tube and of which the smallest dimension receives the cylindrical part 7 of the tube 2. Below the opening 5, the holding device 1 has a central cavity 8 of which the largest horizontal dimension remains substantially constant to the bottom of the cavity 8 so that the sealed lower end 6 of the tube 2 can descend to the bottom and bear against it, the tube 2 then being vertical and open at the top with a view to its filling (FIG. 2).

In the plane of symmetry of the cavity 8 passing through the largest dimension of the opening 5, the outline of the cavity 8 is substantially rectangular. In the plane of symmetry of the cavity 8 perpendicular to the preceding one, that is to say in the plane passing through the smallest dimension of the opening 5, the outline of the cavity 8 descends from the opening 5 in two lines 9, 10 which are at first parallel and then approach one another to join up at the bottom of the cavity 8 (FIG. 3). The curvature of the lines 9, 10 substantially corresponds to the shape of the lower part of the tube 2 perpendicularly to its sealed end 6. The bottom of the cavity 8 consists of a groove 15 capable of guiding the sealed end 6 of the tube 2, whether this end is rectilinear or curved.

Thus, in its smallest transverse dimension, the cavity 8 substantially the same profile as the tube 2 and ensures that it is maintained stably in position.

The device 1 for holding the tube 2 is rigid and stable and ensures that the tube 2 is held on a chain for filling the tube and then for sealing and/or closing the upper part of the tube 2. The shape of the cavity 8 ensures the insertion of the empty tube 2, the centering of the tube 2, the holding of the tube 2 during its high-speed filling, the protection of the outer decoration of the tube 2, and the release of the tube 2 or its ejection by filling, for example.
The inner dimensions of the cavity 8 are adapted to a tube format. The shape and the outer dimensions of the holding device are adapted to the demands of the tube filling chain. The holding device is advantageously produced in the form of a plastic block which may be apertured to a greater or lesser extent.

The opening 5 at the upper part of the holding device is composed of two symmetrical circular arcs 11, 12, each of about 30° to 90°, intended to hold the tube in its cylindrical part, the circular arcs being connected to two commissures 13, 14 placed at the ends of the largest dimension of the opening 5 (Fig. 4).

It is not necessary to provide a contact zone between the device and the tube over the entire surface of the tube. All that is required is to have an annular zone with a mouth-shaped opening which holds the upper part of the tube and a base provided with a groove to hold the sealed end. The annular zone and the base may be connected by a rigid bar. The exposed zones of the tube may in particular allow the marking of the batch number on the tube on the automated filling line without removing the tube from the device. Moreover, limiting the contact zones facilitates insertion and ejection of the tube. The device with solid walls as appears in the drawings is therefore a particular embodiment.

The invention has been described in a particular embodiment by way of nonlimiting illustrative example and it covers the technical equivalents thereof.

A device for holding a flexible tube, sealed at one end, and intended to contain a viscous product, the tube (2) being of general cylindrical shape and held substantially vertically with its sealed lower end, characterized in that it comprises a central cavity (8) of which the bottom consists of a groove (15) capable of receiving the sealed lower end (6) of the tube (2) and of which the opening (5) is mouth-shaped.

The holding device as claimed in claim 1, characterized in that the opening (5) in its largest dimension receives the sealed end (6) of the tube (2), and in its smallest dimension receives the cylindrical part (7) of the tube.

The holding device as claimed in claim 1, characterized in that the opening (5) is composed of two symmetrical circular arcs (11, 12) connected to two commissures (13, 14) placed at the ends of the largest dimension of the opening (5).

The holding device as claimed in claim 1, characterized in that the largest horizontal dimension of the cavity (8) remains substantially constant between the opening (5) and the bottom so that the sealed lower end (6) of the tube (2) descends to the bottom and bears against it.

The holding device as claimed in claim 1, characterized in that, in the plane passing through the smallest dimension of the opening (5), the outline of the cavity (8) descends from the opening (5) in two lines (9, 10) which are at first parallel and then approach one another to join up at the bottom of the cavity (8).