(54) Title: TIGHT HEAD PLASTIC DRUM BUNG CLOSURE SYSTEM WITH SAFETY CAP

Figure 3

(57) Abstract: Accordingly the present invention provides a T.H. plastics drums used for the transportation of liquid dangerous goods. A T.H. plastics drum is a flat ended circular cross section packaging with internally threaded openings for filling and emptying in the head not exceeding 70 mm in diameter. The openings are designed as standard bung closure systems. The standard bung of the piler proofed bung closure system is changed to allow the durable snap on of a safety cap with filling good collection feature in a unscrewed upside down position. This feature reduces the danger of human contamination with the dangerous filling good and allows a refilling of the collected dangerous filling good.
Published:

— with international search report (Art. 21(3))
TIGHT HEAD PLASTICS DRUM BUNG CLOSURE SYSTEM WITH SAFETY CAP

FIELD OF INVENTION

This invention relates to a plastics safety cap for T.H. Plastics Drums Bung Closure System with pilfer-proof function and carryover filling good collection area at upside down positioning of the unscrewed safety cap.

BACKGROUND OF INVENTION

The safety cap assembly consists of 2 main parts: Bung and Safety cap. These parts are fixed into each other and become a single unit. These parts enable to seal the opening of T.H. Plastics drums and make it pilfer proof, while opening if kept upside down, Collects the carryover of filling goods.

The conventional bungs for drums are with sealing gasket on either top side or bottom side. Bungs are kept in position with the help of threads on the outer surface which is getting engaged in the threads of bung housing. These bungs are covered either by metal or plastic sealing caps against theft or misuse snapped-on on the bungs or the bung housings.

A T.H. Plastics Drum is a flat ended circular cross section packaging with opening for filling and emptying in the head not exceeding 70mm in diameter. T.H. Plastics Drums are available in the range of 20 - 250L the preferred size is 220L. The main application for T.H. Plastics Drums is the transportation of dangerous liquid goods. Fig. 1 is a perspective view of a 220 L T.H. plastics drum. The drum is blow molded out of high molecular polyethylene has two handling rings and two openings for filling and emptying in his drum head.

The Openings for filling and emptying are designed as standard closure systems. A Bung closure system consists of one or more components which enables an
internally threaded container (Bung Housing) to be filled or emptied and then secured (B.S Bung and Sealing Cap) to provide a leak proof seal for the subsequent transport or storage. Fig. 2 is a cut through a bung housing with a standard closure system for plastics drums. The closure system is named BCS 70x6 or 56x4. 70 or 56 mm is the diameter of the thread, the connection between bung and bung housing, 6 or 4 mm is the pitch of the thread. The bung is screwed in the bung housing and the gasket is sealing up the opening. The metal sealing cap covering and protecting the top enfaces of bung and bung housing is clinched around the retaining collar of the bung housing.

The plastic drums are having 2 openings on the top for filling/taking out filled liquid. The conventional bungs and sealing caps are 2 separate components, bungs are not having any provision/cover to collect the carryover liquid which may fall on the drum and cause damage/injury. The conventional sealing caps are easily available in the market and if somebody wants to pilfer he can remove the old sealing cap and put a new sealing cap on.

Standard bung closure system:
For the transportation of the T.H. plastics drum, the plastics bung is screwed in, the closure system sealing internally by a gasket and sealed or secured externally by a steel or plastics sealing cap. During transport of the plastics T. H. orum the lower side of the bung will be wetted by the liquid filling good. For emptying the sealing cap has to be removed, the bung unscrewed and placed somewhere. The lower side of the bung is wetted with dangerous filling goods, chemicals; there is a danger of spilling and human contamination with the dangerous filling good.

Prior arts:
US 4785963 shows a tamper-evident buttress plug for sealing closed a plastics 55 US gal T.H. plastics drum. This closure system incorporates a bung housing, a buttress plug with an external, sonic-welded temper evident ring with ratchets. The external ring features a series of ratchets that correspond and lock up with another
series of ratchets on the outside of the bung housing, preventing plug backoff. When the plug is unscrewed the first time the ratchet ring connection to the plug breaks, the ratchet ring stays on the bung housing, only the plug will be removed. If the lower side of the plug is wetted with dangerous filling goods there is a danger of spilling and contamination with the dangerous filling good, there is no collection area for the dangerous filling good.

DE 29821764 shows a standard closure system with a snapped on plastics sealing cap covering the end-face of the bung housing and the center bung wrench area. The sealing cap is pushed, after bung insertion and tightening, on the bung, snaps on the bung collar secured in position by the sealing cap clips. The sealing cap has to be removed, pulled by a lip of the sealing cap, shearing of the sealing cap split lines allowing the removal of the safety cap and the insertion of the bung wrench. ISO 20848-3 shows all standard bung closure systems for T.H plastics drums.

**OBJECTS OF INVENTION**

The main object of the present invention is to obviate the above drawbacks, using a standarised bung housing according ISO 20848 - 3.

Another object of the present invention is to provide pilfer proof safety cap with closed bung housing avoiding water collection in the bung wrenching area.

Yet another object of the present invention is to provide unique pilfer proof safety caps which cannot be copied easily and can provide good protection.

Another object of the present invention is to provide safety cap which avoids spilling of the liquid to further avoid human contamination with dangerous liquids.

Another object of the invention is to provide cost effective mechanism to enable customer to print their logo on safety caps.
BRIEF DESCRIPTION OF DRAWINGS

According to the present invention,
Figure - 01 shows 220L TH Plastics Drum. (Prior Art)
Figure - 02 shows sectional view of Standard 56x4 bung closure system according ISO 20848 - 3. (Prior Art)
Figure - 03 shows sectional view of Standard Bung Housing with Safety Cap.
Figure - 04 shows Details of Safety Cap assembly.
Figure - 05 shows Safety cap in collecting (Up side - Down) position.
Figure - 06 shows Safety Cap in Emptying Position.

STATEMENT OF INVENTION

Accordingly the present invention provides a new bung closure system for plastics drums for closing the internally threaded opening comprises
at least one externally threaded bung (10) threadedly engageable with the interior of a standard threaded bung housing (4);
at least one safety cap (12) snapped on the bung wherein the bung is screwed in alone;
said safety cap (12) is pushed on further after snapping on the bung for screwing out safety cap and bung as one piece; and
at least one safety foil for sealing the wrenching area of the safety cap.

BRIEF DESCRIPTION OF INVENTION

It is the function of the present invention to provide a safety cap assembly for tight head plastics drums bung closure systems with protection against pilferage additional human safety and reduced rise of contamination. This function is fulfilled by:
- Using a standardized bung housing according ISO 20848-3.
- Changing the design of the bung allowing the snap-on of the safety cap.
- Using a safety cap with safety foil over the safety cap wrench area and having a filling good connection feature.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings wherein the showings are for the purpose of illustrating a preferred embodiment of the invention only, and not for the purpose of limiting the same.

According to present application a bung is having conventional fitting/tightening arrangement. The sealing gasket (7) is fixed on the bung bottom side. Provision is made for plastics/metal sealing cap (8) to put on top side. The present method is to put bungs (6) in the housing (4) and then add metal/plastics sealing caps (8) for protection. While opening the bung (10), sealing caps (8) are removed and then bungs are opened. Sealing caps (8) are thrown in trash can separately.

The invention is new bung (10) with a new design safety cap (12) and safety foil/cover (13) which comes as a single body. The bung (10) is tightened in the bung housing (4) and then safety cap (12) is pressed fitted on the bung. The bungs (10) can be opened only after removing or tearing the foil/logo or safety foil (13) placed on top of the safety cap (12). Conventional spanners can be used for opening/closing the bungs (10). Once spanner is used to open the cap this foil/cover (13) will break and cannot be refixed again making the bung closure system tamper evident.

Another feature of safety cap (12) is while opening bungs (10) safety caps (12) are coming together with bungs (10). Operator has to hold the safety cap (12) and not the bung (10) which was in contact with filled in chemical. He can place complete assembly upside down so that residue stuck on the bung (10) shall not fall on any other surface but get collected in the inside cavity of the safety cap (12). This will not contaminate the drum (1) surface also. While refixing the cap operator has to
just tilt the safety cap (12) in bung housing (4) to drain collected chemical in the
drum and put the bung with safety cap back on the drum.

Fig. 3 is a cut through a standard bung housing (4) with an assembled bung closure
system for plastics T.H. drums (1) with safety cap (12) according the invention.
The drum head (2) has two openings (3) with identical standard bung housings (4),
only one opening (3) is equipped with the closure system according the invention,
Fig 3. The standard gasket (7) is placed on the plastics bung for safety cap (9). The
bung for safety cap (10) is screwed into the standard bung housing (4) and
tightening by using a standard bung wrench up the recommended closing torque.
The safety cap (12) is placed over the bung (10) for safety cap, rotated until the
wrench area (14) of the safety cap (12) fits into wrench area (11) of the bung for
safety cap (10) and the areas without fastening teeth (17) of the safety cap (12) are
going over the standard bung housing (4) ribs (9) and then the safety cap (12) is
manually pushed down until the retaining lips (15) of the safety cap (12) are
snapping under the retaining collar (5) of the standard bung housing (4). The bung
closure is now temper -evident locked.

For T.H. plastics drum (1) opening, the bung (10) has to be unscrewed. The safety
foil (13) of the safety cap (12) has to be punched by the wrenching teeth of the
wrenching tool, bung (10) and safety cap (12) screwed out and manually placed
upside/down as one piece as shown in fig.5. The liquid, dangerous good, wetting
the bung (10) will drop or creep into the safety cap (12) and will stay there until the
safety cap is emptied according fig.6.

The safety cap (12) with the bung (10) can be reused and re-screwed as one part
again, a wire temper-evidence using the holes of the retaining lips (15) and the
bung housing (4) ribs (9) can be achieved.

Fig.4 shows all parts of the T.H. Plastics drum bung closure system with safety cap
according the invention in an exploded view. The safety foil (12) is induction
welded to the plastics safety cap (12). The wrench area (14) of the safety cap (12) fits into the wrench area (11) of the plastics bung (10). The bung housing (10) for a bung closure system with safety cap according the invention is the same as a standard bung housing, this allows easy T.H. plastics drum (1) production, the T.H. plastics drum (1) can be fitted with one or two closure systems according the invention.

Part designation

1. T.H. plastics drum
2. drum head
3. drum opening
4. standard bung housing
5. retaining collar of 4
6. standard bung
7. standard gasket
8. standard metal sealing cap
9. rib of 4
10. bung for safety cap
11. wrench area of 10
12. safety cap
13. safety foil of 12
14. wrench area of 12
15. retaining lips of 12
16. fastening teeth of 12
17. area of 12 without fastening teeth

The foregoing description is a specific embodiment of the present invention. It should be appreciated that this embodiment is described for purpose of illustration only, and that numerous alterations and modifications may be practiced by those skilled in the art without departing from the spirit and scope of the invention. It is
intended that all such modifications and alterations be included insofar as they come within the scope of the invention as claimed or the equivalents thereof.
WE CLAIM

1. A new TH plastics drum bung closure system for closing the internally threaded opening of a container comprises
   at least one externally threaded bung (10) threadedly engageable with the interior of a standard threaded bung housing (4);
   at least one safety cap (12) snapped on the bung (10) wherein the bung (10) is screwed in alone;
   said safety cap (12) is pushed on further after snapping on the bung (10) for screwing out safety cap (12) and bung (10) as one piece;
   at least one safety foil (13) for sealing the wrenching area (14) of the safety cap (12).

2. The bung closure system of claim 1 wherein the wrenching area (14) of the safety cap (12) fits into the wrenching area (14) of the bung (10).

3. The bung closure system of claim 1 wherein the wrenching area (14) of the safety cap (12) is sealed by a safety foil (13) wherein the foil is induction welded to the plastics safety cap (12) for protection against pilferage and contamination.

4. The bung closure system of claims 1 and 2 wherein said bungs (10) can be opened only after removing or tearing the foil/logo or plastic film (13) placed on top of the safety cap (12) providing the safety cap (12) with tamper proof sealing.

5. The bung closure system of claim 1-3 wherein the safety foil (13) of the safety cap (12) has to be punched out by the wrenching teeth of the wrenching tool prior to the bung (10) unscrewing.
6. The bung closure system of claim 1 wherein said safety cap (12) is configured for screwing out and manually placing upside/down with the bung (10) as one piece such that the liquid, dangerous good, wetting the bung (10) will drop or creep into the cavity provided in safety cap (12) and will stay there until the safety cap (12) is emptied.

7. The bung closure system of claim 1-5 wherein the opened and reclosed closure system with safety cap (12) can be resealed with a wire temper-evident.

8. The bung closure system of claim 1 wherein said safety cap (12) provides human safety, protection against pilferage and contamination.

9. The bung closure system of claim 1 wherein said safety cap (12) is configured for manually pushing down such that the retaining lips (15) of the safety cap (12) are snapped under the retaining collar (5) of the standard bung housing (4)

10. The new bung closure system for closing the internally threaded opening of a container as substantially as herein described with reference to accompanying drawings.
Figure 4
A. CLASSIFICATION OF SUBJECT MATTER

INV. B65D39/08 B65D41/08 B65D51/18

ADD.

According to International Patent Classification (IPC) into both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"Z" document member of the same patent family

Date of the actual completion of the international search: 6 March 2012

Date of mailing of the international search report: 14/03/2012

Name and mailing address of the ISA:

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Authorized officer

Vigilante, Marco

Form PCT/ISA/210 (second sheet) (April 2005)
INTERNATIONAL SEARCH REPORT

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. □ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. X Claims Nos.: 10 because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically: see FURTHER INFORMATION sheet PCT/ISA/210

3. □ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. □ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of additional fees.

3. □ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos. :

4. □ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos. :

Remark on Protest

□ The additional search fees were accompanied by the applicant’s protest and, where applicable, the payment of a protest fee.

□ The additional search fees were accompanied by the applicant’s protest but the applicable protest fee was not paid within the time limit specified in the invitation.

□ No protest accompanied the payment of additional search fees.
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Continuation of Box II.2

Claims Nos.: 10

Rule 6.2(a). Claim 10 refers to other parts of the application.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EP0 policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EP0, the applicant is reminded that a search may be carried out during examination before the EP0 (see EP0 Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.