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PLASTIC THREADED SLEEVE

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(71) Applicant(s)
KLAUS THANISCH

(72) Inventor(s)
KLAUS THANISCH

(74) Attorney or Agent
GRIFFITH HACK & CO., GPO Box 4164, SYDNEY NSW 2001

(56) Prior Art Documents
AU 25750/77 B65D
AU 24136/77 B65D

(57) Claim

1. A threaded sleeve manufactured by a process which includes stripping the finished sleeve from a mould in the axial direction comprising:

(a) a skirt;

(b) screw thread means projecting from the interior wall of the skirt for mating with a thread on a neck of a container, said thread means being formed along a helical path on the interior surface of said skirt said helical path extending one full turn around said closure skirt circumference;

(c) said screw thread means including a plurality of spaced thread segments located on the helical path;

(d) said segments being ramped or rounded, or both, on the side facing the axial direction in which the sleeve is moved to be stripped from the mould, to facilitate release from the mould; and

(e) said segments are separated from one another along the helical path by spaces shorter than said segments.

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Name of Applicant: KLAUS THANISCH

Address of Applicant: Am Rosenkreuz 6, D–5583 Zell, WEST GERMANY

Actual Inventor: Klaus Thanisch

Address for Service: GRIFFITH HASSEL & FRAZER
71 YORK STREET
SYDNEY NSW 2000
AUSTRALIA

Complete Specification for the invention entitled:

PLASTIC THREADED SLEEVE

The following statement is a full description of this invention, including the best method of performing it known to me/us:–

0705A:rk

PLASTIC THREADED SLEEVE

The invention relates to a threaded sleeve with a thread projecting from its inner wall. The threaded sleeve can be the wall of a threaded cap, e.g. a closure cap for a bottle mouth with a pouring opening with or without a lid.

Such threaded sleeves have at least one projecting thread (= thread rib). For manufacture in a moulding, particularly an injection moulding, process an appropriately shaped core must be provided within the mould.

It is known after the injection of the threaded sleeve to demould it by screwing the mould core out. This complicates the mould due to the necessary screwing process but produces mouldings with a particularly good appearance, whereby a critical factor is that the projecting threads do not mark the outer wall of the threaded sleeves.

If relatively simple moulds are used, with which the moulding is forceably pulled in the axial direction over the core provided with thread grooves, considerable forces are exerted in the peripheral direction on the projecting threads on the moulding and thus on its wall. The consequence is that the projecting threads strongly mark the outer wall which is undesirable.

If threaded cores are used which after the injection process can be contracted inwardly (collapsible cores)

then the demoulding can be more rapid than when screwing out the mould core but expensive mould cores are required which are also subject to a high degree of wear.

According to the present invention, there is provided a threaded sleeve manufactured by a process which includes stripping the finished sleeve from a mould in the axial direction comprising:

(a) a skirt;

(b) screw thread means projecting from the interior wall of the skirt for mating with a thread on a neck of a container, said thread means being formed along a helical path on the interior surface of said skirt said helical path extending one full turn around said closure skirt circumference;

(c) said screw thread means including a plurality of spaced thread segments located on the helical path;

(d) said segments being ramped or rounded, or both, on the side facing the axial direction in which the sleeve is moved to be stripped from the mould, to facilitate release from the mould; and

(e) said segments are separated from one another along the helical path by spaces shorter than said segments.

The threaded sleeve may be manufactured from plastics material with simply constructed moulds, may be demoulded in a simple manner, and after the demoulding, the projecting threads do not mark the outer wall or only to a negligible extent. The invention is also to be applicable to relatively hard plastic materials, such as polypropylene.

Currently available moulds, which are used for the manufacture of force fitted members, particularly closures, that is to say of closures with inwardly extending projections which all lie in a common radial plane, can also be used for the fabrication of threaded sleeves embodying the present invention, particularly threaded closures, if only their inner mould member is exchanged.

Threaded sleeves embodying the invention can be manufactured with rigid cores, that is to say those which are not inwardly collapsible. They are withdrawn in the axial direction after the injection process. During this the wall of the threaded sleeves stretches in the peripheral direction. Since, however, the segments are mutually offset in the peripheral direction, a very much larger portion of segment-free wall can accommodate stretching for each segment so that the wall material is not excessively stretched and no traces, i.e. markings, of the segments remain on the outer wall. Furthermore, a proportion of the peripheral stretching can be accommodated by the regions between the segments.

The segments have such a thread profile that by virtue of an oblique position and/or rounding of their surfaces which are stressed during the pulling out process they facilitate the demoulding by sliding out of the segments from corresponding recesses in the mould core.

It is known to divide the projecting portions of a thread into segments. Such a feature is, however, deliberately used in the present invention with threaded sleeves injected from plastics material to produce sleeves with external surfaces of high quality, that is to say external surfaces which are not marked by components of the thread, despite a rational demoulding by axial withdrawing of the mould core.

The spaces between the segments can have a certain minimum size. The smaller the spaces the cleaner the

screwing function, the larger they are the less may the position of the segments be recognized on the external wall.

If the threaded sleeve has more than one projecting thread, then the segments of one projecting thread can be prevented from snapping into the openings in the core of the projecting thread above it when axially withdrawing the core.

In the case of plastic bottles with a threaded mouth, the problem occurs that screw caps or the like become loose again by themselves after having been screwed on. This is particularly the case when the bottle mouths are wet and/or have multiple threads. A reverse rotation lock may be formed in a simple manner, namely by appropriate shaping of at least one of the segments, which lock cooperates with a corresponding radial projection on the other thread portion, i.e. in this case on the bottle mouth.

The reverse rotation lock may be so shaped that the user can unscrew the threaded portion with the exertion of a small force.

On the other hand, unscrewing may be completely prevented. This is advantageous with closure members which are provided with a lid, that is to say are not themselves to be unscrewed. Such closure members have been previously force fitted.

More recent methods of fabrication permit plastic bottles to be manufactured with even thinner walls. In this manner material is saved. On the other hand, such bottle mouths cannot withstand a forceable application but are deformed inwardly. In such cases a forceably applied

closure may be replaced by a threaded closure with a reverse rotation lock.

Exemplary embodiments with further features of the invention will be described below with reference to the drawings.

Figure 1 is a longitudinal section through a threaded sleeve in accordance with the invention;

Figures 2 to 5 are schematic scrap sections through threaded sleeves in accordance with the invention with segments of different shapes;

Figure 6 is a scrap section through a threaded sleeve with a reverse rotation lock; and

Figure 7 is an elevation of a bottle mouth with a reverse rotation lock.

Figure 1 shows a threaded sleeve 2 in the form of a cap with a large discharge opening 4. The invention is applicable to caps of widely varying type and to purely circularly cylindrical or conical threaded sleeves. Of importance is that the thread of the threaded sleeve is divided into individual inwardly projecting segments 6. Figure 1 shows a thread. The segments are uniformly distributed over the inner periphery. Between each two segments there is a space 8 of 0.4 mm or more in peripheral direction. After the injection moulding process the threaded sleeve 2 is withdrawn in the direction of the arrow 10 from the mould core, which is not illustrated. In this process the wall of the threaded sleeve is stretched, particularly at the points outside the segments.

As shown in Figure 1, the upper and lower surfaces of

the segments 6 bulge outwardly. This is important primarily for the upper surface because this must ensure that the segments can slide out of the corresponding mould recesses during demoulding. The upper surfaces can be oblique flat surfaces or arched surfaces or radially extending surfaces which are rounded towards the interior space.

The segments can have differing shapes, as is shown in Figures 2 to 5 in connection with the segments 6.2 to 6.5 provided therein. In Figure 2 they have a straight inner edge, in Figure 3 an arcuate one. In Figure 4 the segments are of approximately trapezoidal shape whilst in Figure 5 they are rounded at their ends, all as seen in the axial direction. If the segments taper in the peripheral direction towards their ends, as is specially shown in Figures 2 and 3, a greater degree of stretching can be accommodated by these end sections of the segments than by their middle sections. This militates additionally against a marking of the segments on the outer wall of the threaded sleeve. By contrast, the segments in Figures 4 and 5 have the advantage of greater strength and can thus be used for the transmission of larger closing forces.

Figures 6 and 7 show a portion of a threaded sleeve or a bottle mouth with a reverse rotation lock. For this purpose the bottle mouth 14 has a radial projection 16 at the lower end of its thread. The projection has a wall 18 which lies in an axial-radial plane. Figure 6 is a partial section transverse to the axis through an associated threaded sleeve with the sectional plane lying above the illustrated segments. The viewing

direction is upwards with respect to the threaded mouth of Figure 7.

Whilst most segments 6 are constructed as described above, at least one of them (20) has a locking surface 22 which catches behind the wall 18 of the projection 16 of the bottle opening when the sleeve is fully screwed on. The segment 20, which is constructed as a reverse rotation lock, can be the lowermost, as in Figure 7, which leads during the screwing up process. Alternatively, it can be provided at a different position. A plurality of segments can also be constructed as reverse rotation locks.

If the wall 18 of the bottle mouth and the locking surface 22 of the segment 20 extend radially then a reverse rotation is prevented after the catching. Having regard to the extensibility of the plastics, a relatively large security against reverse rotation can be created if both surfaces are additionally inclined with respect to the axial-radial plane in such a sense that both members, namely segment 20 and projection 16, become even more wedged when a load is applied in the reverse rotary direction.

If, on the other hand, a reverse rotation is to be possible but a spontaneous release of the closure is to be rendered impossible, the locking surface 22 and the wall 18 can be inclined in the opposite sense, that is to say in such a manner that the segment 20 is pressed outwardly on reverse rotation and then snaps back over the projection 18.

If a thread having more than one projecting thread is defined by the segments 6 to 6.5, then the segments of the one projecting thread should be offset with respect to those of the next and with respect to those of the optional further projecting thread in the peripheral direction. In this manner the segments are prevented during demoulding from snapping from one recess in the mould core into the next one which would result in a repeated stretching of the wall 12 of the threaded sleeve and would be associated with the danger that the segments would then mark its outer wall.

REFERENCE LIST

2	Schraubhülse	threaded sleeve
4	Entnahmeöffnung	discharge opening
6	Segment	segment
6.2 bis 6.5	Segment	segment
8	Zwischenraum	space
10	Pfeil	arrow
12	Wand	wall
14	Flaschenmündung	bottle mouth
16	Vorsprung	projection
18	Wand	wall
20	Segment als Rückdrehsperre	segment as reverse rotation lock
22	Sperrfläche	locking surface

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A threaded sleeve manufactured by a process which includes stripping the finished sleeve from a mould in the axial direction comprising:

(a) a skirt;

(b) screw thread means projecting from the interior wall of the skirt for mating with a thread on a neck of a container, said thread means being formed along a helical path on the interior surface of said skirt said helical path extending one full turn around said closure skirt circumference;

(c) said screw thread means including a plurality of spaced thread segments located on the helical path;

(d) said segments being ramped or rounded, or both, on the side facing the axial direction in which the sleeve is moved to be stripped from the mould, to facilitate release from the mould; and

(e) said segments are separated from one another along the helical path by spaces shorter than said segments.

2. A threaded sleeve as claimed in claim 1, wherein the segments are separated from one another along the helical path by spaces of at least 0.4mm.

3. A threaded sleeve as claimed in claim 1 or 2, wherein the segments have a length in the peripheral direction of 3 to 10mm.

4. A threaded sleeve as claimed in any one of the preceding claims having more than one projecting thread, wherein the segments of one projecting thread are offset in the axial direction with respect to those of at least the adjacent projecting thread.

5. A threaded sleeve as claimed in any one of the preceding claims, wherein at least one of the segments has a relatively blunt face on its hailing edge to co-operate with a radial projection on the neck of the container to obstruct removal of the sleeve by reverse rotation.

6. A threaded sleeve as claimed in claim 5, wherein the blunt face is inclined in such a manner that a reverse rotation is possible after jumping over the projection.

7. A threaded sleeve as claimed in claim 5, wherein the blunt face extends radially or is inclined against the reverse rotation direction in such a manner that a reverse rotation is rendered impossible.

8. A threaded sleeve substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 28th day of August 1990.

KLAUS THANISCH

By his Patent Attorneys

GRIFFITH HACK & CO.

FIG.1

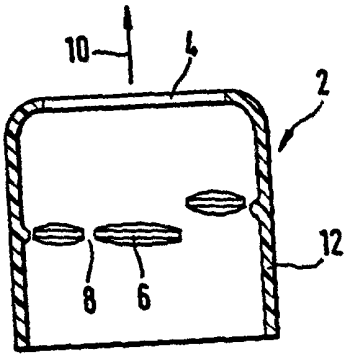

FIG.2

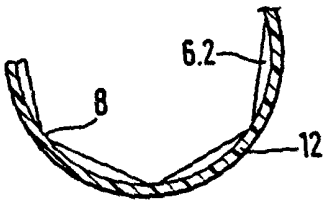

FIG.3

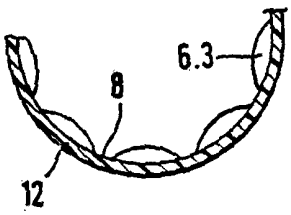

FIG.6

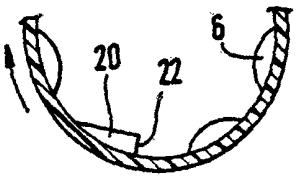

FIG.4

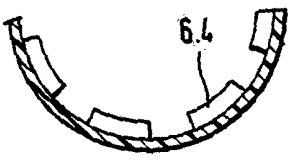

FIG.7

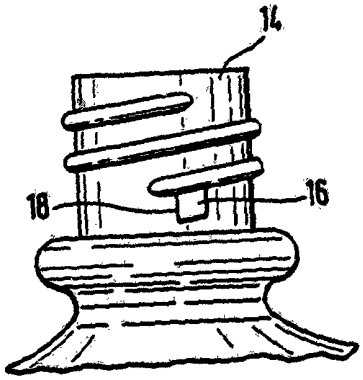

FIG.5