

## PLASTIC CLOSURE WITH CORRESPONDING TUBE BODY

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to a plastic tube with a tubular tube body which is connected through a shoulder to a neck having an external thread and with a screw cap which can be screwed with an internal thread onto the external thread of the neck.

#### 2. Description of the Related Art

A plastic tube of the above-described type is known from DE-PS 41 00 894. In addition to the screw connection of the cap to the external thread of the neck, a perforated diaphragm at the neck and a corresponding perforated element, for example, a truncated cone, are provided at the screw cap; however, these elements are not significant with respect to the present invention. This tube has the disadvantage of being of relatively complicated construction and another disadvantage is the fact that the tube body and the neck with the external thread are manufactured in one piece and, thus, of the same plastic material.

DE-OS 41 00 757 discloses a plastic tube which has a rectangular cross-section and is manufactured by blow molding, wherein the tube body also is integrally connected to the tube neck. A closure cap to be pressed on in the longitudinal direction of the tube can be connected to the tube neck by locking. Another disadvantage is the fact that this tube must be filled from that side which later is the side for dispensing the contents of the tube. This is relatively cumbersome and time-consuming. In addition, there is the danger that air bubbles remain in the interior of the tube after filling the tube.

PCT/EP 91/02164 discloses a collapsible container for pasty products which has a shape similar to a tube. The body of this container is not rectangular in cross-section in the collapsed state. Two oppositely located side walls can be folded together in the manner of a harmonica. Seen in longitudinal direction of the container, one end of the container is closed permanently while the other end has a nozzle which can be closed by a screw cap. Also in this case, the body of the container and the part with the nozzle are manufactured in a single piece.

In DE-OS 41 00 757 as well as in PCT/EP 91/02164, the oppositely located side surfaces of the tube body are completely plane and parallel to each other. Consequently, a number of such tubes can be stacked easily and safely without requiring repacking. However, the features and effects thereof explained above with respect to the prior art do not suggest the subject matter of the present invention and the advantages achieved thereby.

Also, it should be mentioned that, in the prior art tubes, it must be ensured that the screw cap sealingly contacts the externally threaded neck either when the screw cap is automatically mounted by the manufacturer or when the screw cap is mounted manually. In this connection, there is the danger that the screw cap is screwed on too much or that the screw cap separates if the screw cap was screwed on to an insufficient extent.

### SUMMARY OF THE INVENTION

Therefore, it is the primary object of the present invention to improve the construction of a plastic tube of the above-described type. In particular, a high stability of the tube body and the cap is to be achieved while simultaneously using

different plastic materials for the externally threaded neck and the tube body. Also, the manufacturing costs should be very low.

In accordance with the present invention, in a plastic tube as described above, the shoulder is injection molded onto the corresponding end of the tube body, wherein the shoulder and the externally threaded neck are constructed in one piece. The shoulder and the adjacent end of the tube body have a polygonal cross-section and the same polygonal cross-section continues over the length of the tube body. At least two side surfaces of the tube body extend from this transition point essentially plane or with a straight surface toward the end of the tube.

The plastic tube according to the present invention has the advantage that the configuration of the tube body in the form of a polygon is very stable against external pressure. Another advantage is the fact that the tube can be provided with a shape which is aesthetically pleasing to the observer. This aspect will be explained further hereinbelow, particularly with respect to the aesthetic total impression when the cap is screwed on. By injection molding the shoulder onto the tube body, two results are achieved with one work operation, i.e., the connection of shoulder and externally threaded neck to the tube body as well as the formation of the shoulder and the externally threaded neck in one piece with the shoulder. In contrast, in the tubes according to the above-described prior art, in which the tube body and the shoulder with the threaded neck are manufactured together from one and the same plastic material, the present invention provides the additional advantage that the tube body can be manufactured with very low costs from an extruded hose or plastic tube which has the optimum properties required of such a tube body, wherein the unit composed of the shoulder and the externally threaded neck is usually made of a material which is significantly harder than the material of the tube body. Also, plastic materials having different colors can be used for the tube body and for the cap. Also, the optimum plastic material can be used for each component. Another advantage of the plastic tube according to the present invention is the fact that it is very simple to print on the tube body. This is because the approximately plane side surfaces of the tube body make it possible that the imprint can be exactly positioned, so that simultaneously there is the advantage of a clearly printed imprint. A completely plane configuration of the side surfaces, as it is required in DE-OS 41 00 757 and in PCT/EP 91/02164, is not absolutely required in the plastic tube according to the present invention. This makes the transition from the printed side surfaces from the remaining surfaces of the tube body easier and, in addition, provides a better appearance of the tube body. Also, there is the advantage that the imprint can be carried out on the tube body before the shoulder and the threaded neck are injection molded onto the tube body; in this connection, reference is made to the method according to the present invention to be explained below. The plastic tube according to the invention further provides the advantage that due to the configuration of the tube in the form of a polygon, the screw cap can be aligned if desired in its end position when screwed onto the thread of the threaded neck exactly in accordance with the corners of the polygon. This also makes it optically clear to the user that the fully closed position of the plastic tube has been reached.

In order to ensure that, in addition to the advantages describe above, a sealing action between the externally threaded neck and the cap placed on the neck can be achieved and that the cap slides into the end position on the neck, a preferred further development of the invention