



DELEGATURA PROPIEDAD INDUSTRIAL

División de Nuevas Creaciones

PCT
SOLICITUD

PATENTE DE INVENCION

ENTRADA EN FASE NACIONAL

21. EXPEDIENTE No.

03-69199

54. TITULO

TAPA PARA ENVASE A PRUEBA DE MANIPULACION INDEBIDA

51. CLASIFICACION INTERNACIONAL

B65D 41/34; 50/04

71. SOLICITANTE

FAMART DISTRIBUTION CO. N.V.

DOMICILIO

CURAÇAO, NETHERLAND ANTILLES

74. APODERADO

RAMIRO CASTRO DUQUE

22. SANTAFE DE BOGOTA, D.C.

PETITORIO

AS: 91.527

Industria y Comercio
SUPERINTENDENCIA

03 069199 00

Radicación : 03069199 00000000 Folios: 69
Fecha (HH): 2003-08-12 17:08:27
Trámite : 011 PCT-PATENT 379 FASE NNCI 411 PRESENTAC
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

FORMULARIO ÚNICO DE SOLICITUD DE PATENTE PCT ENTRADA EN FASE NACIONAL

1

SOLICITUD DE:

☒ Patente de Invención.

☐ Patente de Modelo de Utilidad.

☐ Capítulo I.

☒ Capítulo II.

2

SOLICITANTE
(71)

Nombre: FAMART DISTRIBUTION CO. N.V.

Dirección: c/o N.V. Fides, Platemaal 15, P.O. Box 584, Curaçao - Netherland Antilles

Nacionalidad o Domicilio: Netherland Antilles

Lugar de Constitución: Netherland Antilles

Teléfono:

Fax:

E-mail:

IDENTIFICACION

C.C. ☐ NIT ☐

C.E. ☐ Otro ☐

Cual _____

Número _____

3

REPRESENTANTE
O APODERADO

Nombre: RAMIRO CASTRO DUQUE

Dirección: Cra. 7 No. 16-56 Piso 9

Teléfono: 380-2200

Fax: 380-2700

E-mail:

IDENTIFICACION

C.C. ☒ NIT ☐

C.E. ☐ Otro ☐

Cual _____

Número 170.322 TP 1003

4

INVENTOR (ES)
(72)

Nombre: Marco Cerracchio

Dirección: Via Galileo Galilei, 328, I-18038 San Remo, Italia

Nacionalidad o Domicilio: Italia

5 PCT (88)

Solicitud Internacional No. PCT/EP02/00272 Fecha 14-01-2002

Publicación Internacional No. WO 02/057141 Fecha 25-07-2002

Título (54): TAPA PARA ENVASE A PRUEBA DE MANIPULACIÓN INDEBIDA

7 Clasificación Internacional (51) B65D 41/34; 50/04

8 Prioridad

SI ☒ NO ☐

(33) País de
Origen

IT

(32) Fecha

17-01-2001

(31) Número de Solicitud

SV01 A000003

9 Comprobante de pago No. 03-45.861

Fecha: 11-08-2003

Instrucciones para el diligenciamiento del presente formulario, ver reverso de esta página.

- ☒ Comprobante de pago de la tasa de presentación de la solicitud. \$400.000
- ☐ Documento que acredite la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☐ Poderes, si fuere el caso.
- ☐ Documento de cesión del inventor al solicitante o a su causante.
- ☐ Declaraciones
- ☒ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Copia del examen preliminar efectuado por la IPEA.
- ☒ Traducción del examen preliminar efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☐ Arte final 12x12.
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☒ Otros Tarjeta de propietarios.

11 FIGURA CARACTERÍSTICA:**12 Solicito la concesión de la patente,****NOMBRE: RAMIRO CASTRO DUQUE****FIRMA:**

C C. 170.322 de Bogotá T P. 1003 del C S J

3

INVENTARIOS Y COMERCIO
Radicación : 03069199 00000000 Folios: 69
Fecha (SMB): 2003-08-12 17:08:17
Trámite : 011 PCT-PATENT 679 FASE NACT 411 PRESENTAC
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

NIT : 900176089-2

RECIBO OFICIAL DE CAJA : 03 - 49,861
FECHA : JULIO 2 DE 2003

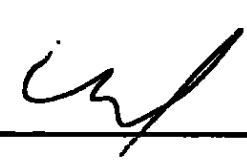
***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
BRIGARD & CASTRO LTDA	CONSIGNACION	BANCO POPULAR	050-00110-6	12603001	02/07/2003	32,620,000.00

***** CONCEPTO *****

CANT. CONTABILITICO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE IN	400,000.00
	TOTAL :	400,000.00

SON: CUATROCIENTOS MIL PESOS

RESPONSABLE : 

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

Folio 4
Tarjeta de Auto
25.04.93
~~9.6.93~~

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 July 2002 (25.07.2002)

PCT

(10) International Publication Number
WO 02/057141 A3

(51) International Patent Classification⁷: B65D 41/34;
51/16, 55/02, 50/04

(74) Agent: ALLAIX, Roberto; Ferrania S.p.A., Via Della
Liberta' 57, I-17014 Ferrania (IT).

(21) International Application Number: PCT/EP02/00272

(81) Designated States (*national*): AL, AU, BA, BG, BR, CA,
CN, CO, CR, CU, CZ, DM, DZ, EC, EE, GE, HR, HU, ID,
IL, IN, IS, JP, KP, KR, LK, LR, LT, LV, MA, MD, MG, MK,
MX, NO, NZ, PH, PL, RO, SG, SI, SK, TN, TR, UA, US,
VN, YU, ZA.

(22) International Filing Date: 14 January 2002 (14.01.2002)

(25) Filing Language: English

(84) Designated States (*regional*): ARIPO patent (GI, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

(26) Publication Language: English

(30) Priority Data: SV01A000003 17 January 2001 (17.01.2001) IT

(71) Applicant and

(72) Inventor: CERRACCHIO, Marco [IT/IT]; Via Galileo
Galilei, 328, I-18038 San Remo (IT).

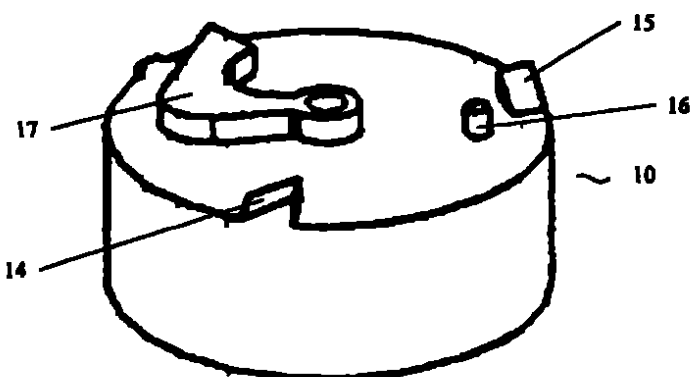
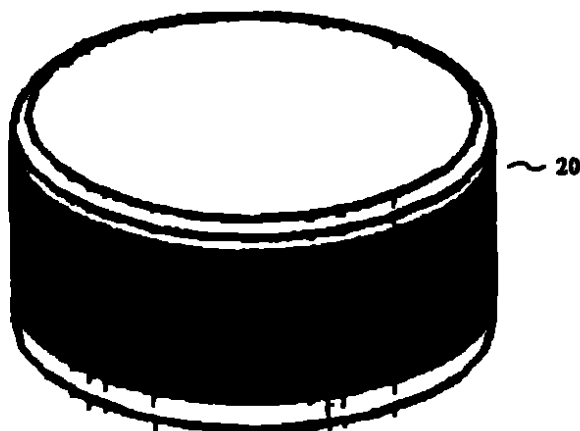
Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

[Continued on next page]

(54) Title: TAMPER-PROOF CONTAINER CAP

(57) Abstract: The present invention relates to
a closing cap for recipients comprising an inner
cap (10) and an outer cap (20), said inner cap (10)
comprising on its upper face (13) retaining means
(14, 15), breakable holding means (16), and ending
stroke means (17) and said outer cap (20) comprising
on its lower face (21) a relief arm (22) comprising
relief cutting means (23) and retaining means (24).



WO 02/057141 A3

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
12 September 2002

TITLE: RECIPIENT CAP

FIELD OF THE INVENTION

- 5 The present invention relates to an improved cap for the closure of recipients, and, more in particular, it relates to a cap for the closure of bottles, flasks, jars, demijohns, tanks and the like.

BACKGROUND OF THE INVENTION

10

The closure of recipients (where recipient means any container intended for containing a fluent material having a neck through which the fluent material can be poured, such as, for example, bottles, flasks, jars, demijohns, tanks and the like) is usually done by means of caps. Recipients and caps are usually made of plastic, such as, for example, polypropilene and polyethylene. The end portion of the recipient neck is usually threaded for allowing the coupling with a threaded cap. In order to avoid unwanted opening or tampering of the recipient content, the threaded cap is usually provided with an antitamper ring connected to the cap by means of breakable plastic teeth. The antitamper ring is hold by a crest made in the proper position on the recipient neck. When the cap is removed, these breakable plastic teeth are broken so giving to the consumer a clear indication that the recipient has been already opened.

15

Even if this solution provides the advantage that does not requires tools for the opening (recipient opener or corkscrew), it still has several disadvantages and drawbacks.

20

First of all, the need of breaking the breakable plastic teeth requires a certain force by the consumer, such a force being increased in case the recipient contains carbonated beverage, due to the gas pressure which acting against the cap makes its rotation and opening more and more difficult.

25

Additionally, the manufacturing of cap and recipient requires a careful study of the quotes, requires quite expensive manufacturing apparatus, and when the cap is made of a resin different from that of the recipient, this creates a recycling problem as the ring must be cut off the recipient before it can be recycled. Furthermore it is

30

occasionally possible to remove such a cap without separating it from its antitamper ring.

Further, dirty particles, residues, and any other kind of dust can accumulate in the little space formed by the breakable plastic teeth between the cap and the anti tampering ring and this increase the risk of contamination of the content of the recipient.

Last but not least, practical experience has demonstrate that the present system is not fully safe as some times, and in particular having regard recipient containing plain water or other non carbonate beverage, both cap and anti-tampering ring can be jointly removed without the rupture of the breakable plastic teeth.

SUMMARY OF THE INVENTION

The present invention relates to a closing cap for recipients comprising an inner cap (10) and an outer cap (20), said inner cap (10) comprising on its upper face (13) retaining means (14, 15), breakable holding means (16), and ending stroke means (17) and said outer cap (20) comprising on its lower face (21) a relief arm (22) comprising relief cutting means (23) and retaining means (24).

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 and 2 represent a plant view of closing cap according to a first embodiment of the present invention.

Fig. 3 comprises an upper (A) and lower (C) plant view and a section view (B) of the inner cap according to a second embodiment of the present invention.

Fig. 4 comprises an upper (A) and lower (C) plant view and a section view (B) of the outer cap according to a second embodiment of the present invention.

Fig. 5 represents a section view of the closing cap according to a third embodiment of the present invention.

Fig. 6 comprises an upper plant view of the closing cap according to the present invention during the initial (A), intermediate (B) and final (C) phase of the opening.

Fig. 7 comprises an axonometric view of the inner cap 10 and of the outer cap 20 of the closing cap of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

5

With reference to figures 1 to 6, the closing cap of the present invention comprises an inner cap 10 and an outer cap 20.

With reference to figure 3, the inner cap 10 comprises, inside its side walls, holding means 12 for holding said inner cap 10 to the recipient neck for closing the recipient itself. According to a preferred aspect of the present invention said holding means 12 are represented by a proper thread (12a, 12b). Other kind of holding means can be provided by the man skilled in the art, such as, for example, bayonet coupling.

The inner cap 10 comprises on its upper face 13 retaining means 14 and 15, breakable holding means 16, and ending stroke means 17. According to a preferred embodiment of the present invention, the retaining means 14 and 15 consist of relief teeth having a face 31 perpendicular to the upper face 13 and a face 32 forming an angle lower than 80°, preferably lower than 45°, with the upper face 13. According to a preferred embodiment of the present invention, the breakable holding means 16 consist in a shaped plastic element protruding from the plane represented by the upper face 13 and closing a hole made through the upper face 13 of the inner cap 10. The breakable holding means 16 are preferably colored in order to allow an easy identification by the user. According to a preferred embodiment of the present invention the ending stroke means 17 consist in a semicircular barrier comprising an arm 17a and an arm 17b linked together and forming an angle preferably in the range of from 30° to 100° between each other.

With reference to figure 4, the outer cap 20 comprises on its lower face 21 the relief arm 22 comprising relief cutting means 23 and retaining means 24. The cutting means are preferably represented by a semi-circular relief blade 23. The retaining means 24 are similar to retaining means 14 and 15 of the inner cap 10. The relief arm 22 can preferably comprise a projection having shape and dimension corresponding to the shape and dimension of the hole formed by removing the holding means 16. The outer cap 20 can have different external shapes for allowing a better grip by the user. An

octagonal shape is showed in figures 1 and 2, a circular shape is showed in figures 3 to 6. Other shapes, such as, for example, hexagonal shape, can be provided by a man skilled in the art, as well as a knurled surface can be provided in order to further improve the grip by the user. The outer cap 20 is preferably made with transparent material to allow the observation of the inner cap 10.

The outer cap 20 and/or the inner cap 10 are provided with holding means for allowing the assembling and the holding of the outer cap 20 on the inner cap 10.

With reference to figure 4, the holding means are preferably represented by a inner projection 40 made on the whole inner end circular portion of the outer cap 20 and able to hold the inner cap 10 after the insertion of the inner cap 10 into the outer cap 20. With reference to figure 4 again, the holding means can be alternatively or at the same time represented by a projection 43 made on the inner cap 10 that, during assembling of the cap, runs at first in a vertical groove 44 made within of the outer cap 20 and then, during the rotation of the outer cap 20 on the inner cap 10, in an horizontal groove 45 forming a L shape with the vertical groove 44.

With reference to figure 5, the holding means are alternatively represented by a groove 18 made for the whole circumference in the middle of the outer wall of the inner cap 10 and by a corresponding groove 26 made for the whole circumference in the middle of the inner wall of the outer cap 20.

Sliding means can be preferably made on the upper face 13 of the inner cap 10 and on the lower face 21 of the outer cap 20 to allow a better smoothness during the rotation of the outer cap on the inner cap.

With reference to figure 5, such sliding means are preferably represented by a circular projection 25 made on the lower face 21 of the outer cap 20 coupled with a circular groove 19 made on the upper face 13 of the inner cap 10.

With reference to figure 6, the working operation of the closing cap according to an embodiment of the present invention will be described hereinbelow.

In figure 6a is represented the starting position of the cap as settled to the end of the packaging line. The relief arm 22 comprising the relief semi-circular blade 23 and the retaining means 24 is held by the retaining means 14 and by the breakable holding means 16.

In figure 6.b is represented the intermediate position of the cap after the starting of the rotation (in clockwise direction) of the outer cap 20. The relief semi-circular blade has cut the breakable holding means 16 so opening the hole 41 from which the excess of carbonate present in the recipient can exit. The opening of the hole 41 and the consequent exit of the excess of carbonate contained in the recipient reduces the pressure of the inner of the recipient, so further reducing the force required for the rotation and the opening of the cap.

In figure 6c is represented the end position of the cap when the opening operation is concluded. The semicircular blade 23 has reached the ending stroke means 17 entrapping the breakable holding means 16 within the so formed cavity 42. The retaining means 24 of the relief arm 22 has stepped over the retaining means 15 and prevent further rotation of the outer cap 20. Accordingly, the outer cap 20 becomes joint with the inner cap 10. The back portion of the relief arm 22 has covered the hole 41 preventing any accidental pouring of the fluid contained in the recipient. The presence of a projection on the relief arm 22 in correspondence of the hole 41 further improves the held of the cap of the present invention.

Even if the present invention has been described in detail with reference to preferred embodiments, obvious modifications realized by the man skilled in the art are intended to be comprised within the spirit and scope of the present invention as claimed hereinbelow.

CLAIMS

1. A closing cap for recipients comprising an inner cap (10) and an outer cap (20), said inner cap (10) comprising on its upper face (13) retaining means (14, 15), breakable holding means (16), and ending stroke means (17), and said outer cap (20)
5 comprising on its lower face (21) a relief arm (22) comprising relief cutting means (23) and retaining means (24).
2. The closing cap for recipients according to claim 1 characterized in that said retaining means (14, 15) are represented by relief teeth having a face (31)
10 perpendicular to the upper face (13) and a face (32) forming an angle lower than 80° with the upper face (13).
3. The closing cap for recipients according to claim 1 characterized in that said breakable holding means (16) are represented by a shaped plastic element protruding
15 from the plane represented by the upper face (13) and closing a hole made through the upper face (13) of the inner cap (10).
4. The closing cap for recipients according to claim 1 characterized in that said ending stroke means (17) are represented by a semicircular barrier comprising a first
20 arm (17a) and a second arm (17b).
5. The closing cap for recipients according to claim 4 characterized in that said first arm (17a) and said second arm (17b) are linked together and form an angle in the range of from 30° to 100° between each other
25
6. The closing cap for recipients according to claim 1 characterized in that said relief cutting means (23) are represented by a semi-circular relief blade (23).
7. The closing cap for recipients according to claim 1 characterized in that said
30 retaining means (24) are represented by relief teeth having a face (31) perpendicular to the lower face (21) and a face (32) forming an angle lower than 80° with the lower face (21).

8

8. The closing cap for recipients according to claim 1 characterized in that said inner cap (10) comprises, inside its side walls (11), holding means (12) for holding said inner cap 10 to the recipient neck.

5

9. The closing cap for recipients according to claim 8 characterized in that said holding means (12) are represented by a thread (12a, 12b).

10. The closing cap for recipients according to claim 1 characterized in that said inner cap (10) and said outer cap (20) are held together by holding means (18, 26, 40, 43, 44, 45).

11. The closing cap for recipients according to claim 1 characterized in that said inner cap (10) and said outer cap (20) are provided with sliding means (19, 25).

Fig. 1

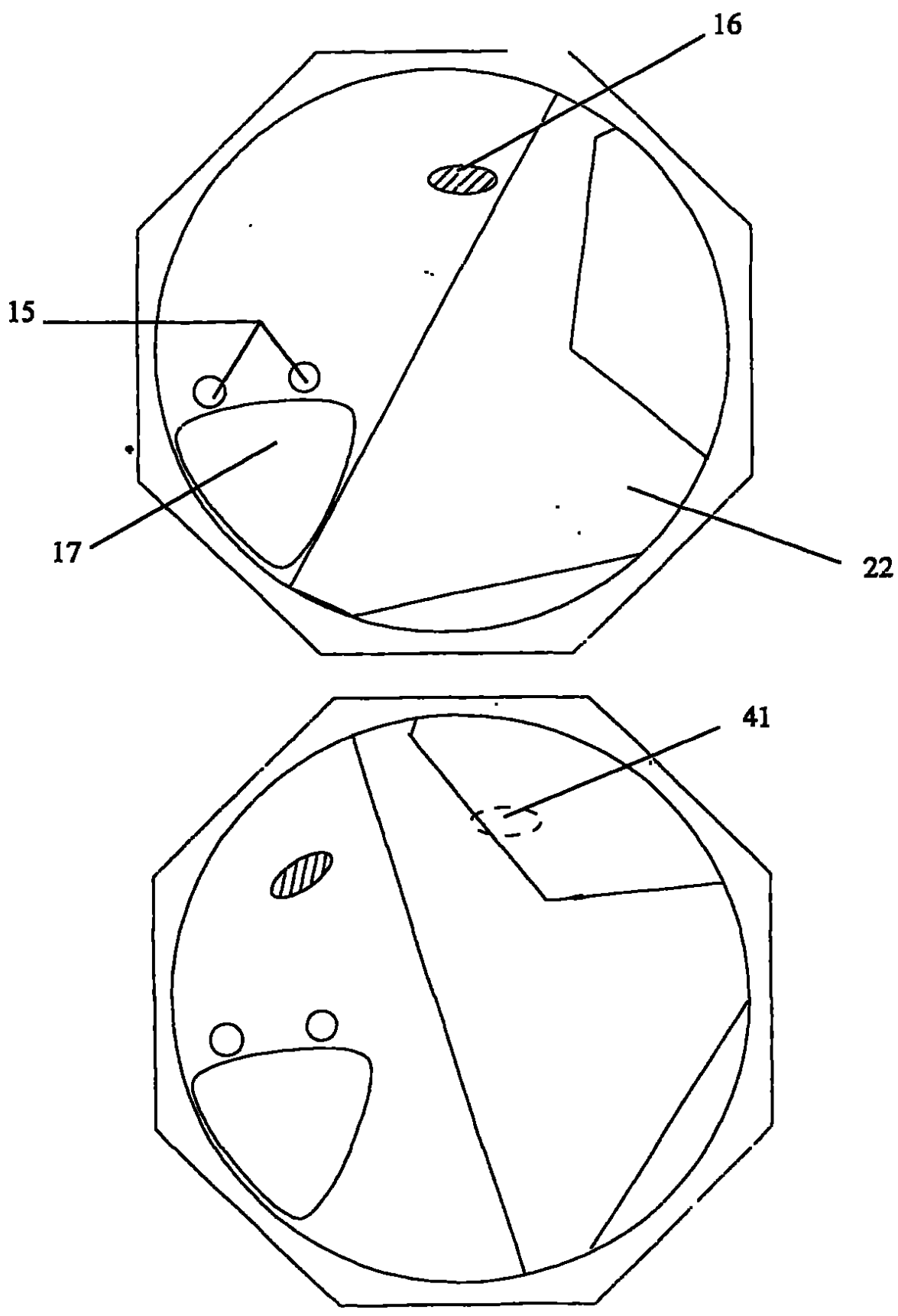
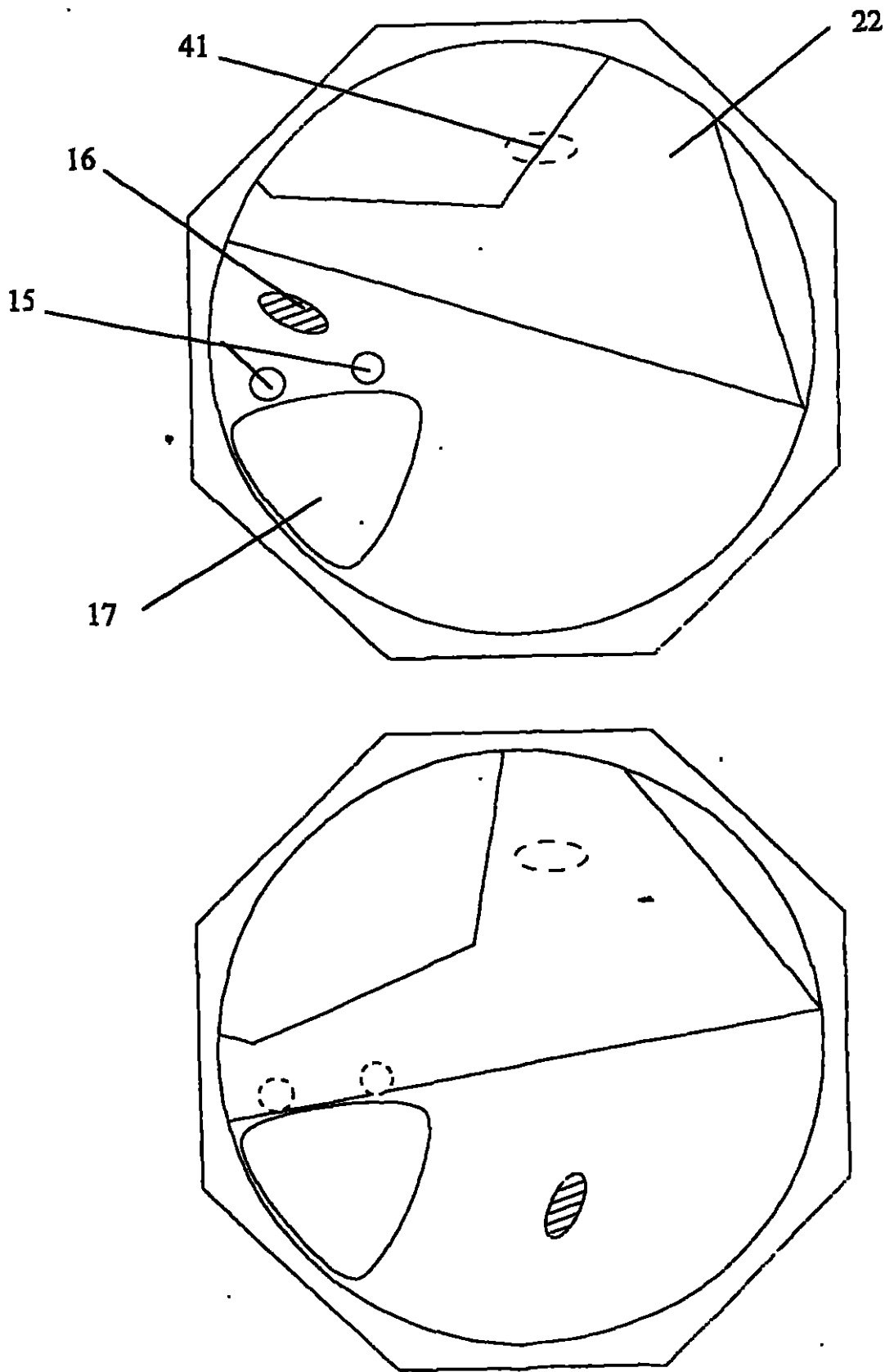
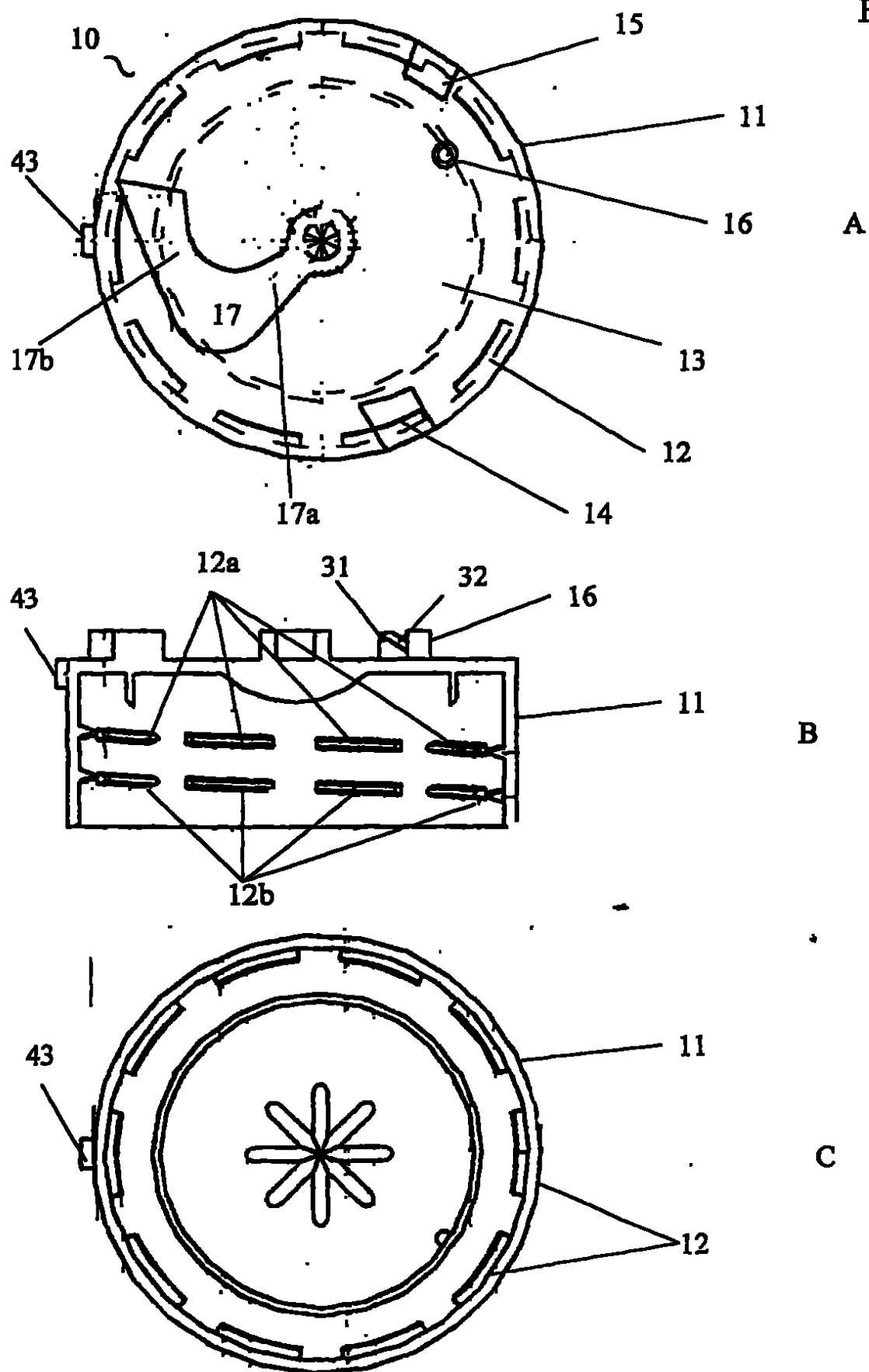


Fig. 2



40212 ~~12~~ 11

FIG. 3



12

FIG. 4

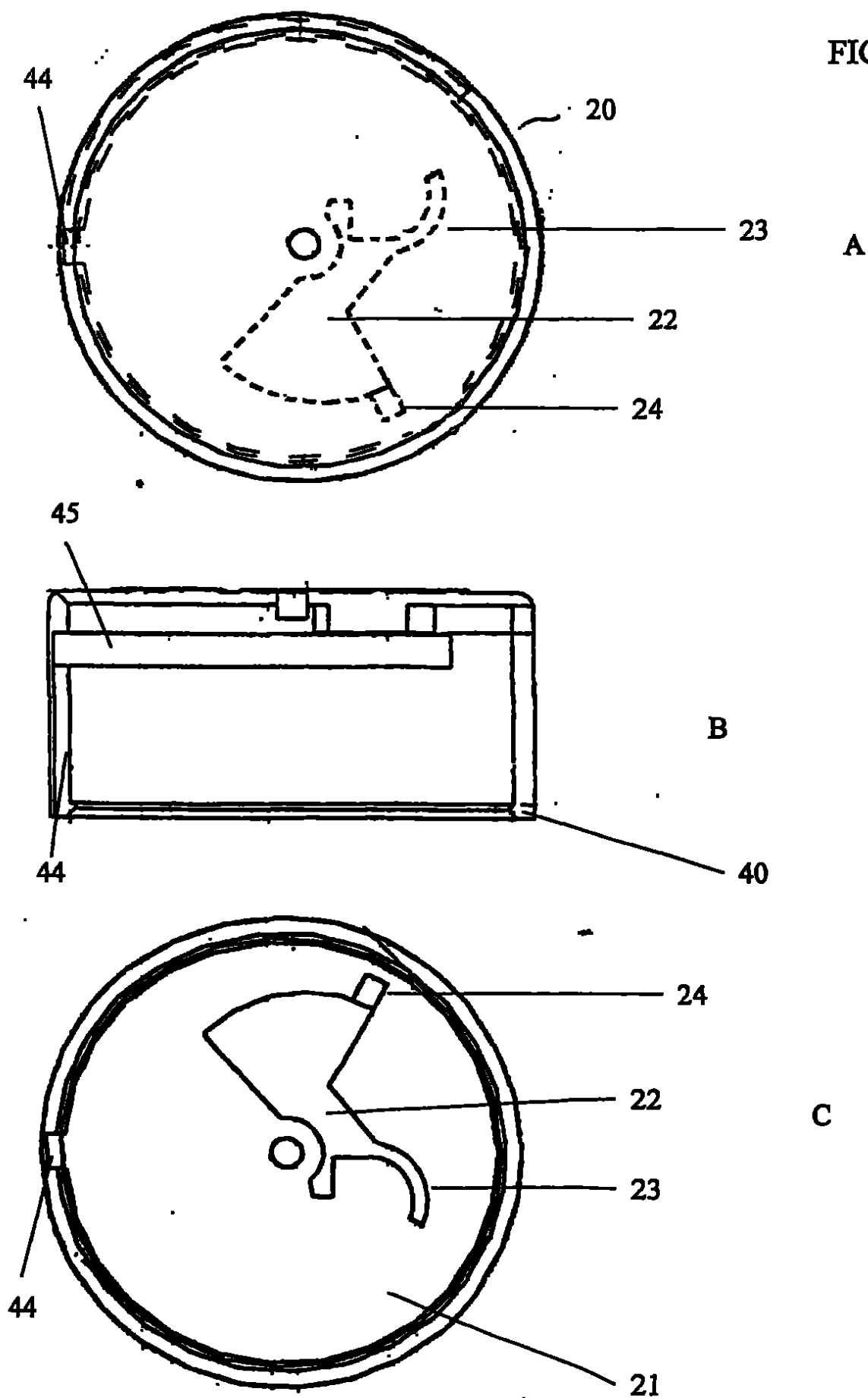
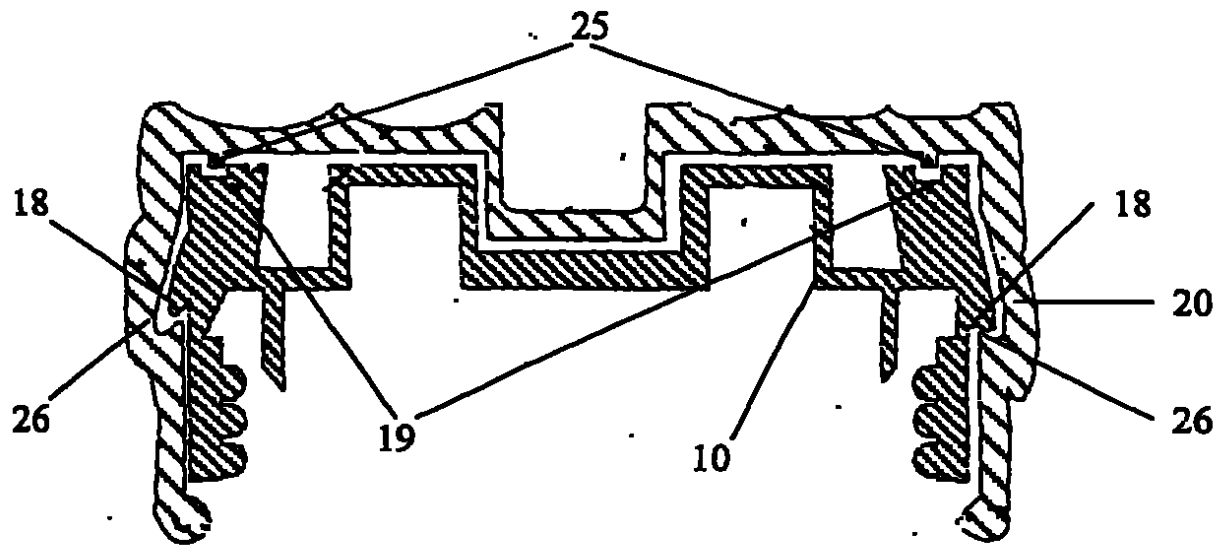


FIG. 5



14

FIG. 6

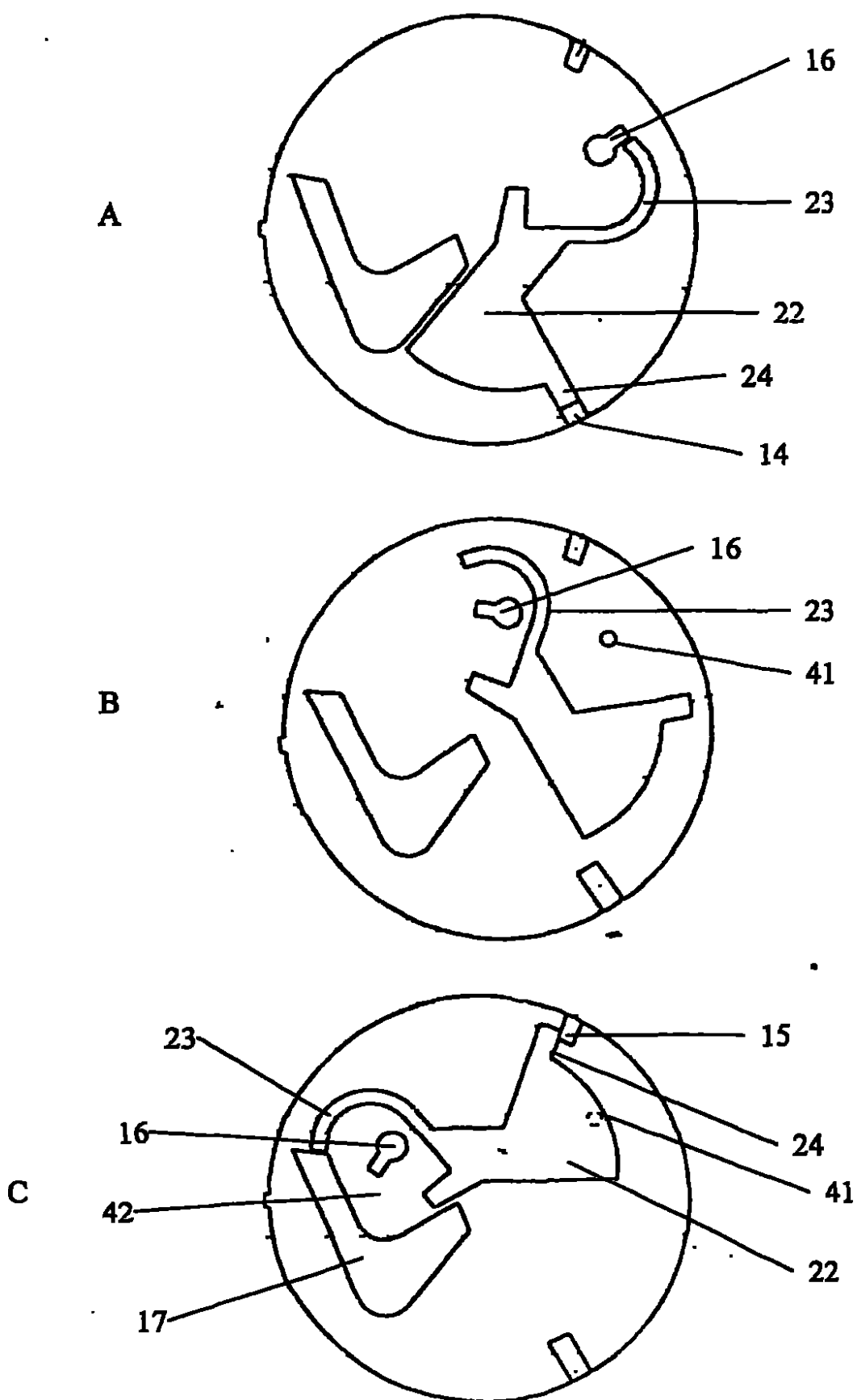
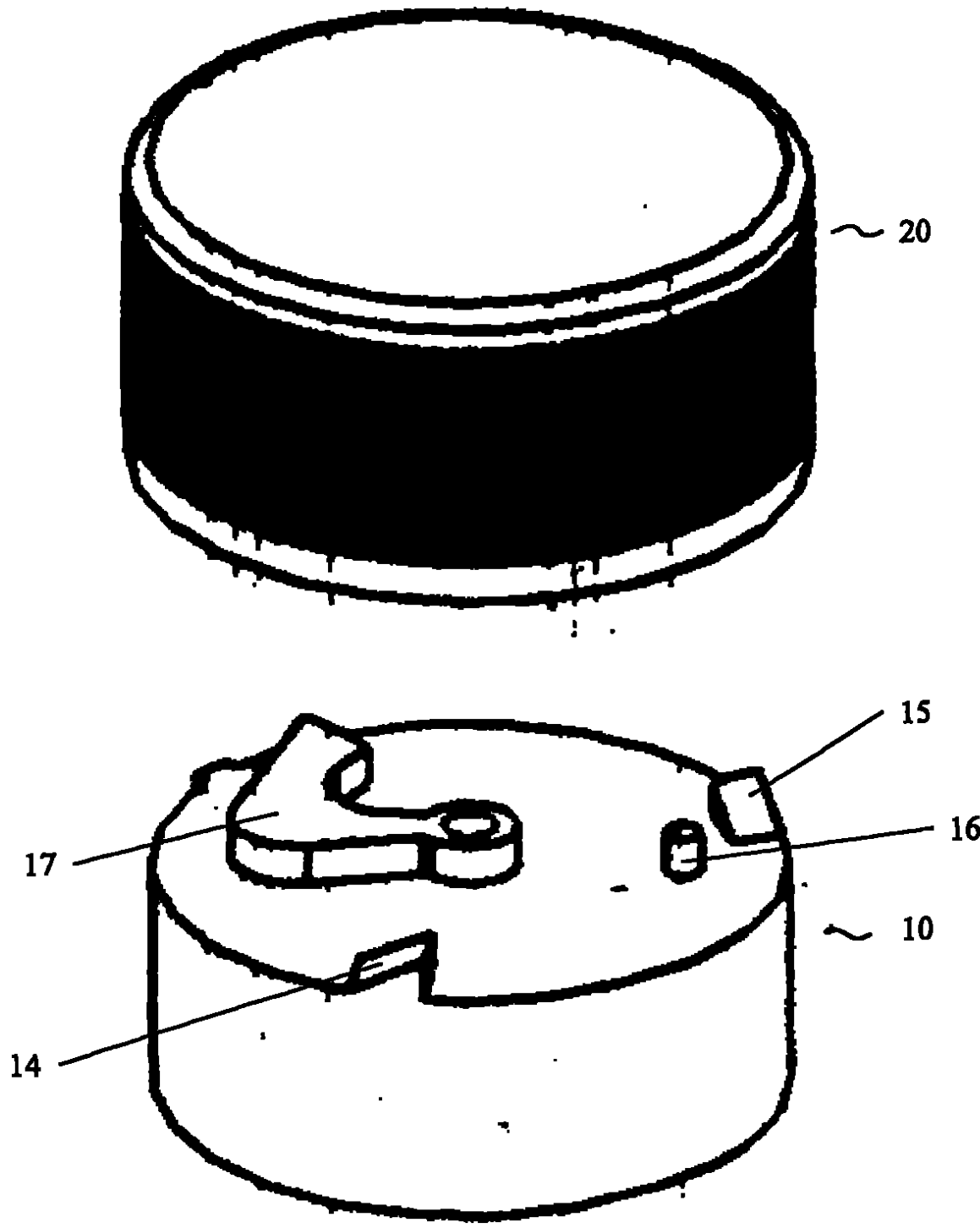


FIG. 7



(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 July 2002 (25.07.2002)

PCT

(10) International Publication Number
WO 02/057141 A2

(51) International Patent Classification⁷: B65D

(21) International Application Number: PCT/EP02/00272

(22) International Filing Date: 14 January 2002 (14.01.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
SV01A000003 17 January 2001 (17.01.2001) IT

(71) Applicant and

(72) Inventor: CERRACCHIO, Marco (IT/IT); Via Galileo
Galilei, 328, I-18038 San Remo (IT).

(74) Agent: ALLAIX, Roberto; Ferrania S.p.A., Via Della
Libertà 57, I-17014 Ferrania (IT).

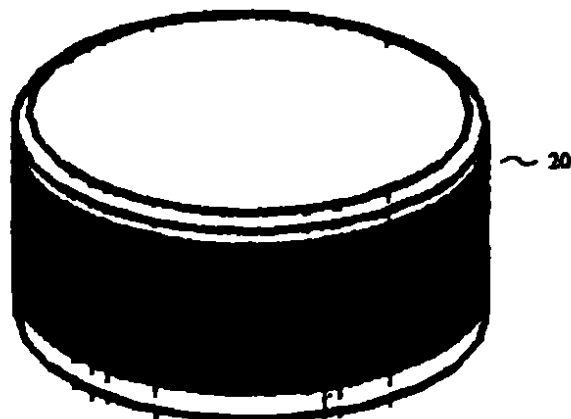
(81) Designated States (*national*): AL, AU, BA, BG, BR, CA,
CN, CO, CR, CU, CZ, DM, DZ, EC, EF, GE, HR, HU, ID,
IL, IN, IS, JP, KP, KR, LK, LR, LT, LV, MA, MD, MG, MK,
MX, NO, NZ, PH, PL, RO, SG, SI, SK, TN, TR, UA, US,
VN, YU, ZA.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

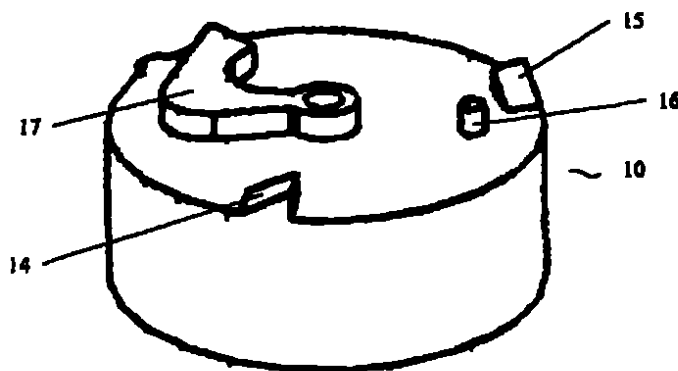
Declaration under Rule 4.17:
— of inventorship (Rule 4.17(iv)) for US only

[Continued on next page]

(54) Title: FIELD OF THE INVENTION



(57) Abstract: The present invention relates to
a closing cap for recipients comprising an inner
cap (10) and an outer cap (20), said inner cap
(10) comprising on its upper face (13) retaining
means (14, 15), breakable holding means (16),
and ending stroke means (17) and said outer cap
(20) comprising on its lower face (21) a relief arm
(22) comprising relief cutting means (23) and
retaining means (24).



WO 02/057141 A2

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/00272

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B65D41/34 B65D51/16 B65D55/02 B65D50/04

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 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, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 42 29 604 A (MERCK PATENT GMBH) 10 March 1994 (1994-03-10) abstract; figures 4,5 ---	1
A	US 4 458 820 A (ABRAMS MARTIN) 10 July 1984 (1984-07-10) abstract; figures ---	1
A	US 4 729 487 A (WRIGHT FRANK S) 8 March 1988 (1988-03-08) ---	
A	US 5 884 788 A (WILDE SHELDON L) 23 March 1999 (1999-03-23) abstract; figures -----	

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in 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.

G document member of the same patent family

Date of the actual completion of the international search

14 June 2002

Date of mailing of the international search report

11/07/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040. Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

SERRANO GALARRAGA, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 02/00272

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 4229604	A	10-03-1994	DE 4229604 A1	10-03-1994
			AT 149135 T	15-03-1997
			DE 59305544 D1	03-04-1997
			DK 620796 T3	01-09-1997
			WO 9405558 A1	17-03-1994
			EP 0620796 A1	26-10-1994
			ES 2101336 T3	01-07-1997
US 4458820	A	10-07-1984	NONE	
US 4729487	A	08-03-1988	NONE	
US 5884788	A	23-03-1999	AU 740205 B2	01-11-2001
			AU 1999899 A	05-07-1999
			CA 2314273 A1	24-06-1999
			EP 1040048 A1	04-10-2000
			JP 2002508285 T	19-03-2002
			NZ 505739 A	21-12-2001
			WO 9930977 A1	24-06-1999

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) RX001Box No. I TITLE OF INVENTION
RECIPIENT CAP

Box No. II APPLICANT

☒ This person is also inventor

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

CERRACCHIO MARCO
VIA GALILEO GALILEI 328
18038 SANREMO (IM)
ITALY

Telephone No.

Facsimile No.

Teleprinter No.

Applicant's registration No. with the Office

State (that is, country) of nationality:
ITALYState (that is, country) of residence:
ITALYThis person is applicant
for the purposes of:all designated
Statesall designated States except
the United States of Americathe United States
of America onlythe States indicated in
the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:



applicant only



applicant and inventor

inventor only (If this check-box
is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant
for the purposes of:all designated
Statesall designated States except
the United States of Americathe United States
of America onlythe States indicated in
the Supplemental Box☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:



agent

common
representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

ALLAIX ROBERTO
FERRANIA SPA
VIA DELLA LIBERTA' 57
17014 FERRANIA (SV) - ITALY

Telephone No.

+39-019-522-4146

Facsimile No.

+39-019-522-4293

Teleprinter No.

Agent's registration No. with the Office

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. V DESIGNATION OF STATES

Mark the applicable check-boxes below; at least one must be marked.

The following designations are hereby made under Rule 4.9(a):

Regional Patent

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT (if other kind of protection or treatment desired, specify on dotted line)
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH & LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | | |
|--|--|---|
| ☐ AE United Arab Emirates | ☐ GM Gambia | ☒ NZ New Zealand |
| ☐ AG Antigua and Barbuda | ☒ HR Croatia | ☐ OM Oman |
| ☒ AL Albania | ☒ HU Hungary | ☒ PH Philippines |
| ☐ AM Armenia | ☒ ID Indonesia | ☒ PL Poland |
| ☐ AT Austria | ☒ IL Israel | ☐ PT Portugal |
| ☒ AU Australia | ☒ IN India | ☒ RO Romania |
| ☐ AZ Azerbaijan | ☒ IS Iceland | ☐ RU Russian Federation |
| ☒ BA Bosnia and Herzegovina | ☒ JP Japan | |
| ☐ BB Barbados | ☐ KE Kenya | ☐ SD Sudan |
| ☒ BG Bulgaria | ☐ KG Kyrgyzstan | ☐ SE Sweden |
| ☒ BR Brazil | ☒ KP Democratic People's Republic of Korea | ☒ SG Singapore |
| ☐ BY Belarus | ☒ KR Republic of Korea | ☒ SI Slovenia |
| ☐ BZ Belize | ☐ KZ Kazakhstan | ☒ SK Slovakia |
| ☒ CA Canada | ☐ LC Saint Lucia | ☐ SL Sierra Leone |
| ☐ CH & LI Switzerland and Liechtenstein | ☒ LK Sri Lanka | ☐ TJ Tajikistan |
| ☒ CN China | ☒ LR Liberia | ☐ TM Turkmenistan |
| ☒ CO Colombia | ☐ LS Lesotho | ☒ TN Tunisia |
| ☒ CR Costa Rica | ☒ LT Lithuania | ☒ TR Turkey |
| ☒ CU Cuba | ☐ LU Luxembourg | ☐ TT Trinidad and Tobago |
| ☒ CZ Czech Republic | ☒ LV Latvia | |
| ☐ DE Germany | ☒ MA Morocco | ☐ TZ United Republic of Tanzania |
| ☐ DK Denmark | ☒ MD Republic of Moldova | ☒ UA Ukraine |
| ☒ DM Dominica | ☒ MG Madagascar | ☐ UG Uganda |
| ☒ DZ Algeria | ☒ MK The former Yugoslav Republic of Macedonia | ☒ US United States of America |
| ☒ EC Ecuador | ☐ MN Mongolia | ☐ UZ Uzbekistan |
| ☒ EE Estonia | ☐ MW Malawi | ☒ VN Viet Nam |
| ☐ ES Spain | ☒ MX Mexico | ☒ YU Yugoslavia |
| ☐ FI Finland | ☐ MZ Mozambique | ☒ ZA South Africa |
| ☐ GB United Kingdom | ☒ NO Norway | ☐ ZM Zambia |
| ☐ GD Grenada | | ☐ ZW Zimbabwe |
| ☒ GE Georgia | | |
| ☐ GH Ghana | | |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:

- | | | |
|--------------------------|--------------------------|--------------------------|
| ☐ | ☐ | ☐ |
| ☐ | ☐ | ☐ |

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) 17.01.2001	SV2001A000003	IT		
item (2)				
item (3)				
item (4)				
item (5)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as:

☐ all items ☐ item (1) ☐ item (2) ☐ item (3) ☐ item (4) ☐ item (5) ☐ other, see Supplemental Box

* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / EP

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year) Number Country (or regional Office)

Box No. VIII DECLARATIONS

The following declarations are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):

		Number of declarations
☐ Box No. VIII (i)	Declaration as to the identity of the inventor	:
☐ Box No. VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	:
☐ Box No. VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	:
☒ Box No. VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America)	:
☐ Box No. VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	:

22 21

Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)
The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

**Declaration of inventorship (Rules 4.17(iv) and 51bis.1(a)(iv))
for the purposes of the designation of the United States of America:**

I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/..... (if furnishing declaration pursuant to Rule 26ter).

I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.

I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority, and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America, including any PCT international application designating at least one country other than the United States of America, having a filing date before that of the application on which foreign priority is claimed.

Prior Applications: SV2001000003, IT, 17.01.2001

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name: CERRACCHIO MARCO

Residence: SANREMO, ITALY

(city and either US state, if applicable, or country)

Mailing Address: VIA GALILEO GALILEI 328

I - 18038 SANREMO

Citizenship: ITALY

Inventor's Signature: *Cerracchio Marco*
(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent)

Date: 11.01.2002

(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

Name:

Residence:

(city and either US state, if applicable, or country)

Mailing Address:

Citizenship:

Inventor's Signature:
(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent)

Date:

(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

☐ This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

Box No. IX CHECK LIST; LANGUAGE OF FILING

This international application contains:

(a) the following number of sheets in paper form:

request (including declaration sheets) : 5
 description (excluding sequence listing part) : 5
 claims : 2
 abstract : 1
 drawings : 7

Sub-total number of sheets : 20

sequence listing part of description (actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (b) below) :

Total number of sheets : 20

(b) sequence listing part of description filed in computer readable form

(i) ☐ only (under Section 801(a)(i))(ii) ☐ in addition to being filed in paper form (under Section 801(a)(ii))

Type and number of carriers (diskette, CD-ROM, CD-R or other) on which the sequence listing part is contained (additional copies to be indicated under item 9(ii), in right column):

This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):

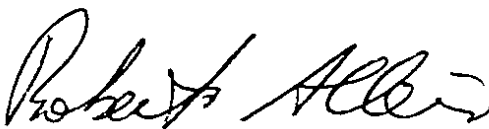
- | | | |
|---|---|---|
| 1. ☒ fee calculation sheet | : | 1 |
| 2. ☒ original separate power of attorney | : | 1 |
| 3. ☐ original general power of attorney | : | |
| 4. ☐ copy of general power of attorney; reference number, if any: | : | |
| 5. ☐ statement explaining lack of signature | : | |
| 6. ☒ priority document(s) identified in Box No. VI as item(s): | : | 1 |
| 7. ☐ translation of international application into (language): | : | |
| 8. ☐ separate indications concerning deposited microorganism or other biological material | : | |
| 9. ☐ sequence listing in computer readable form (indicate also type and number of carriers (diskette, CD-ROM, CD-R or other)) | : | |
| (i) ☐ copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application) | : | |
| (ii) ☐ (only where check-box (b)(i) or (b)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter | : | |
| (iii) ☐ together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column | : | |
| 10. ☒ other (specify): Translation of priority document | : | 1 |

Figure of the drawings which should accompany the abstract: 7

Language of filing of the international application: ENGLISH

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).


 ROBERTO ALLAIX, AGENT

For receiving Office use only		2. Drawings: ☐ received: ☐ not received:
1. Date of actual receipt of the purported international application:		
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA /	6. ☐ Transmittal of search copy delayed until search fee is paid	

For International Bureau use only	
Date of receipt of the record copy by the International Bureau:	

24 23

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:
IPEA/EP

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION	
Applicant's or agent's file reference RX001	
International application No. PCT/EP 02/00272	International filing date (day/month/year) 14/01/2002
(Earliest) Priority date (day/month/year) 17/01/01	
Title of invention TAMPER-PROOF CONTAINER CAP	
Box No. II APPLICANT(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) CERRACCHIO MARCO VIA GALILEO GALILEI 328 18038 SANREMO (IM) ITALY	Telephone No.
	Facsimile No.
	Teleprinter No.
	Applicant's registration No. with the Office
State (that is, country) of nationality: ITALY	State (that is, country) of residence: ITALY
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
State (that is, country) of nationality:	State (that is, country) of residence:
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
State (that is, country) of nationality:	State (that is, country) of residence:
☐ Further applicants are indicated on a continuation sheet.	

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representative
 and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.
☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.
☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: (Family name followed by given name; for a legal entity, full official designation.
 The address must include postal code and name of country.)

ALLAIX ROBERTO
 FERRANIA SPA
 VIA DELLA LIBERTA' 57
 17014 FERRANIA (SV) - ITALY

Telephone No.
 +39-019-522-4146

Facsimile No.
 +39-019-522-4293

Teleprinter No.

Agent's registration No. with the Office

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filed

the description ☐ as originally filed
☐ as amended under Article 34

the claims ☐ as originally filed
☐ as amended under Article 19 (together with any accompanying statement)
☐ as amended under Article 34

the drawings ☐ as originally filed
☐ as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). (This check-box may be marked only where the time limit under Article 19 has not yet expired.)

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: ENGLISH

☒ which is the language in which the international application was filed.

☐ which is the language of a translation furnished for the purposes of international search.

☐ which is the language of publication of the international application.

☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The applicant hereby elects all eligible States (that is, all States which have been designated and which are bound by Chapter II of the PCT)

excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (specify) | : | sheets |

For International Preliminary
Examining Authority use only

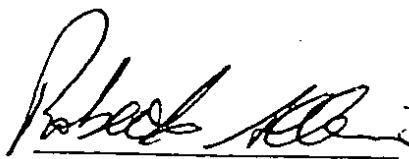
- | | |
|--------------------------|--------------------------|
| received | not received |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |

The demand is also accompanied by the item(s) marked below:

- | | |
|---|--|
| 1. ☒ fee calculation sheet | 5. ☐ statement explaining lack of signature |
| 2. ☐ original separate power of attorney | 6. ☐ sequence listing in computer readable form |
| 3. ☐ original general power of attorney | 7. ☐ other (specify): |
| 4. ☐ copy of general power of attorney;
reference number, if any: | |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).


ROBERTO ALLAIX, AGENT

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due
to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months
from the priority date and item 4 or 5, below, does not apply.

☐ The applicant has been
informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of
Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival
is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

PATENT COOPERATION TREATY

91.527
26

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

Allaix, Roberto
FERRANIA SPA
Via Della Liberta' 57
17014 Ferrania (SV)
ITALIE

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing (day/month/year) 23/10/2002	
Applicant's or agent's file reference RX001	IMPORTANT NOTIFICATION
International application No. PCT/EP 02/ 00272	International filing date (day/month/year) 14/01/2002
Priority date (day/month/year) 17/01/2001	
Applicant CERRACCHIO, Marco	

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

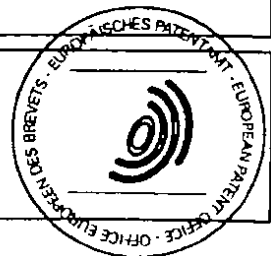
The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/ European Patent Office D-80298 Munich Tel. (+49-89) 2399-0, Tx: 523656 epmu d Fax: (+49-89) 2399-4465	Authorized officer MARRA E Tel. (+49-89) 2399 2828
---	--



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference RX001	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 02/ 00272	International filing date (day/month/year) 14/01/2002	Priority date (day/month/year) 17/01/2001
International Patent Classification (IPC) or national classification and IPC B65D41/34		
Applicant CERRACCHIO, Marco		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This **REPORT** consists of a total of 2 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consists of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 01/08/2002	Date of completion of this report 19/10/2002
Name and mailing address of the IPEA/  European Patent Office D-80298 Munich Tel. (+49-89) 2399-0, Tx: 523656 epmu d Fax: (+49-89) 2399-4465	Authorized officer ZIDI K Tel. (+49-89) 2399 2828



I. Basis of the report

The basis of this international preliminary examination is the application as originally filed.

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability

In light of the documents cited in the international search report, it is considered that the invention as defined in the claims meets the criteria mentioned in Article 33 (1) PCT, i.e. it appears to be novel, to involve an inventive step and to be industrially applicable.

PATENT COOPERATION TREATY

70
29

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

To:

FERRANIA SPA
Attn. Allaix, Roberto
Via Della Liberta' 57
17014 Ferrania (SV)
ITALYDate of mailing
(day/month/year)

11/07/2002

Applicant's or agent's file reference

RX001

FOR FURTHER ACTION

See paragraphs 1 and 4 below

International application No.

PCT/EP 02/00272

International filing date
(day/month/year)

14/01/2002

Applicant

CERRACCHIO, Marco

- 1.
- ☒
- The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.**Where?** Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35**For more detailed instructions, see the notes on the accompanying sheet.**

- 2.
- ☐
- The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

- 3.
- ☐
- With regard to the protest**
- against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

- 4.
- Further action(s):**
- The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority

European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

John Berry

31-30

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

32
31

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

PCT

43 32

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference RX001	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/EP 02/00272	International filing date (day/month/year) 14/01/2002	(Earliest) Priority Date (day/month/year) 17/01/2001
Applicant CERRACCHIO, Marco		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 02 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

TAMPER-PROOF CONTAINER CAP

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

7



None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/00272

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B65D41/34 B65D51/16 B65D55/02 B65D50/04

33

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 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, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 42 29 604 A (MERCK PATENT GMBH) 10 March 1994 (1994-03-10) abstract; figures 4,5	1
A	US 4 458 820 A (ABRAMS MARTIN) 10 July 1984 (1984-07-10) abstract; figures	1
A	US 4 729 487 A (WRIGHT FRANK S) 8 March 1988 (1988-03-08)	
A	US 5 884 788 A (WILDE SHELDON L) 23 March 1999 (1999-03-23) abstract; figures	

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in 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.

8 document member of the same patent family

Date of the actual completion of the international search

14 June 2002

Date of mailing of the international search report

11/07/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

SERRANO GALARRAGA, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 02/00272

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 4229604	A	10-03-1994	DE 4229604 A1	10-03-1994
			AT 149135 T	15-03-1997
			DE 59305544 D1	03-04-1997
			DK 620796 T3	01-09-1997
			WO 9405558 A1	17-03-1994
			EP 0620796 A1	26-10-1994
			ES 2101336 T3	01-07-1997
US 4458820	A	10-07-1984	NONE	
US 4729487	A	08-03-1988	NONE	
US 5884788	A	23-03-1999	AU 740205 B2	01-11-2001
			AU 1999899 A	05-07-1999
			CA 2314273 A1	24-06-1999
			EP 1040048 A1	04-10-2000
			JP 2002508285 T	19-03-2002
			NZ 505739 A	21-12-2001
			WO 9930977 A1	24-06-1999

United States Patent [19]
Wright

[11] Patent Number: 4,729,487
[45] Date of Patent: Mar. 8, 1988

[34] PUSH AND LOCK CHILD-RESISTANT
CLOSURE

[76] Inventor: Frank S. Wright, 109 W. 7th Ave.,
Dayton, Tenn. 37321

[21] Appl. No.: 53,019

[22] Filed: May 22, 1987

[51] Int. Cl.⁴ B65D 53/02

[52] U.S. Cl. 215/220; 215/219

[58] Field of Search 220/219, 220, 222

[56] References Cited

U.S. PATENT DOCUMENTS

4,011,960	3/1977	Mauverney et al.	215/220
4,103,797	8/1978	Morris	215/209
4,285,437	8/1981	Morris	215/220
4,346,809	8/1982	Kusz	215/214
4,393,977	7/1983	Willingham	215/211
4,394,916	7/1983	Smalley	215/220
4,433,789	2/1984	Gibilisco	215/220
4,690,292	9/1987	Hemming	215/219

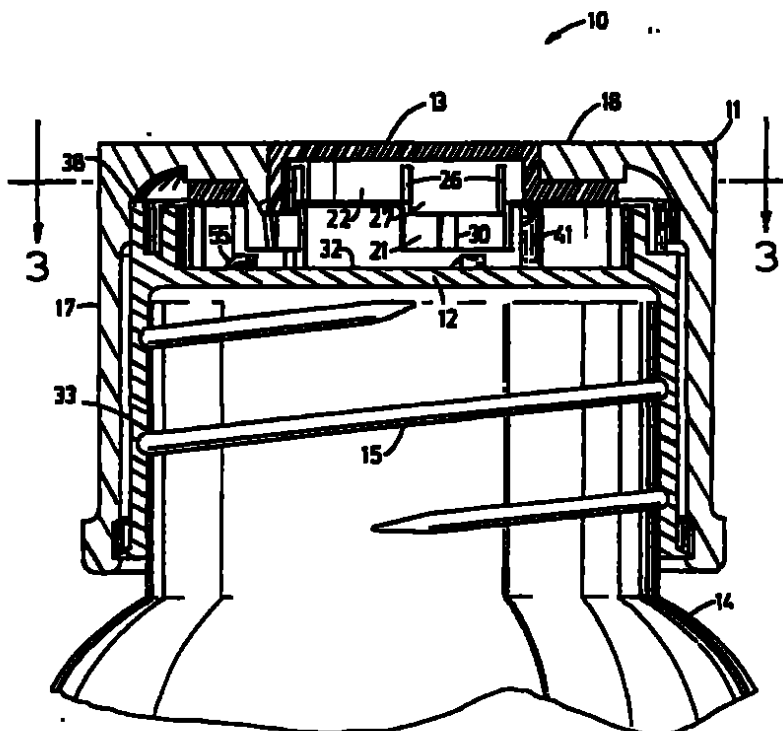
Primary Examiner—George T. Hall

[57] ABSTRACT

A closure assembly is rotationally free in a child-resistant mode and is provided with a push-button to convert the closure to an operational mode. The closure assem-

bly employs an inner cap, an outer cap, and a push-button selector assembled in a permanent nested configuration. A top portion of the selector is moveably received through an outer cap opening while lugs depending from the bottom surface of the outer cap are received by selector bottom portion slots to form a rotationally locked engagement, yieldingly radially flexible selector locking arms include a lip portion engaged within cam detents formed within the lugs and hold the selector in an axial outward position wherein rotating the outer cap transmits no rotational torque to the inner cap, depressing the selector causes the lips to track the cam detents and the lips snap outward under the lugs when the selector is fully depressed wherein selector rotational driving means are in an axial engageable relationship with inner cap rotational driving means. Subsequently depressing the outer cap causes the lugs to force the lips inward; when the lugs contact the top of the inner cap the lips are again engaged within the cam detents wherein the cam detents translate the radially outward biasing force of the locking arms to axial outward biasing force and cause the selector to return to the first position.

15 Claims, 13 Drawing Figures



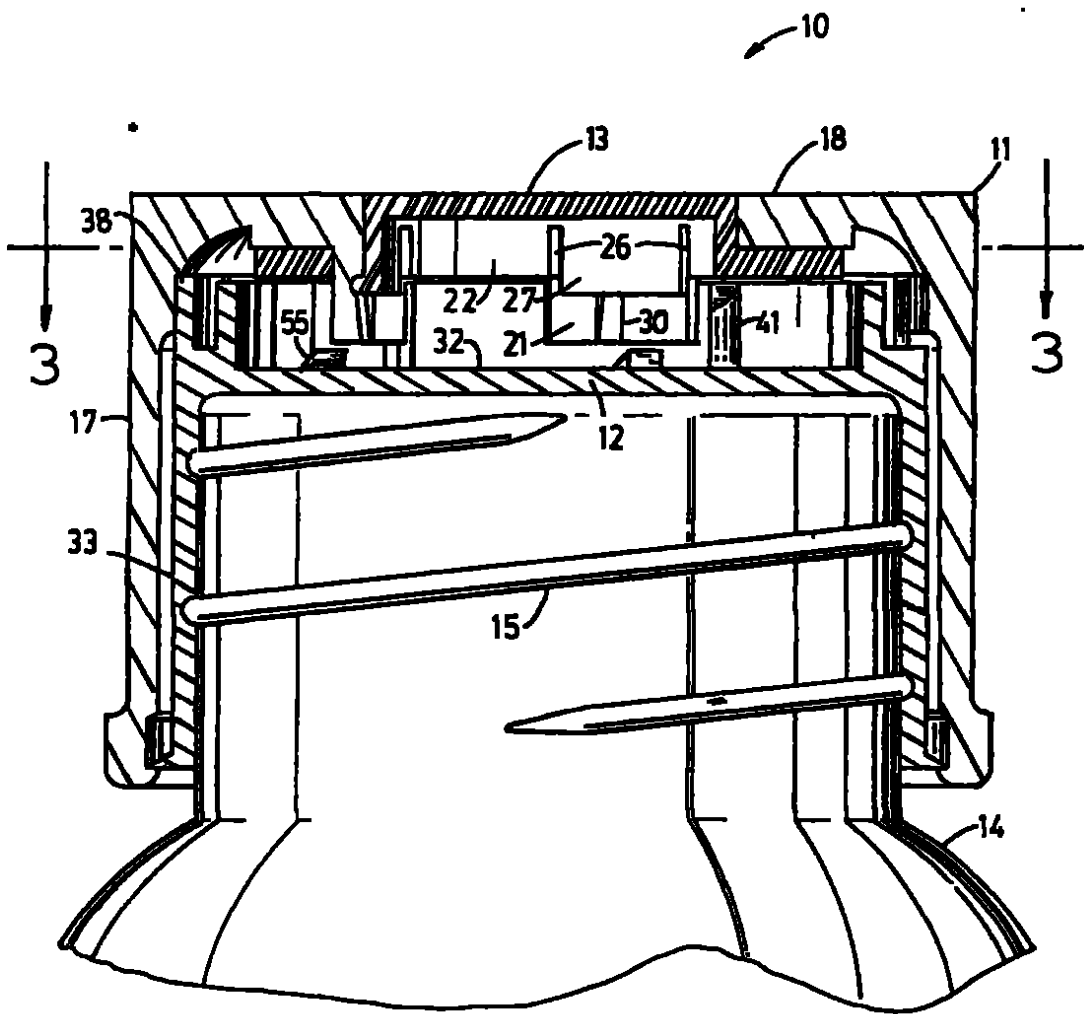
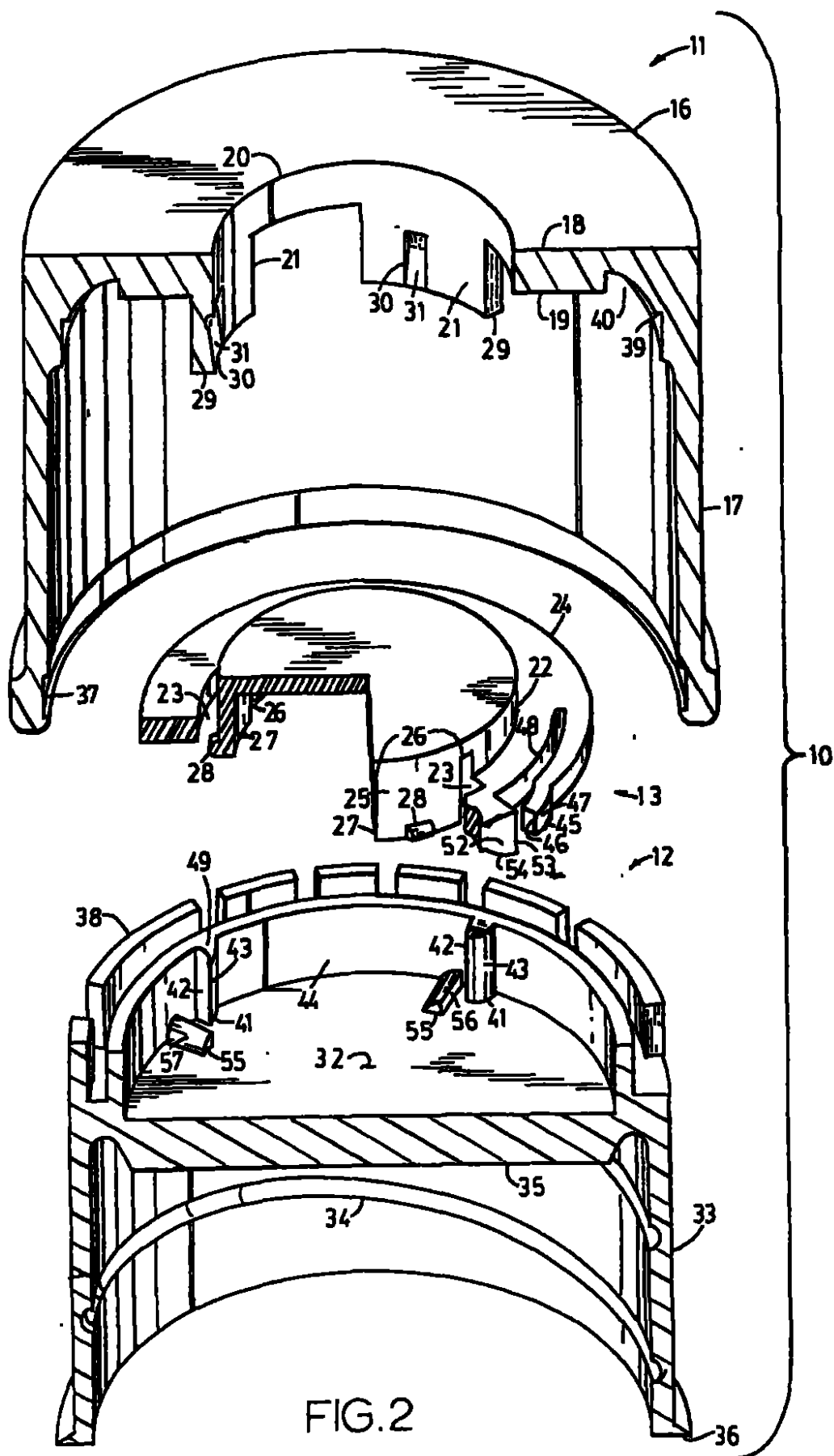


FIG.1

37/36



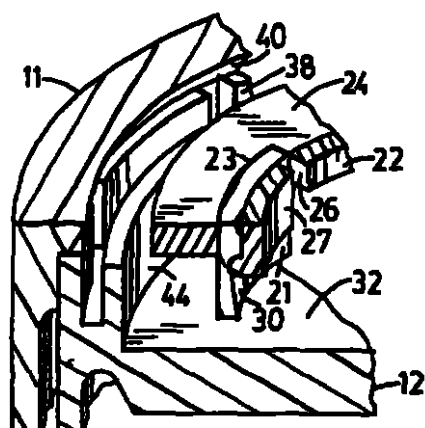


FIG. 3

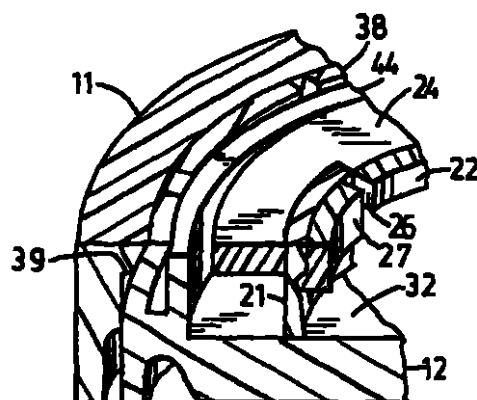


FIG. 4

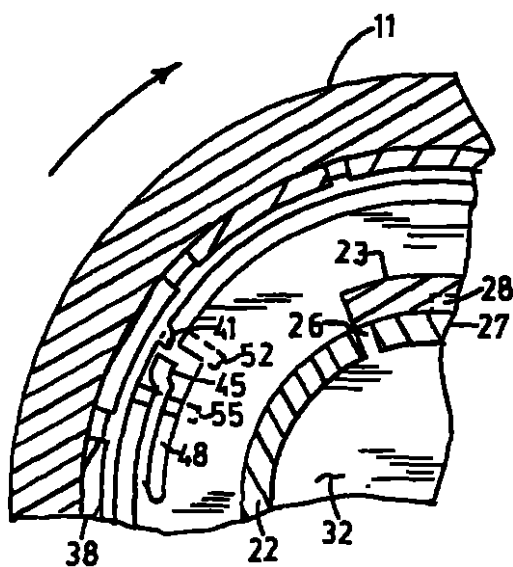
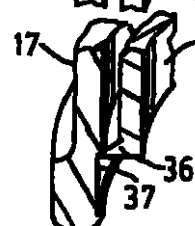


FIG. 5

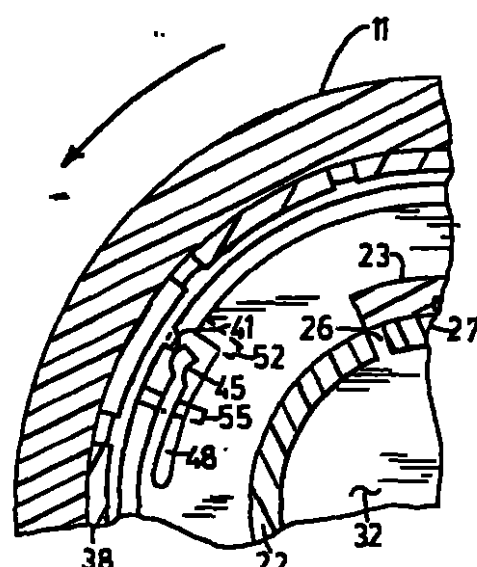


FIG. 6

5837

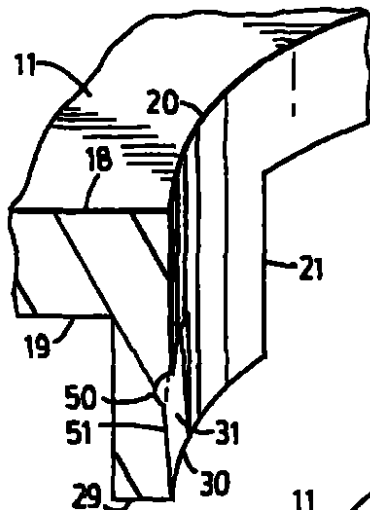


FIG. 7

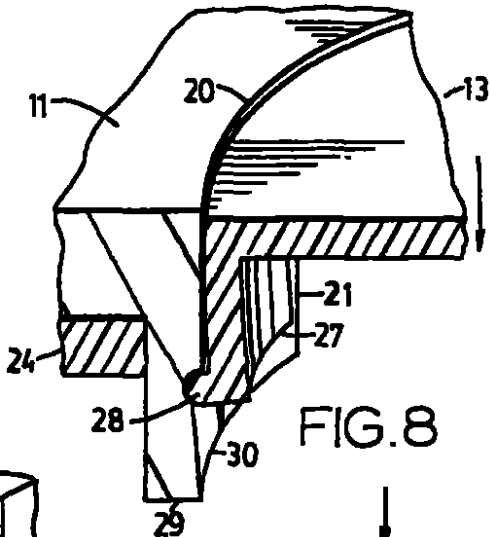


FIG. 8

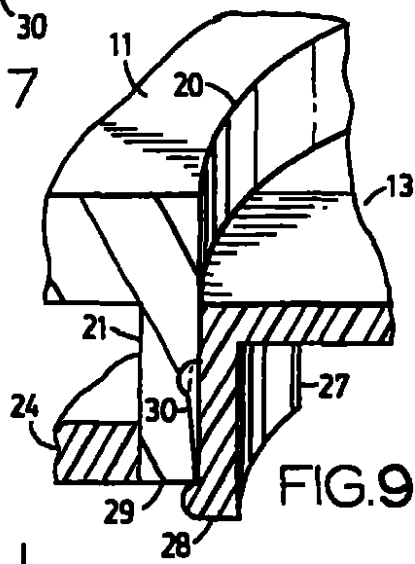


FIG. 9

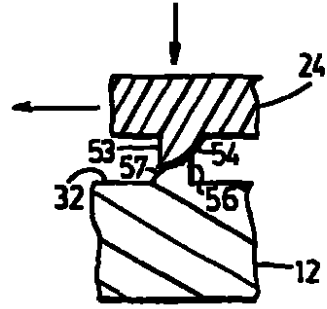


FIG. 10

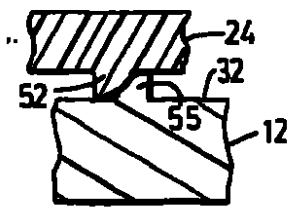


FIG. 11

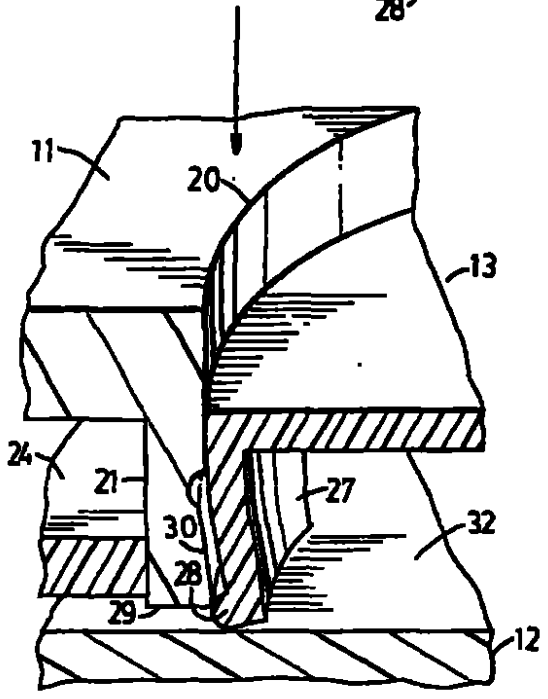


FIG. 12

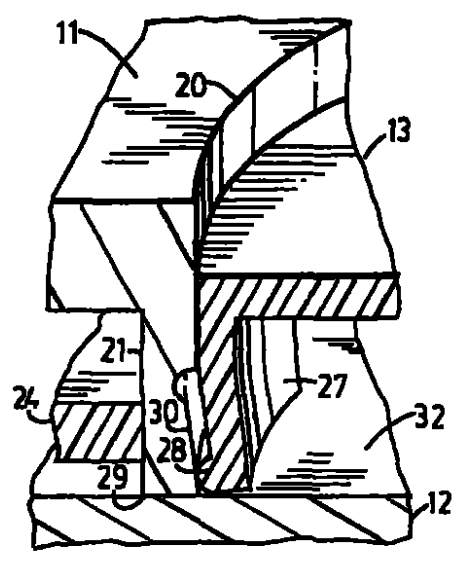


FIG. 13

PUSH AND LOCK CHILD-RESISTANT CLOSURE

BACKGROUND

1. Field of the Invention

The present invention relates to a container closure which has "child-resistant" and "not child-resistant" positions.

2. Background-Description of the Prior Art

Many types of container closures that are difficult for young children to operate have been known in prior art and are generally designated as "child-resistant" closures. It is often the case, however, that the means employed to render a closure "child-resistant" makes the closure difficult to operate by adult users, especially in the case where a physical disability caused by either a physical injury to the hand or a disease process such as arthritis, as by way of example, decreases manual dexterity. Accordingly, many pharmaceutical companies provide "not child-resistant" closures for their product containers and many adults request "not child-resistant" closures for prescription medicine containers.

In response to many adults not wanting "child-resistant" closures for product containers, closures having "child-resistant" and "not child-resistant" positions have been disclosed in prior art such as the closure assembly disclosed by U.S. Pat. No. 4,346,809 to Kusz. Kusz discloses a "child-resistant" closure assembly that utilizes a resilient liner, that, when employed in one relative angular orientational alignment renders the closure "child-resistant," but may be removed and replaced in a particular angular orientational alignment to render the closure "not child-resistant." U.S. Pat. No. 4,103,797 to Morris discloses a unitary reversible closure for sealing a container that, when applied in one direction forms a "child-resistant" closure and when reversed end for end and reapplied to the container is "not child-resistant." Many adults, however, do not return closures to a "child-resistant" position because of the difficulty involved or subsequent difficulty in removing the closure.

Another type of "child-resistant" closure assembly that is known in the prior art employs two or more closure members assembled in a permanent nested configuration. While many such closure assemblies are operated by two simultaneous movements, such as depressing the closure assembly while turning and are therefore difficult to operate by many adults, several closure assemblies are disclosed that employ means to simplify their operation. For example, U.S. Pat. No. 4,285,437 to Morris, discloses a closure assembly comprising two nested closure members assembled in a fixed axial relationship by a rotationally free engagement whereby the closure members rotate freely relative to each other. A push button tab formed therewith the outer closure member may be depressed when the outer closure member is in a particular angular orientational alignment to provide transmission of opening rotational torque to the inner closure member for subsequent removal of the closure assembly. When the closure is reapplied to the container, tightening the closure causes the tab to automatically return to the "child-resistant" position. Once a child learns the particular angular orientational alignment necessary to depress the tab and operate the closure, however, it is as easy for the child to operate the closure as the ease required by adult users.

It is also known in the prior art to provide a "child-resistant" closure and container assembly wherein the closure assembly may be converted to a "not child-resistant" position as exemplified by U.S. Pat. No. 4,393,977 to Willingham. Willingham discloses a closure-container assembly wherein axial pressure may be applied through an opening in the outer closure member to disengage an inner closure member from the container, wherein the closure assembly may be subsequently lifted from the container. Willingham's closure container assembly anticipates using a single axial movement to move the closure assembly to a "not child-resistant" position, but the closure assembly is of use only with the disclosed container and is not adaptable for use on containers employing closure rotational engagement means, such as, by way of example, containers with a threaded-neck portion.

As far as is known, it is not known in the prior art to provide a "child-resistant closure" assembly, for use on containers employing closure rotational engagement means, that may be moved to a "not child-resistant" position when the closure is in any relative angular orientational alignment by a single axial movement, remains in the "not child-resistant" position during subsequent use, and which can be returned to a "child-resistant" position by a further application of a single axial movement.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a closure assembly adaptable for use on containers employing closure rotational engagement means, wherein the closure assembly, in a "child-resistant" position rotates freely and cannot be removed from the container, but may be moved to a "not child-resistant" position by adult users by the application of a single axial movement for the subsequent removal thereof, by rotating the closure assembly. The closure assembly is comprised of an outer cap, an inner cap, and a push button selector assembled in a permanent nested configuration. An upstanding portion of the push button selector is movably received through an opening in the outer cap and is rotationally locked therewith by outer cap axial locking lugs depending from the periphery of the outer cap opening movably received therethrough selector bottom portion slots. Formed within the included angle of the selector bottom portion slots, radially inwardly flexible selector axial locking arms include a bottom lip portion engaged within outer cap axial locking lug cam detents and retains the selector in an axial relative outward first position. The outer-cap selector assembly engages telescopically over the inner cap and has a rotationally free engagement therewith including an intergaging annular tongue-and-groove whereby the outer cap-selector assembly rotates freely about the inner cap and transmits no rotational torque thereto. In any relative angular orientational alignment, axial pressure applied thereto the top of the selector through the outer cap opening, causes the selector axial locking lug lips to track (follow) the cam detents axially outward (relative to the cam detents) as the cam detents cammingly cause the locking arms to bend radially inward. The selector is in an axial relative inward second position when the selector locking arm lips track therebelow the outer cap locking lug, and the radially inwardly bent selector locking arms snap radially outward causing the lips to engage thereunder the locking lugs. Selector rotational driving means are in a relative

axial engageable position in the selector axial relative inward second position and drivingly engage inner cap rotational driving means by rotating the outer cap whereby the closure assembly functions as a screw-type closure.

Yet another object of the present invention is to provide a closure assembly that is relatively easy to operate by adult users and relatively difficult to operate by children. The closure assembly is moved to a "not child-resistant" position by the application of a single axial inward force applied to the selector which is easy for adults but is difficult for young children because of the shape of the cam detents. The outer cap axial locking lug cam detents include a radially convexed outward axial inward first portion requiring the application of a proportionally increasing force applied to the selector before the locking arm lips can track the remaining portion of the cam detents. With the application of sufficient axial force, the selector "snaps" to the axial relative inward second position as opposed to moving axially inward in direct proportion to the amount of force applied. The selector, however, can only be depressed to the axial relative inward second position by depressing the selector without pressing inward on the outer cap. The outer cap-selector assembly is held in an axial relative outward first position by inner cap upstanding spring elements engaged under an outer cap, top portion bottom surface annular rim. Depressing the outer cap causes the spring elements to disengage the rim and bend radially inward and, acting conjointly with the outer cap skirt annular groove, allows the outer cap-selector assembly to move axially inward relative to the inner cap until the outer cap axial locking lugs contact the top of the inner cap. It is a salient feature of the present invention that the selector opening rotational driving means are not in axial relative engageable position by depressing the outer cap and further, the selector axial locking arm lips cannot engage thereunder the outer cap axial locking lugs when the outer cap is depressed. A child trying to depress the selector and having difficulty doing so, will invariably try and depress the selector while applying simultaneous force to the outer cap, and thereby be unable to lock the selector in the axial relative inward second position; upon releasing the force, the locking lug cam detents cause the selector to return to the axial relative outward first position (relative to the outer cap) while the inner cap spring elements yieldingly cause the outer cap-selector assembly to return to the axial relative outward first position (relative to the inner cap).

Yet another object of the present invention is to provide a closure assembly which remains in the "not child-resistant" position during use but is easily returned to a "child-resistant" position. When the selector is in the axial relative inward (i.e., "not child-resistant") position, there is no axial outward biasing force acting on the selector so adult users not wanting a "child-resistant" closure may leave the closure in this position indefinitely. Noting the closure is in a "not child-resistant" position from seeing that the selector is depressed or feeling the top of the closure, an adult can easily return the closure to the "child-resistant" position by depressing the outer cap. As mentioned previously, depressing the outer cap causes the outer cap axial locking lugs to move axially inward until contacting the top of the inner cap. When the selector is in the axial relative inward second position and the outer cap is depressed, the slightly rounded top surface of the selector

axial locking arm lips cause the lips to move radially inward as the locking lugs move axially inward. When the locking lugs contact the top of the inner cap, the locking arm lips are engaged within the bottom portion of the cam detents, and the radially inwardly bent locking arms cause the selector to move axially outward as the lips track the cam detents radially outward and axially inward. The ease of converting the closure assembly between the two positions encourages adults to leave the closure in a "child resistant" position or return the closure to this position whenever there are children present.

Other objects advantages and features of the present invention will become apparent to those ordinarily skilled in the art from the following detailed description taken in conjunction with the annexed drawings, wherein, by way of example, certain preferred embodiments of the present invention are illustrated.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an axial sectional view of the present invention secured thereto the neck portion of a container, the closure assembly depicted in a child-resistant mode.

FIG. 2 is an exploded, radially sectioned, perspective view of the members of the closure assembly, of the present invention.

FIG. 3 is a perspective view of a portion of FIG. 1, further sectioned along line 3-3, showing an outer cap locking lug depending through a selector bottom portion slot, and a co-acting selector axial locking arm lip and locking lug cam detent in the closure assembly child-resistant mode.

FIG. 4 is a view similar to FIG. 3, but showing the outer cap member in the axial relative inward second position thereby carrying selector closing rotational driving means to an axial engageable position.

FIG. 5 is a top plan view of FIG. 4, illustrating a selector closing tooth drivingly engaging an inner cap closing lug by rotating the outer cap in the closure assembly closing rotational direction indicated by the arrow.

FIG. 6 is the same view as FIG. 5, but showing the selector closing tooth ratcheting past an inner cap closing lug by rotating the outer cap in the closure assembly removal rotational direction indicated by the arrow.

FIG. 7 is an enlargement view through the outer cap axial locking lug and cam detent illustrated in FIG. 2.

FIG. 8 is a view similar to FIG. 7, but including the corresponding portion of the selector member, illustrating the camming motion of the cam detent illustrated in FIG. 7 thereto the selector axial locking arm lip by an axial inward force applied thereto the selector, the relative motion being illustrated by arrows.

FIG. 9 is a view similar to FIG. 8, but showing the selector member in the axial relative inward second position illustrating the selector axial locking arm lip engaged thereunder the outer cap locking lug and the axial position of the selector disc portion.

FIG. 10 is a fragmentary axial sectional view through opening rotational driving means in an obstructive angular orientational alignment, illustrating selector relative rotational movement by arrows as the selector moves inward.

FIG. 11 is the same view shown in FIG. 10, but depicting the relative angular orientational positions of the opening rotational driving means when the selector reaches the axial relative inward second position.

FIG. 12 is a view similar to FIG. 9, but showing the selector axial locking arm lip being forced to move radially inward by depressing the outer cap, the movement being shown by arrows.

FIG. 13 is a view similar to FIG. 12, but depicting the selector axial locking arm lip illustrated in FIG. 12 engaged therein the outer cap axial locking lug cam detent when the outer cap has been depressed to the axial relative inward second position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the drawings wherein like numerals designate like parts, and referring first to FIG. 1, there is shown a convertible child-resistant closure assembly 10 comprised of an outer cap 11, an inner cap 12, and a push button selector 13 assembled in a permanent nested configuration. Preferably, the parts comprising the closure assembly are formed of thermoplastic material by injection molding, but the closure assembly is useful on containers formed of plastic, glass, or the like, such as illustrated container 14 wherein the inner cap is adapted to engage container threaded neck portion 15 to secure the closure thereto. As will become apparent in the following detailed disclosure, the present invention contemplates a means of selectively transmitting rotational torque therebetween the outer and inner caps, and, as such, any means of securing the closure thereto a container by employing a rotational movement of the inner cap may be used.

In reference to FIG. 2 to describe the construction of the various portions of the closure assembly, it is shown that outer cap 11 is comprised of a circular top portion 16 and an annular skirt 17 depending from the periphery thereof. Top portion 16 includes a top surface 18 and a bottom surface 19 with a centrally located opening 20 therebetween. Formed therewith bottom surface 19, axial locking lugs 21 depend from the periphery of opening 20 for a distance to be presently described. Upstanding cylinder portion 22 of selector 13 is received moveably by outer cap opening 20 while outer cap axial locking lugs 21 are received moveably by cooperatively spaced selector slots 23 (FIGS. 3-6) thereby forming a rotationally locked engagement therebetween the outer cap and selector.

Selector 13 is integrally formed as one-piece comprising of said cylinder portion 22 and a bottom disc-shaped portion 24 as the main components thereof. Said selector slots 23 are formed therethrough disc portion 24 and include an interior radial circumferential surface 25 coexistent with the exterior surface of cylinder 22. Within the included angle of at least one slot 23, a pair of axially extending slots 26 therethrough cylinder 22, beginning at a point slightly below the top of the cylinder and continuing downward therefrom, describes a resiliently radial flexible selector axial locking arm 27, at least one such arm including a bottom lip portion 28 extending radially outward for a portion of the radial width of cojointly formed slot 23. Each outer cap axial locking lug 21 adapted to be engaged therethrough a slot 23 wherein there is a locking arm 27 and a lip portion 28, includes a bottom face 29 and an integral cam detent 30 extending upwards therefrom. Locking arm lip portions 28 are received by locking lug cam detents 30 whereby contact therebetween cam detent faces 31 and the lips retain the selector in an axial relative outward first position. It is illustrated in FIG. 1 that selector locking arms 27 stand rigidly vertical and the top of

the selector is essentially in the same horizontal plane with outer cap top portion top surface 18 when the selector is in the axial relative outward first position.

A modification of the outer cap opening and selector cylinder portion (not shown) will also form a rotationally locked engagement therebetween the selector and outer cap. According to the modification, in top plan, the outer cap opening and selector upstanding top portion may be formed in the shape of an ellipse or rectangle, as by way of example, and the outer cap axial locking lugs may be omitted. Further, therewith, the modification, the locking lug cam detents may be formed therein the sides of the outer cap opening and cooperate with radially outwardly extending tabs formed thereon the modified selector upstanding portion to retain the selector in an axial relative outward first position. The modification is not the preferred form of the present invention, however, because it would make the cooperatively formed cam detents and selector tabs difficult to form so as to maintain their herein specified function.

The outer cap-selector assembly is engaged telescopically over the inner cap to form a permanent nested configuration as illustrated in FIG. 1. In reference to the construction of the inner cap shown in FIG. 2, it is illustrated that inner cap 12 includes a circular top portion 32 and an annular skirt 33 depending from the periphery thereof. Inner cap skirt 33 includes internal screw threads 34 adapted to engage a container screw threaded neck portion but may be adapted to include external screw threads (not shown) to engage a container internally threaded neck portion. Further, inner cap top portion 32 may include a bottom surface 35 formed in the shape of a plug to provide a moisture-proof seal therewith a container mouth portion. The outer cap-selector assembly has a rotationally free engagement therewith the inner cap (FIGS. 1,2,4) including an annular tongue 36 extending radially outward from inner cap skirt 33 engaged therein annular groove 37 formed on the interior surface of outer cap skirt 17. Upstanding circumferentially spaced spring elements 38, formed along the periphery of inner cap top portion 32, engage outer cap top portion bottom surface annular rim 39 and retains the outer cap-selector assembly in an axial relative outward first position wherein the outer cap selector assembly rotates freely and transmits no rotational torque to the inner cap.

The closure assembly is in a child-resistant mode when the push button selector is in the previously describe axial relative outward first position, but selector closing rotational driving means may be carried to an axial engageable position by depressing the outer cap. With reference to FIG. 4, in any relative angular orientational alignment, axial inward force applied thereto the outer cap causes, spring elements 38 to disengage annular rim 39 and bend radially inward allowing the outer cap to move axially inward. Outer cap top portion bottom surface groove 40 is provided to maintain unobstructive axial clearance therebetween said bent spring elements and bottom surface 19 as the outer cap moves axially inward helping to insure that the spring element maintain resiliency as they may easily obtain a permanent radially inwardly curve if caused to bend from contacting the bottom surface and subsequently be unable to yieldingly return the outer cap to the axial relative outward first position. The outer cap is in an axial relative inward second position when outer cap locking lugs 21 contact inner cap top portion 32.

Referring back to FIG. 2, inner cap top portion 32 includes upstanding closing lugs 41 (2 illustrated), adapted to rotate the inner cap in the closure assembly closing direction, circumferentially spaced in an arc equidistant from the center of the cap, the diameter of the arc being necessarily slightly greater than the diameter of the selector disc portion 24. The closing lugs include a substantially vertical engagement face 42 and a rounded body portion 43 extending radially outward therefrom the radially inward edge of the lug in the clockwise rotational direction. The lugs extend radially inward and are formed therewith annular ring 44 which is provided, according to one embodiment of the present invention, to give the lugs stability, but which may be omitted. Selector disc portion 24 includes at least one radially inwardly flexible closing tooth 45, extending radially outward in a curvilinear fashion from the exterior of the disc. Each closing tooth is formed therewith the disc includes a substantially vertical engagement face 46 and a curvilinear body portion 47 formed radially outward from a slot 48 therethrough a portion of the periphery of the disc. By depressing the outer cap to the axial relative inward second position illustrated in FIG. 4, selector disc portion 24 is carried axially inward relative to the inner cap thereinto the open area between the inner cap closing lugs. Selector closing teeth 45 drivingly engage inner cap closing lugs 41 by rotating the outer cap in the closure assembly closing rotational direction indicated by the directional arrow in FIG. 5, but the closing lug rounded body portion 43 causes the closing teeth curvilinear body portion 47 to bend radially inward therein disc portion slots 48 if the outer cap is rotated in the opening closure assembly rotational direction, FIG. 6. In the relative angular orientational alignment wherein the closing lugs 41 lie axially beneath the closing teeth 45, the radially inwardly and axially downwardly closing lug top bevel 49 (FIG. 2) causes the closing teeth curvilinear body portions 47 to bend radially inward to the like position shown in FIG. 6 as the outer cap is depressed.

Removal of the closure assembly is accomplished by first depressing the push button selector to an axial relative inward second position which can best be understood by first referring to the outer cap locking lug cam detent shown in axial cross section in FIG. 7. Cam detents 38 have an irregularly curved face 31 comprising a radially convexed outward axial inward portion 50 and a radially inwardly sloped portion 51 extending axially outward therefrom. The application of an axial inward force thereto the top of the selector causes selector locking arms 27 to bend radially inwardly relatively quickly as the locking arm lips 28 track (follow) the convex outward portion of the cam detent axially outward (relative to the cam detent, FIG. 8). A constant radially inwardly axially outwardly sloped cam detent face would allow the selector to move axially inward in a direct proportion to the amount of axially inwardly force applied thereto the selector because the locking arms would bend radially inwardly in direct proportion to the locking arm lip axial outward movement, whereas the disclosed radially convexed outward portion of the cam detent face requires a proportionally increasing force applied thereto the selector to cause subsequent inward movement. Sufficient axial inward force applied to the selector causes the selector locking arms 27 to bend radially inwardly to a distance wherein the locking arm lips 28 track axially therebeyond the radially convexed portion and quickly snap axially out-

ward past the locking lug bottom face 29. It is illustrated in FIG. 9 that the locking arm lip 28 has tracked axially outward therebeyond the locking lug bottom face 29 wherein the radially inwardly bent locking arm has snapped radially outward to cause the lip to engage thereunder the locking lug bottom face. The selector is in an axial relative inward second position when the locking arm lips have snapped thereunder the locking lug.

In a further reference to FIG. 2, selector opening teeth 52 depend from selector disc portion 24 and include a vertical engagement face 53 and a rounded body portion 54 extending axially upwards therefrom in the clockwise rotational direction (in top plan). Inner cap top portion opening lugs 55 (2 illustrated) include a vertical engagement face 56 and a rounded body portion 57 extending axially downward therefrom in the counter-clockwise rotational direction. The disclosed selector opening rotational driving means are not carried to an axial engageable position when the selector is carried axially inward by depressing the outer cap. Therefore, the axial depending length of the outer cap axial locking lugs is such to allow only the closing rotational driving means to be in an axial engageable position by depressing the outer cap. When the selector is depressed to the axial relative inward second position, rotating the outer cap in the closure assembly removal direction causes the selector opening teeth to drivingly engage the inner cap opening lugs thereby transmitting opening rotational torque thereto the inner cap. In the relative angular orientational alignment wherein the inner cap opening lugs lie axially beneath the selector opening teeth, the opening means rounded body portions 54 and 57 cause the rotationally locked selector-outer cap assembly to rotate slightly in the counter clockwise (opening) rotational direction as the selector moves inward. The axial cross sectional side view of a pair of opening means in an obstructive relative angular orientational alignment of FIG. 10 illustrates the resulting angular movement of the selector by the arrow as the selector is depressed, and, further, FIG. 11 illustrates the angular relationships of the same opening means when the selector reaches the axial relative inward second position. FIG. 11 also illustrates that the selector is in essentially the lowest axial position relative to the inner cap in the axial relative inward second position.

In a further reference to FIG. 2, it is illustrated that inner cap opening lugs 55 do not lie in the same angular plane therewith inner cap closing lugs 41, but rather form a counterclockwise rotational angle therewith, while vertical engagement faces 46 and 53 of selector rotational driving means 45 and 52 lie in a relatively closer angular plane. With the selector in the previously described axial relative inward second position, rotating the outer cap in the closure assembly removal (counterclockwise) rotational direction, the described angular placement of the inner cap rotational driving means allows the selector closing means to ratchet past the inner cap closing lugs before the opening means engage. In the relative angular orientational alignment wherein the opening means are engageable, subsequent rotation of the outer cap in either direction will cause either the opening or closing means to engage.

The closure assembly remains in an operational mode indefinitely during subsequent use, but can be returned to a rotationally free child-resistant mode by depressing the outer cap. Because the selector is in essentially the

closest axial position relative to the inner cap when in the axial relative inward second position (FIG. 11), depressing the outer cap causes outer cap locking lugs 21 to place axial inward force on selector locking arm lips 28. The locking arm lips are slightly rounded on the top causing locking arms 27 to bend radially inward as the locking lugs move axially inward as illustrated in FIG. 12. In reference to FIG. 13 when locking lug bottom face 29 contacts inner cap top portion 32, selector locking arm lip 28 is engaged within bottom portion 51 of cam detent 30. The function of lower portion 51 of cam detent 30 is to translate the radially outwardly biasing force of the bent selector arms to axially inward movement of the lips (relative to the cam detent) and axially outward movement of the selector. It will be appreciated by those skilled in the art of forming thermoplastic parts by the injection molding process, that the cam detents are easily formed in the depending lugs while forming the disclosed cam detent (requiring a radially sloped inward portion extending axially outward) in the side portion of an opening would require the use of a complex and expensive mold. By depressing the outer cap, the closure assembly returns to the position illustrated in FIG. 4; when the outer cap is released, the closure assembly returns to the position illustrated in FIG. 1.

In a further reference to FIGS. 10 and 11, if the opening means are brought into contact by rotating the outer cap in the closing direction, the rounded body portions would impart an axially upward force there to the selector leading to an obvious modification of the present invention. Closing means may be formed in the same manner as the disclosed opening means, (i.e. depending from bottom of the selector and formed on the inner cap top portion) differing only in the rotational direction of the outer cap required to ring the engagement faces into contact. If the depending closing means are formed with a sloped engagement face, tightening the closure assembly would cause the selector axially upward, and in the same herein disclosed manner, the selector locking arm lips would engage within the cam detents and the selector would return to the axial relative outward first position. Therewith this modification, it would not be necessary to adapt the outer cap to be able to move in the axial direction. This modification is not the preferred form of the present invention, however, because the closing rotational driving means could not be brought into an axial engageable position without depressing the selector.

The preferred form of the present invention is useful on any container and is particularly useful as a tamper-resistant closure. A common means employed to render a container tamper-resistant is to secure a fragile seal around the closure and container after the container has been filled and the closure secured thereto, wherein the seal must be broken before the closure may be subsequently removed. The present invention may employ a fragile seal secured to the closure when the closure is made. The seal, as by way of example, may be formed of paper, plastic, or a like material, and so secured in a manner such that the seal must be broken in order to depress the selector. Because the present invention may be secured to a container by depressing the outer cap while rotating in the closing direction, it is not necessary to secure the seal in place after the closure is secured to a container.

While there has herein been disclosed a closure assembly employing certain rotational driving means

therebetween the inner cap and selector and therewith illustrated in the accompanying drawing, a certain number and angular placement of said means, it should be understood that any number of such means may be employed and arranged in any angular placement. Further, other rotational driving means (not shown), wherein other means are carried to an axial engageable position via the axial positioning of the selector, may be used.

It should be understood that the various terms and expressions used in the foregoing specific and illustrated in the accompanying drawings, are illustrative and explanatory, thereof, and there is no intention in the use of such terms and expressions, of excluding any equivalents of the features shown or described. It will be appreciated by those skilled in the art, that various modifications of the parts, or the portions thereof, the type of material used to form the parts or portions of the closure assembly are possible within the scope and spirit of the invention.

I claim:

1. A rotationally-free child-resistant closure assembly for containers convertible to an operable position by an axially depressable member, comprising:

an inner cap member including a top portion and an annular skirt depending therefrom, the inner cap member top portion including rotational driving means formed thereon, said inner cap member top portion adapted to provide a closure for the open mouth portion of a container, the inner cap member skirt including rotational engagement means formed thereon for engagement with a container rotational engagement means by a rotational movement of the closure assembly;

an outer cap member including a top portion and an annular skirt depending therefrom, the outer cap member engaged telescopically over said inner cap member, the outer cap member top portion including an opening formed therethrough and a member depending from the lower surface of said top portion, the outer cap member skirt including a rotationally free swivel connection therewith said inner cap member skirt;

a selector member including an upstanding top portion and a perpendicular bottom portion, the selector member top portion movably received by said outer cap member top portion opening, the selector member bottom portion including an opening formed therethrough receiving said outer cap member top portion depending member to transmit rotational torque therebetween said outer cap and selector members, said selector member top portion including a radially flexible portion within the included rotational angle of said bottom portion opening, the radially flexible portion including a lip portion;

said outer cap member depending portion including a detent formed therein adapted to receive said selector member flexible portion lip to hold said selector member in an axial relative outward first position, the depending portion detent adapted to allow said selector member flexible portion lip to disengage said detent and allow said selector member to move axially inward therewith the application of an axially inward force applied thereto said selector member, said outer cap member depending portion adapted to receive said selector member flexible

portion lip thereunder and hold said selector member in an axial relative inward second position; said selector member bottom portion including rotational driving means formed thereon, the selector member driving means adapted to drivingly engage said inner cap rotational driving means therewith the selector in said axial relative inward second position.

2. The child-resistant closure as set forth in claim 1 wherein;

said selector member flexible portion is formed by a pair of axially extending slots extending therethrough said selector member top portion within the included angle of said selector member bottom portion opening.

3. The child-resistant closure as set forth in claim 1 wherein:

said outer cap member depending portion including severally disposed circumferential spaced lugs depending from the periphery of said outer cap member opening.

4. The child-resistant closure as set forth in claim 1, wherein;

said outer cap depending member detent including a radially convex outward axially inward portion and a radially inwardly sloped portion extending axially outward therefrom.

5. The child-resistant closure assembly as set forth in claim 1, wherein;

said inner cap member rotational driving means including a vertical engagement face adapted to be engageable by said selector rotational driving means by rotating the closure assembly in the opening direction and a sloped engagement face adapted to force said selector member bottom portion axially upwards therewith rotating the closure assembly in the closing direction.

6. The child-resistant closure assembly as set forth in claim 1, wherein;

said outer cap depending member detent adapted to receive said selector member flexible portion lip as said selector member is forced axially upward and further adapted to carry said flexible portion lip axially upward and return said selector to said axially relative outward first position.

7. A rotationally free child-resistant closure for containers convertible to a screw-type closure by a push button selector, comprising:

an inner cap member including a circular top portion and an annular skirt depending from the periphery thereof, the inner cap skirt having rotational engagement means formed thereon for engagement with container rotational engagement means, the inner cap top portion including a bottom surface adapted to close the open mouth portion of a container and a top surface having rotational driving means formed thereon;

an outer cap member including a circular top portion and an annular skirt depending from the periphery thereof, the outer cap member encompassing said inner cap member, the outer cap member top portion having an opening formed therethrough and an axial locking lug depending from the lower surface of said outer cap member top portion, the outer cap member skirt having swivel connection with said inner cap member skirt that permits free rotational and limited axial movement therebetween said inner and outer cap members;

a selector member including an upstanding top portion and a perpendicular bottom portion, the selector top portion being axially insertable in said outer cap opening, the selector bottom portion including at least one opening formed therethrough where said outer cap member axial locking lug is axially insertable for transmission of rotational torque therebetween said outer cap and selector members while permitting limited axial movement therebetween said outer cap and selector members;

said selector member top portion having a radial flexible axial locking arm within the included angle of said selector member bottom portion opening, the selector member axial locking arm including a perpendicular lip portion;

spring elements formed on one of said inner or outer cap members engaging a portion of other said cap member, the spring elements adapted to hold said outer cap member in an axial relative outward first position, said spring elements adapted to yieldingly bend radially inwardly thereupon axial inward force applied thereto the outer cap member to allow said outer cap member to move axially inward to an axial relative inward second position, said spring elements adapted to yieldingly urge said outer cap member toward said axial relative outward first position thereupon being bent radially inwardly, said spring elements adapted to stand rigidly vertical therewith said outer cap member axial relative outward first position;

said outer cap member axial locking lug including a flat bottom face and an integral cam detent extending axially upward therefrom, the integral cam detent adapted to receive said selector member axial locking arm lip portion when said selector member is in an axial relative outward first position thereby retaining said selector member in said axial relative outward first position, said integral cam detent adapted to cammingly move said selector member axial locking arm lip portion radially inwardly to cause said selector member axial locking arm to bend radially inward therewith axial inward movement of said selector member, said outer cap member axial locking lug bottom face adapted to receive said selector member axial locking arm lip portion thereupon said selector member in an axial relative inward second position;

said selector member bottom portion including rotational driving means formed thereon, the selector member bottom portion rotational driving means adapted to drivingly engage said inner cap member top portion rotational driving means in the opening rotational direction only when said selector member is in said axial relative inward second position; said outer cap member axial locking lug bottom face adapted to receive said selector member axial locking arm lip portion only when said outer cap member is in said axial relative outward first position.

8. The convertible child-resistant closure as set forth in claim 7, wherein;

said spring elements are circumferentially spaced upstanding portions of said inner cap member annular skirt, the spring elements adapted to engage an annular rim formed thereon said outer cap member annular skirt to retain said outer cap member in an axial relative outward first position and to disengage said outer cap member skirt annular rim therewith the application of an axial inward force ap-

4440

13

plied thereto said outer cap member to allow relative axial inward movement of said outer cap member.

9. The convertible child-resistant closure as set forth in claim 7, wherein;
 said selector member including a centrally located upstanding cylindrical top portion and a circular disc bottom portion.
10. The convertible child-resistant closure as set forth in claim 7, wherein;
 said selector member bottom portion opening is comprised of a plurality of circumferentially spaced slots formed therethrough said selector member bottom portion at the base of said selector member upstanding top portion so that the radial exterior surface of said selector member upstanding top portion is coexistent with the radial interior circumferential surfaces of said selector member bottom portion slots.
11. The convertible child-resistant closure as set forth in claim 7, wherein;
 said inner cap member top portion top surface rotational driving means including at least one upstanding closing lug, the closing lug including a flat engagement face coexistent with the radius of said inner cap member and a rounded body portion extending radially outward therefrom the radial inner edge of said closing lug face in the clockwise rotational direction, said inner cap top portion closing lug formed radially outward from at least one opening lug, the inner cap opening lug including a flat engagement face coexistent with the radius of said inner cap top portion and a rounded body portion extending axially downward therefrom the top of said inner cap opening lug in the counter clockwise rotational direction.
12. The convertible child-resistant closure as set forth in claim 7, wherein;
 said selector bottom portion rotational driving means including at least one radially inwardly flexible closing tooth extending radially outward in the clockwise rotational direction therefrom the periphery of said selector member bottom portion, said select member closing tooth including a flat engagement face essentially coexistent with a radius of said selector member bottom portion, said selector member bottom portion rotational driving means including at least one opening tooth depending from the lower surface of said selector member bottom portion, the selector member opening tooth including a flat engagement face essentially coexistent with a radius of said selector member bottom

14

- portion and a rounded body portion extending axially upwards therefrom the bottom of said opening tooth flat face in the clockwise rotational direction, said selector member closing tooth adapted to be in a relative axial engageable position with said inner cap member top portion closing lugs by either carrying said selector member axially inward therefrom depressing said outer cap member to said outer cap member axial relative inward second position or carrying said selector member axially inward to said selector member axial relative inward second position, said selector member closing tooth adapted to drivingly engage said inner cap member top portion closing lug by rotating said outer cap member in the closing rotational direction but ratchet past said inner cap member top portion closing lug by rotating said outer cap member in the opening rotational direction, said selector member opening tooth adapted to be in a relative axial engageable position with said inner cap member top portion opening lug only by depressing said selector member to said selector member axial relative inward second position, said said selector member opening tooth adapted to drivingly engage said inner cap member top portion opening lug by rotating said outer cap member in the opening rotational direction.
13. The convertible child-resistant closure as set forth in claim 7, wherein;
 said inner cap member top portion rotational driving means including a plurality of circumferentially spaced upstanding closing lugs formed in an arc equidistant from the center of said inner cap member top portion and a plurality of opening lugs formed in an arc radially inward from said closing lug arc, said inner cap member top portion opening lugs formed to produce a counter clockwise included angle relative to said inner cap member closing lugs.
14. The convertible child-resistant closure as set forth in claim 7, wherein;
 said outer cap member axial locking lug cam detent including a radially convex outward axial inward portion and a radially inwardly sloped portion extending axially outward therefrom.
15. The convertible child-resistant closure as set forth in claim 7, wherein;
 said selector member axial locking arm adapted to be engaged thereunder said outer cap member axial locking lug only with said outer cap member in an axial relative outward first position.
- * * * * *

55

60

65



US 5,884,788 A

United States Patent [19]
Wilde

[11] **Patent Number:** 5,884,788
[45] **Date of Patent:** Mar. 23, 1999

[54] **TAMPER-INDICATING CLOSURE**

4,801,028 1/1989 Puresovic et al. .

[76] **Inventor:** Sheldon L. Wilde, 5418 Noble Ct.,
Indianapolis, Ind. 46234-2031

FOREIGN PATENT DOCUMENTS

WO 94/29186 8/1994 WIPO .

[21] **Appl. No.:** 992,145

Primary Examiner—Stephen K. Cronin

[22] **Filed:** Dec. 17, 1997.

Assistant Examiner—Nathan Newhouse

[51] **Int. Cl.⁶** B65D 41/34

Attorney, Agent, or Firm—Rockey, Milnamow & Kav. Ltd.

[52] **U.S. Cl.** 215/230; 215/252; 215/253;
215/351; 215/349

[58] **Field of Search** 215/230, 250,
215/252, 253, 331, 341, 342, 346, 349,
350, 351

[57] **ABSTRACT**

A tamper-indicating closure for a container includes a cap with removable panels of a top wall of the cap. Each removable panel is connected to a tab on the inside of the cap. The top wall includes inner and outer cams on an inside surface and the tabs underlie the cams. A liner disc is applied inside the cap for sealing against the container. A plurality of spaced-apart ratchet teeth are arranged in one or two circular patterns on the liner disc and sized and located such that the circular pattern of teeth meshes with the two cams. The tabs have a toothed transverse cross-section which allow the tabs to ride over the ratchet teeth in a screwing-on direction to the cap, but the tabs are engaged by the ratchet teeth in a screwing-off direction of rotation of the cap. Since the liner disc and ratchet teeth are stationary with respect to the container, unscrewing of the cap causes the ratchet teeth to separate the panels from the moving cap.

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,154,032	9/1936	Conner et al.	215/252
2,561,793	7/1951	Greene .	
2,939,597	6/1960	Greene .	
4,378,894	4/1983	Willis et al.	215/252
4,446,979	5/1984	Claunich et al. .	
4,473,163	9/1984	Geiger .	
4,505,300	3/1985	Weiner .	
4,531,649	7/1985	Shull .	
4,564,117	1/1986	Heibert .	
4,721,219	1/1988	Dullabaun et al. .	

26 Claims, 5 Drawing Sheets

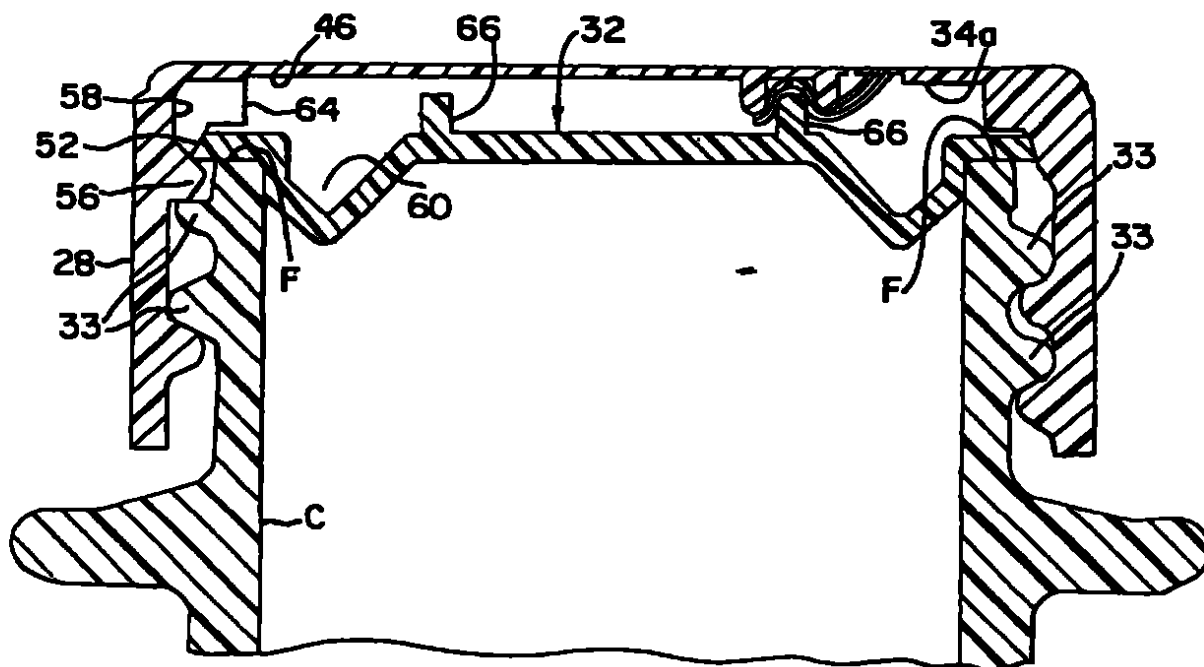
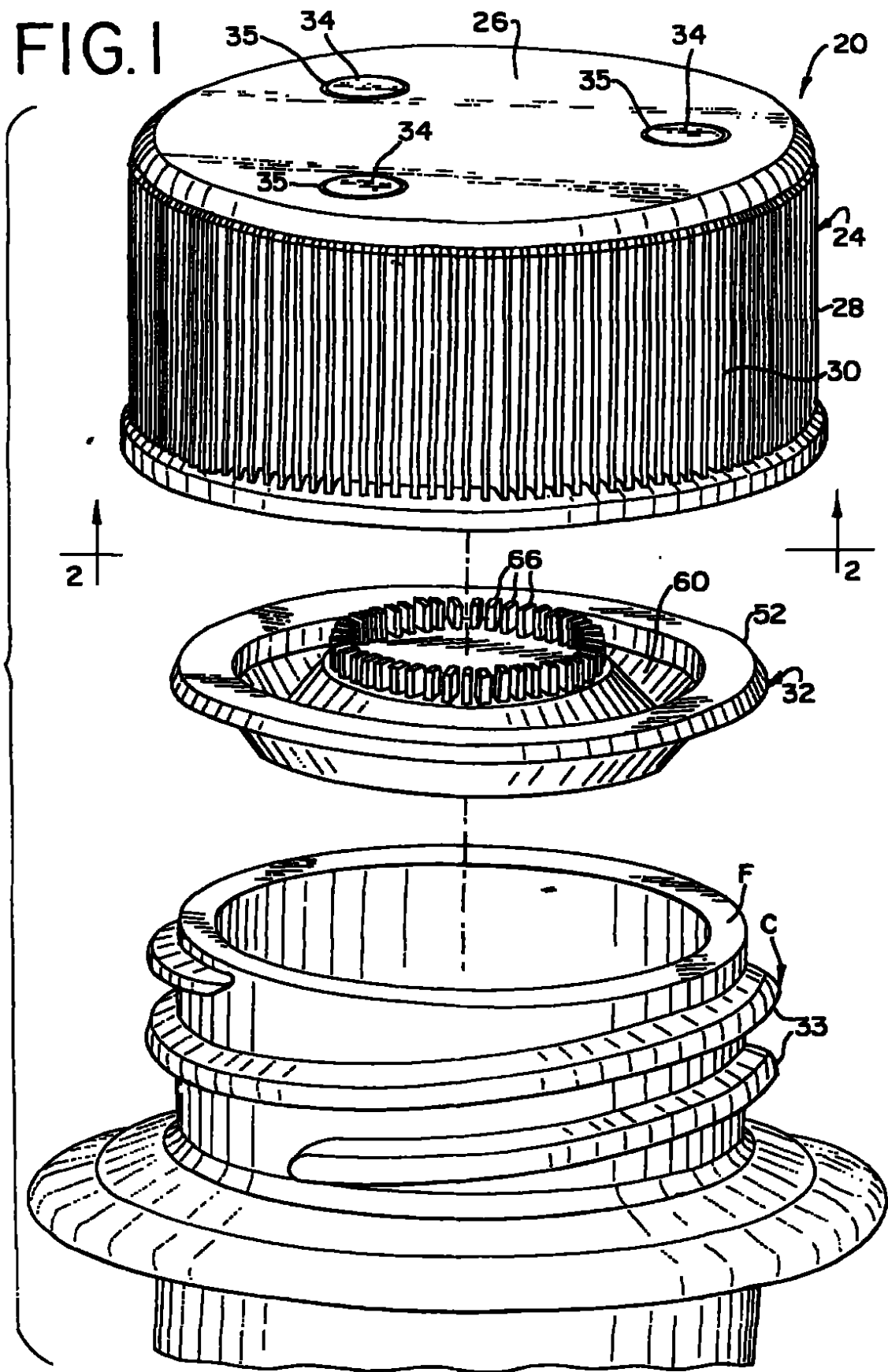


FIG. 1



342

FIG. 2

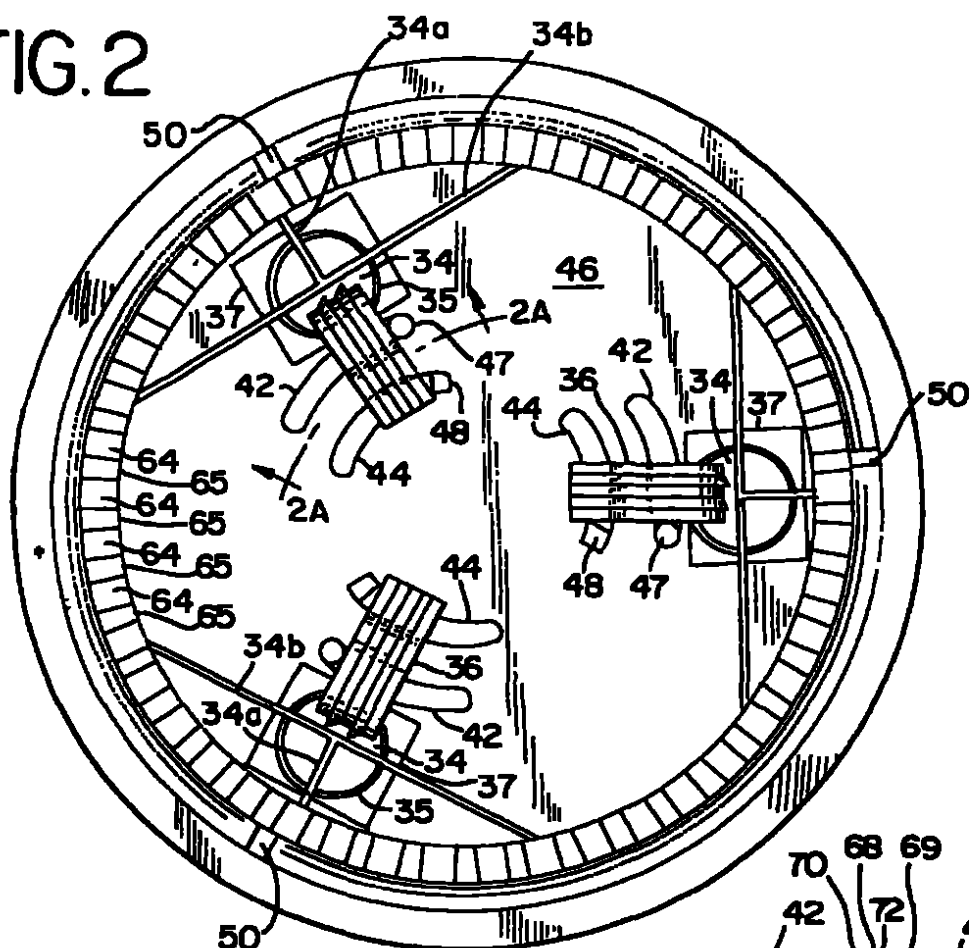


FIG. 2A

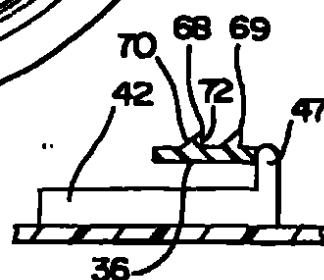
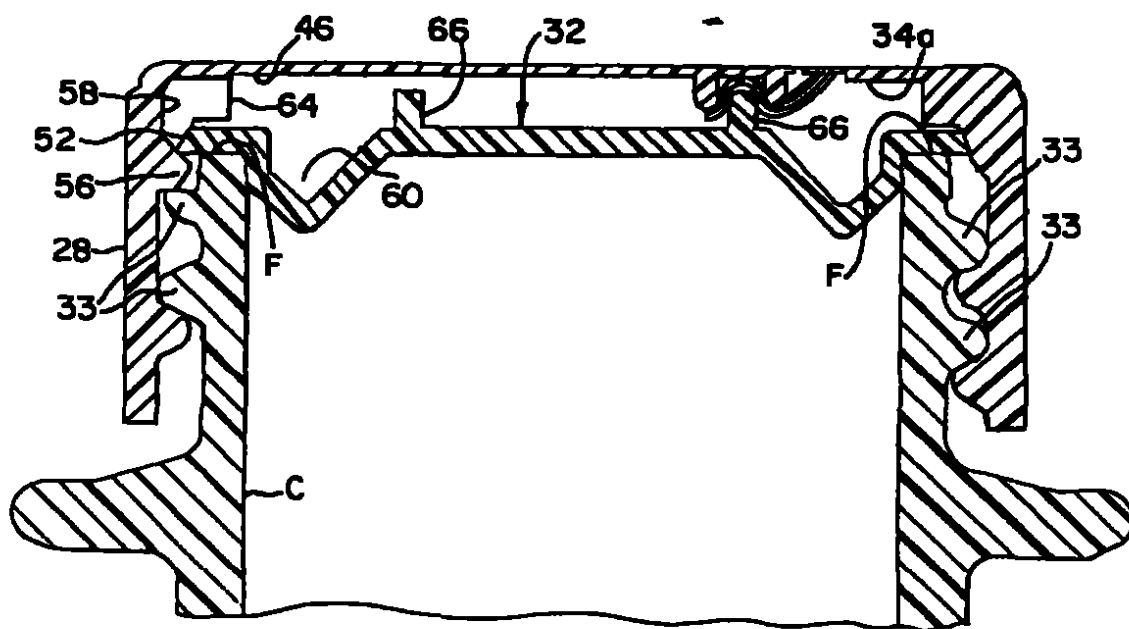
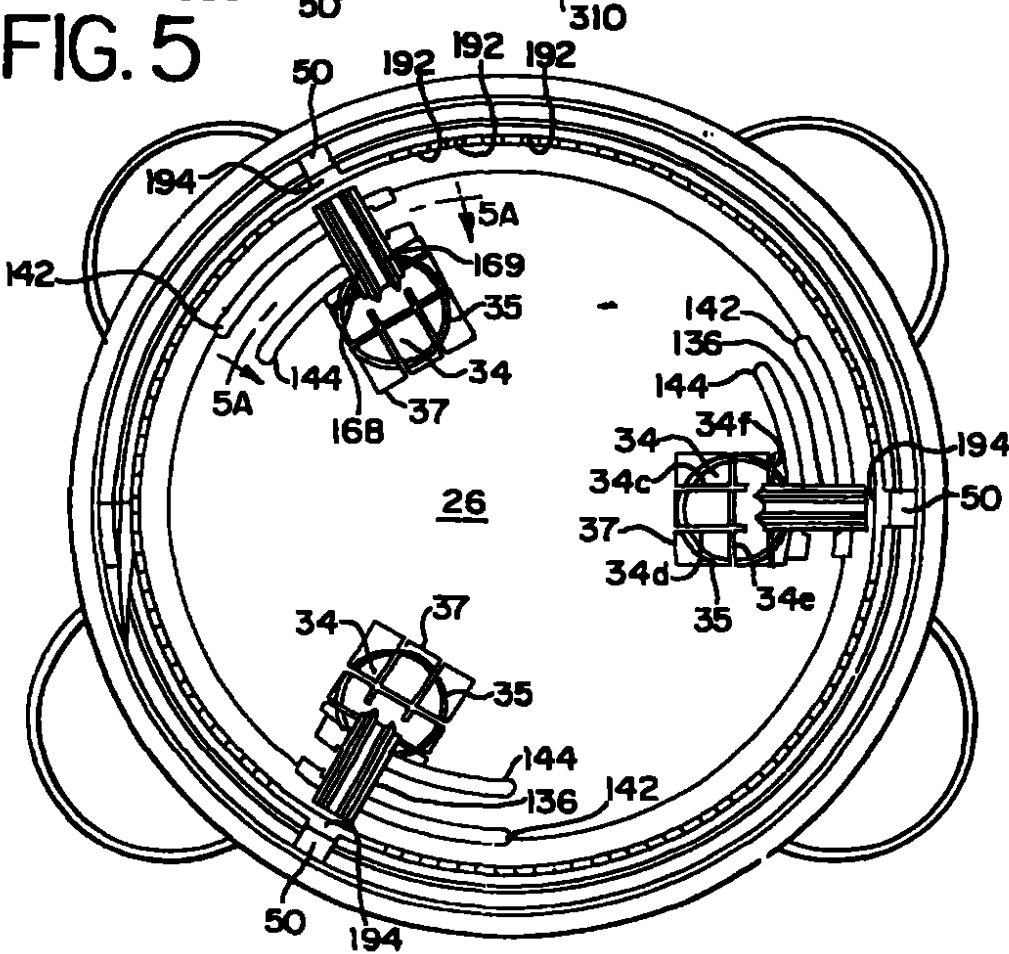
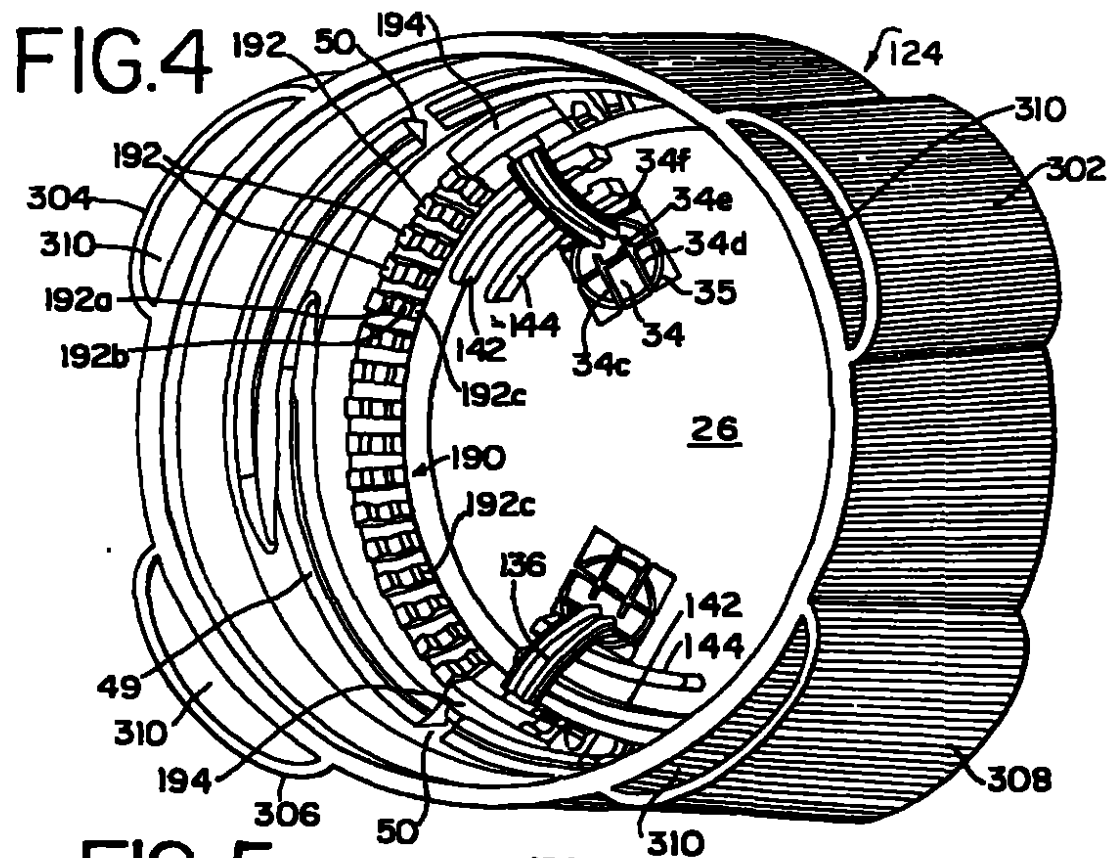


FIG. 3





4743

FIG. 5A

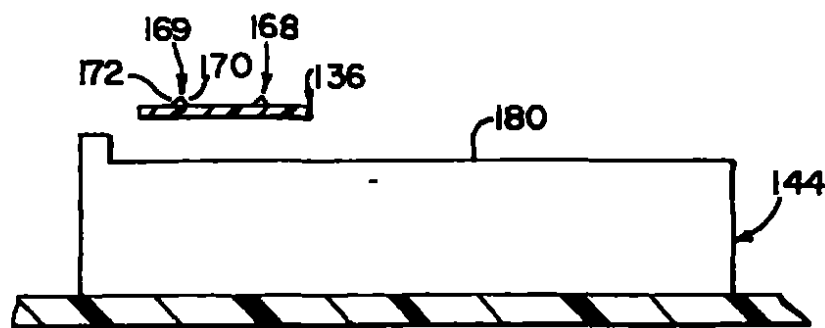
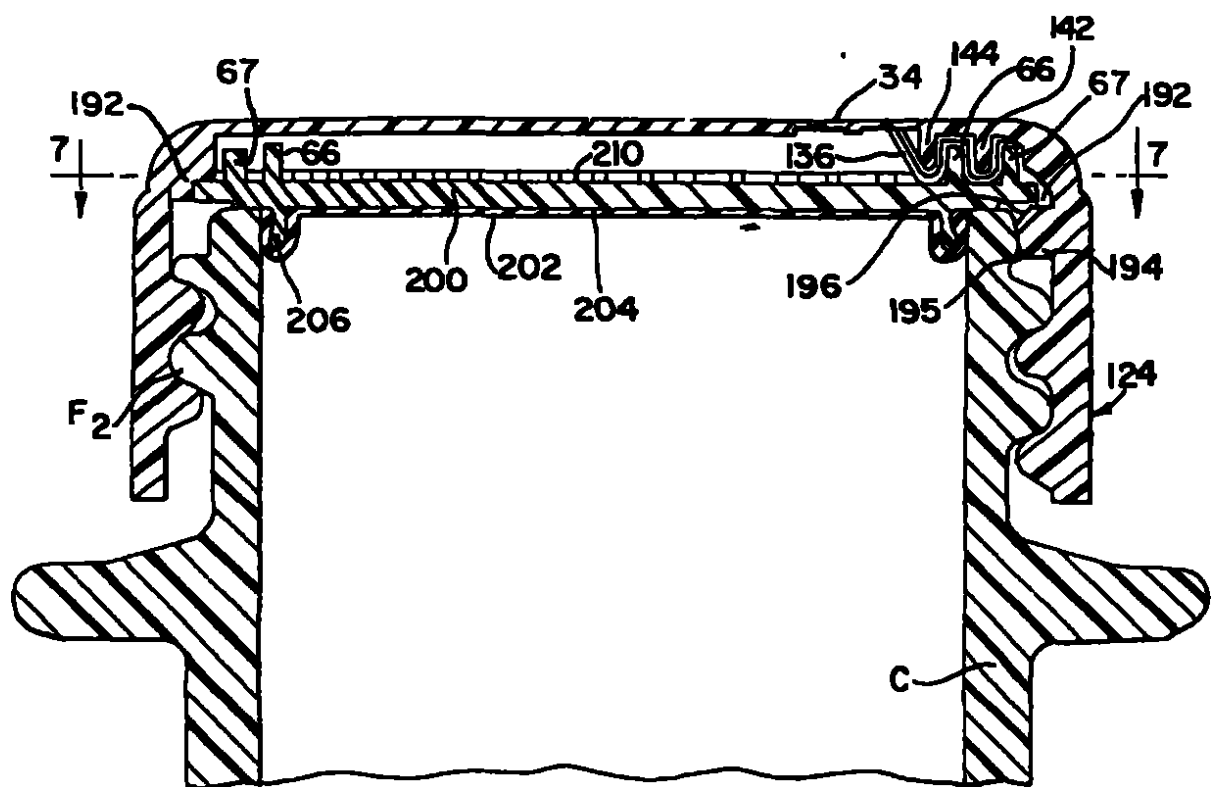
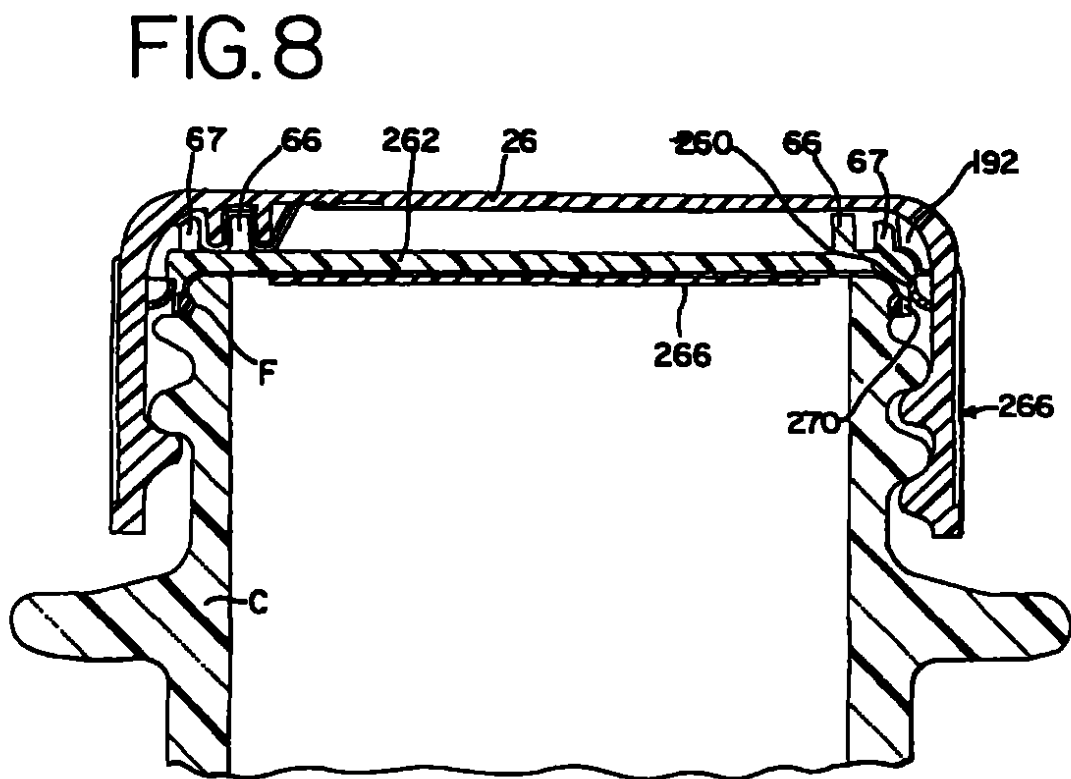
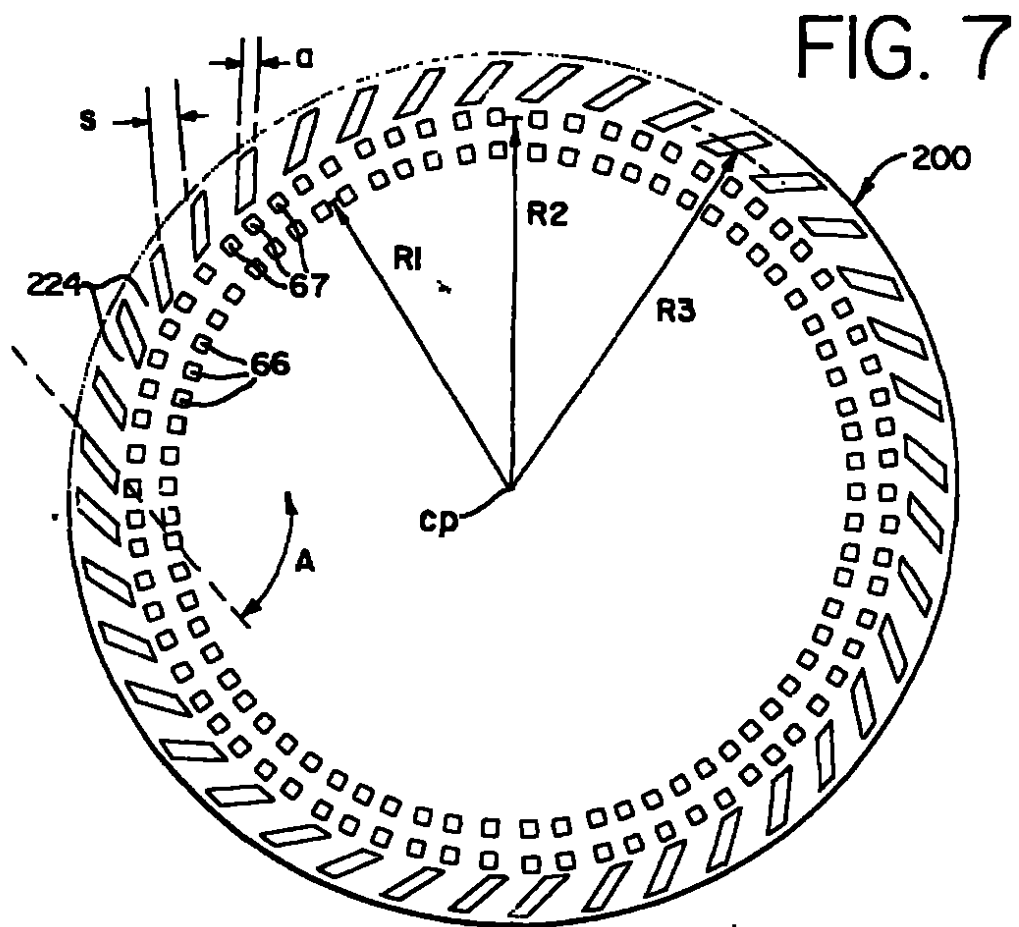


FIG. 6





TAMPER-INDICATING CLOSURE

TECHNICAL FIELD

The present invention relates generally to a closure for a container, the closure having tamper-indicating elements, and particularly to a tamper-evident closure having indicating panels in the end wall of an outer closure cap which are visibly displaced when the closure is removed from its respective container. Tamper-indication is provided by relative rotation of the outer closure cap with respect to an inner disc which sealingly engages the container.

BACKGROUND OF THE INVENTION

Conventional bottle caps or closures for carbonated beverages have included cork and plastic liners and metal fluted caps which are crimped around the radius lip of a glass bottle. Recent bottle closures have included a plastic or metal cap with a frangible ring which interlocks with the bottle neck to be held in axially fixed position while an upper cap portion is unscrewed. U.S. Pat. No. 5,564,582 describes such a frangible ring tamper-evident closure.

A closure including an inner disc having applied thereon a container-engaging liner element and an overlying outer screw cap are known. In this type of closure, the liner element is secured to the lower face of the disc for engagement with a top of an associated container. The outer plastic cap includes screw threads which are advanced onto respective formations of the container which press the disc and liner into sealing engagement with the container.

It is also known, in general, to provide one or more breakable or frangible elements arranged in a top wall of the outer closure cap. Such structures are disclosed, for example, in published PCT Application WO 94/29186.

The need exists for a closure that can be inexpensively manufactured, applied to both pressurized and partially evacuated containers, and can provide an effective seal by closure rotation, and tamper evidence by a subsequent counter-rotation. The closure needs to maintain its effective seal even with the imposition and release of heavy top loading, such as that experienced in storage and shipment.

The need exists for a closure which has a high degree of reliability against liner failure and displacement, tamper evidence accuracy, and seal integrity after repeated reclosures. The need exists for a tamper evident closure having clear indication of prior closure removal. The need exists for a tamper-evident closure which is difficult to remove without triggering indication of prior removal.

SUMMARY OF THE INVENTION

The present invention pertains to a so-called "top tamper evident" closure, which provides tamper-indication without the need for a lower portion of the closure to be mechanically interlocked with the associated container. The two-piece construction includes an inner disc having a high-friction sealing surface (either inside or outside of the bottle finish) to provide a non-rotating seal, low torque application, and removal, and closure back-off prevention, as well as tamper-evidence.

The invention includes a closure having a shell or cap having a disc-shaped end wall and a depending skirt, the skirt having threads on an inside surface thereof for engaging cooperating formations on a container, such as a bottle neck. A liner disc is interfit within the shell against the disc-shaped end wall. The end wall includes tamper-indicating, removable panels which are defined by weak-

ened perimeters through the top wall. The weakened perimeters can be formed by gaps or cuts entirely through or partially through the end wall.

Each panel is connected by an elongate tab within the shell and which is extended over and preferably onto two cams or tracks formed on an inside surface of the end wall. The liner disc includes a plurality of ratchet teeth arranged to press the tab between the two cams when the liner disc is installed into the shell and the shell is screwed down tightly onto a container. The tabs themselves preferably have triangular-shaped cross-sections which define tab teeth.

In operation, during an installation of the closure to a container, the liner disc presses the ratchet teeth to deform the tab between the two cams, but during tightening of the closure to the container, the shape of the tab teeth allows the ratchet teeth of the liner disc to slide relatively easily across the tab without displacement of the tab (and its attached panel) with respect to the end wall. The cap includes a stop surface positioned adjacent the cams for engagement with the tab as the closure is applied to the associated container. The stop surface assures that the tabs move across the teeth of the liner disc during tightening of the cap as the cap moves relative to the disc. This prevents undesired displacement of the tabs during closure application, and avoids premature fracture of the tamper-indicating removable panels in which the tabs are connected.

When the shell is unscrewed from the container in a reverse direction, the shape of the tab teeth causes the ratchet teeth of the liner disc to engage the tab and forcibly move the tab with respect to the end wall, which displaces and removes the removable panels accordingly. The shape of the liner disc beneath the removable panels provides for a tab reservoir such that the removed panel with tab attached does not fall into the container.

The liner disc can be a contrasting color to the shell such that the removable panels allow the liner disc color to be seen through the holes vacated by the removable panels to further alert the consumer that the closure has been previously loosened.

By providing a top wall-removable-panel tamper-evident closure, the shell can be vented during removal through the removable panels as the removable panels are separated. This optionally allows for the elimination or minimizing of vent grooves in the thread regions of the shell skirt. It is further contemplated that vent grooves can be employed in combination with the removable panels to optimize venting during closure removal, while avoiding passage of moisture through the top wall after removal of the panels. Thus, a continuous thread can be used which increases the overall strength of the thread engagement with the container. This increase in strength therefore allows for shell and skirt portions to have correspondingly thinner walls which results in a savings in materials of construction.

Other features and advantages of the present invention will become readily apparent from the following detailed description, the accompanying drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view of a closure assembly of the present invention;

FIG. 2 is a bottom view of a cap of the closure assembly taken generally along plane 2—2 of FIG. 1;

FIG. 2A is a fragmentary sectional view taken generally along plane 2—2 of FIG. 2;

3

FIG. 3 is a sectional view of the closure assembly of FIG. 1 in an assembled condition;

FIG. 4 is a perspective bottom view of an alternative cap of an alternative closure assembly;

FIG. 5 is a bottom view of the alternative cap of FIG. 4;

FIG. 5A is a fragmentary sectional view taken generally along plane 5A—5A of FIG. 5;

FIG. 6 is a sectional view of the alternative embodiment closure assembly corresponding to FIG. 4;

FIG. 7 is a sectional view taken generally along plane 7—7 of FIG. 6; and

FIG. 8 is a sectional view of a further alternative embodiment closure assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the present invention is susceptible of embodiment in various forms, there is shown in the drawings and will hereinafter be described presently preferred embodiments, with the understanding that the present disclosure is to be considered as an exemplification of the invention, and is not intended to limit the invention to the specific embodiments illustrated.

For convenience of description, terms of relative orientation or position such as "top", "bottom", "below", "above" are used and should be understood to be referring to the arbitrary orientation of the invention as depicted in FIG. 1. The invention however, encompasses all orientations.

FIG. 1 illustrates a closure assembly 20 of the invention. The closure assembly includes an outer shell or a cap 24 having a disc-shaped end wall or top wall 26 and a depending annular skirt 28. The skirt 28 includes knurling-like ribs 30 which assist in gripping the shell by a user to exert a twisting force on the shell to install or remove the closure from a container.

Shown on the end wall 26 are removable panels 34, such as in this case three circular removable panels, which constitute frangible tamper-evidence components in accordance with the present invention.

A liner disc 32 (described below) interfits into the cap 24 and the cap is screwed onto a container C having a sealing finish F. The container C includes threads 33 which engage cooperating threads of the cap 24 described below.

As illustrated in FIG. 2, the removable panels 34 include weakened peripheral portions or perimeters 35 formed such as by molding, scoring, or cutting a slot(s), a gap(s), or perforations partially through or completely through the end wall 26, either continuously or intermittently around the panels 34. The panels are held in place to the end wall 26 by frangible "residuals" or bridges 34a, 34b which can be molded into the end wall 26. The frangible bridges can be molded so that complete cutting (i.e., scoring) through the end wall 26 defines panels 34, with the unmolded bridges (i.e., the residual portion) providing the desired frangible connection of each panel to the end wall. Alternatively, a cutting or scoring device having an interrupted cutting edge can be used so that uncut portions of the end wall provide the desired frangible bridges. Formation of frangible portions comprising thin membranes for holding each panel is also contemplated.

Surrounding the perimeters 35 are squares 37 which define the boundaries of areas of reduced thickness, including the thickness of the panels 34 but not the residuals 34a, 34b. Thus, when the weakened perimeter 35 is formed or cut, the perimeter 35 can extend completely through a

4

thickness of the end wall 26 but only partially through a thickness of the residuals 34a, 34b. This allows the panels 34 to be removed easily and precisely, upon breaking of the residuals. In a current embodiment, the end wall has a full thickness of 0.016 inches, the area within the square 37 has a reduced thickness of 0.008 inches. The residuals have a thickness of 0.008 inches throughout the square 35 but have a reduced thickness of 0.003 inches where the residuals cross the perimeter 35.

The removable panels 34 are shown having extending tabs 36 each of which overlie parallel arcuate wall formations or "cams" 42, 44 formed extending perpendicularly from an inside surface 46 of the end wall 26. As will be further described, each cam 42, 44 includes a downwardly extending stop 47, 48 respectively at one end thereof, with an additional stop 48' preferably positioned therebetween. Stops 47, 48, and 48' together provide the cap 24 with a stop surface extending perpendicularly from the inside surface of the cap. Each stop surface is engageable with the respective tab 36 during application of the closure to a container.

The cap 24 includes threads 49 for engagement with the container threads 33 for holding the cap to the container and exerting sufficient axial force therebetween to seal between the liner disc 32 and the container finish F. Caps 50 can be provided axially through the threads 49 to allow venting of gas from the container during opening.

As illustrated in FIGS. 1 and 3, the liner disc 32 is placed within the shell 24 and retained around its outer circumference 52 by a plurality of disc retainers 56 formed on the inside surface 58 of the skirt 28. An annular well 60 is formed on the liner disc 32 for receiving the panels 34 once separated from the end wall.

The liner disc is held between the disc retainers 56 and disc support ribs 64 formed integrally with the shell 24. The disc support ribs 64 are arranged closely spaced around an inside circumference of the cap 24. In a current embodiment, forty-five support ribs are provided spaced at 8 degrees apart. A space between adjacent support ribs 64 define vent slots 65. Thus, gas within the container can be released, prior to complete disengagement of the respective thread formations, in a controlled fashion during unscrewing of the cap 24 by exhausting gas past the liner disc 32, through the vent slots 65, and through apertures vacated by the panels 34. It may thus be possible to eliminate or minimize the gaps 66 through the threads 49. By so eliminating these gaps the threads can be made stronger by being continuous, and a thickness reduction in the skirt wall 28, and materials savings, may be possible.

Returning to FIG. 1, the liner disc 32 includes a plurality of bar-shaped, ratchet teeth 66 arranged in a circle and extending upward on a surface of the liner disc 32 facing the end wall 26 of the shell 24. The ratchet teeth 66 are arranged in a selected circumference such that the ratchet teeth 66 align between each pair of the first and second cams 42, 44. Ratchet teeth 66 can be generally bar-shaped, and are preferably inwardly tapered at the upper ends thereof into a generally triangular or rounded configuration. In a current embodiment, each tooth 66 has converging surfaces arranged at a 60° angle.

On an end of the cams are the cam stops 47, 48 respectively, with stop 48' positioned therebetween. When the shell is screwed down tight onto a container C, the container finish F presses the liner disc 32 such that the ratchet teeth 66 press and bend each of the tabs 36 onto and between the respective two cams 42, 44. The stops 47, 48, and 48' collectively provide a stop surface which engages

the respective tab during closure application, thus precluding undesired displacement of each tab. The stop surface provided by stops 47, 48, and 48' is generally U-shaped, this maximizing engagement with the generally U-shaped portion of respective tabs positioned between the pair of cams 42, 44. The provision of stop 48' positioned between the cams is particularly desirable since it most directly acts in opposition to the ratchet teeth 66, and helps to prevent excessive deformation of the tab.

As shown in FIG. 2A, each tab 36 has a sawtooth cross-section with two upwardly extending tab teeth 68, 69. Each of the teeth can be configured to include a sloped surface 70 backed by a vertical surface 72.

When the cap is turned in a screwing-on direction for closure application, typically clockwise onto the container C, during a few final tightening degrees of rotation, the liner disc is held stationary by friction against the container finish F. The stops 47, 48, and 48' hold the tabs 36 substantially stationary with respect to the end wall 26 while each of the sloped surfaces 70 allow the cap to turn freely with respect to the liner disc by the tab teeth 68, 69 riding over the ratchet teeth 66.

When the cap is thereafter turned in a screwing-off direction for closure removal, typically counterclockwise off the container C, the vertical surfaces 72 of the tab teeth are engaged by the ratchet teeth 66 and are held substantially stationary with the liner disc by the teeth, as the remainder of the cap rotates. The cams 42, 44 assist in holding the tabs 36 in position as the frictional grip of the ratchet teeth 66 in opposition to the rotating cap 24 cause forced displacement of the removable panels 34 from the end wall 26 by breaking the bridges 34a, 34b and separation of the weakened perimeters 35.

Although three coaxing assemblies are shown in FIG. 2, each including a removable panel 34, a tab 36 and a pair of cams 42, 44 as shown and described, any number of assemblies, one or greater is encompassed by the invention. Although circular panels are shown, other shapes are contemplated by the invention, including panels which have number or letter shapes, trademark or logo shapes, or decorative shapes.

The above-described embodiment, wherein the tabs 36 extend generally radially inwardly of the respective panels 34, can be particularly desirable for some applications. When the closure is used on containers having carbonated contents, pressure within the container can act to outwardly deform or "dome" the liner disc 32. This outward deformation can desirably act to increase the interference between the disc teeth 66 and the associated tabs during closure removal. However, since such deformation does not take place until the closure is fully applied to the container, such interference is avoided during closure application, minimizing deformation of the teeth and tabs during application. Additionally, this orientation of the tabs maximizes the mechanical advantage created by the disc liner frictionally engaging the container, with the torque created providing the desired force for fracture of panels 34. Even though a somewhat greater degree of relative rotation between the disc and outer shell is required to effect panel fracture, a liner material exhibiting a relatively lower coefficient of friction with the container can be employed, if desired.

FIGS. 4 through 6 illustrate an alternate embodiment cap 124. This embodiment shares some common features with the previously described cap and like components are indicated with like numerals. In distinction from the previous embodiment which included frangible panels each having a

tab extending radially inwardly, the panels of this embodiment each include a tab extending radially outwardly. The removable panels 34 are located on the end wall 26 radially inward of cams 142, 144, and tabs 136 extend from the panels 34 radially outwardly. The panels 34 are defined by weakened perimeters 35, and connected to the remainder of the end wall 26 by residuals or bridges 34c, 34d, 34e, 34f, as shown.

As illustrated in FIGS. 5 and 5A, the tabs 136 include two tab teeth 168, 169, each having opposing inclined surfaces 170, 172. The cam 144 includes a tab stop 176. This tab stop acts during screw-tightening of the cap 124 onto a container, as described above with respect to the stop 48. The tab 136 is shown elevated from the cam 144 in FIG. 5A by its resiliency but will be forcibly brought into contact with an upper surface 180 of the cam 144 when the cap 124 is brought into contact with a liner disc.

FIG. 4 illustrates the cap 124 includes a skirt 128 having an annular supporting structure 190 which includes spaced apart support ribs 192 all around an inner circumference of the skirt 128. The support ribs 192 have an L-shaped sealing surface having a vertical surface 192a for guiding the liner disc radially and a radial surface 192b for supporting the liner disc against axial sealing force from the container C.

A front wall 192c of each rib 192 faces radially inwardly. Vent slots 193 are located between ribs 192 to allow gas to escape through the cap and through the apertures vacated by the panels 35. However, since the flow area of the apertures vacated by the panels is respectively large, absent a corrective measure, too great a venting flow during unscrewing the cap would be directed upwardly, resulting in unwanted moisture above the cap, and possibly on a user's hand. To balance the distribution of gas venting between upward venting through the area vacated by the panels 35, and downward venting through the gaps 50 through the threads 49, the front walls 192c can be made continuous around the inner circumference of the cap, i.e., bridging between each rib 192, forming an annular wall (not shown) covering most of the area of the vent slots 193. A limited number of notches (not shown) or places where the front walls are not continuous between ribs 192, can be provided as vent orifices to control the flow resistance of upward venting.

Disc retainers 194 are spaced apart around the inner circumference of the skirt 128. The disc retainers 194 include a first radially inclined surface 195 facing toward an open end of the cap 124, and a second radially inclined surface 196 facing toward the end wall 26. The disc retainers 194 extend radially to an extent to allow a liner disc to be inserted into the cap, forcing the retainers apart resiliently, past the disc retainers 194 in an insertion direction, to be retained by the disc retainers inside the cap, close to the end wall 26.

FIG. 6 illustrates the cap 124 assembled onto a container C. A liner disc 200 has a liner 202 secured thereto across an outside surface 204 and over an annular lip 206. The liner 202 seals against an inside surface of the container C, in the nature of a so-called plug seal. A first, inner circle 207 of ratchet teeth 66 extend upwardly from a top surface 210 of the liner disc 200. The first circle 207 has a radius R1. A second circle 208 of ratchet teeth 67 surrounds the first circle 207. The second circle 208 has a radius R2 (FIG. 7) which differs from radius R1. Although not illustrated, it is contemplated that the second circle 208 of ratchet teeth can be formed as a continuous rib, preferably having a downwardly projecting V-shaped edge (in cross-section) to further enhance engagement and retention of tabs 136. The second

circle of ratchet teeth 67 is spaced radially from the first circle 207, either outwardly (as shown), or inwardly thereof if the tabs extend inwardly of the fracturable panels.

Some of the ratchet teeth 66, 67 of both circles 207, 208 press and bend each tab 136 between and over the cams 142, 144. The tabs 136 are bent in a serpentine shape by the meshing of the inner and outer circles 207, 208 of the ratchet teeth 66, 67 with the cams 142, 144. The cams 142, 144 also provide at least the one stop 176 (FIG. 5) for preventing differential rotation between the tabs 136 and the cams 142, 144, i.e., between the panels 34 and the cap 124. Like the previous embodiment, stop 176 preferably defines a generally U-shaped stop surface for enhancing engagement with the respective tab 136. The tabs include the tab teeth 168, 169 with inclined surfaces 170, which allow the ratchet teeth 66, 67 to ride over the tabs 136 during tightening of the cap 124 to a container. During subsequent unscrewing, the tabs are restrained from differential movement from the stationary liner disc 200 by the ratchet teeth 66, 67 engaging the inclined surfaces 172, while the cap 124 is rotated, and the panels 34 are thus separated from the end wall 26 by breakage of the residuals 34c, 34d, 34e, and 34f.

FIG. 7 illustrates the liner disc 200 in detail. The ratchet teeth 66, 67 are arranged around inner and outer circles 207, 208 evenly spaced. A plurality of parallelogram-shaped slots 220 are formed or cut through the liner disc 200 in an outer edge region thereof at a mean radius R3. The slots have a width "a", preferably $a=0.012$ inches. The slots are spaced at a spacing "s", preferably $s=0.015$ inches, forming approximately ninety spokes 224. The spokes and slots are angled at "A", preferably $A=45$ degrees from radial lines from a center point "cp". The spokes preferably are approximately 0.015 inches thick. The spokes provide sufficient strength for the liner disc 200 to be retained by the disc retainers 194 into the cap, but at the same time are sufficiently weak that the cap 124 cannot be radially squeezed sufficiently to obtain a firm radial grip on the liner disc (through the skirt of the cap). Thus, a person attempting to defeat the tamper indicating function of the closure could not force the liner disc to rotate with the cap 124 because the outer edge region of the liner disc would collapse radially before sufficient torque could be generated to overcome the friction between the liner disc and the container.

FIG. 8 describes an alternate embodiment which includes resilient disc retainers 260 which allow passage of a liner disc 262 into the cap 264. The disc retainers are in the form of circumferentially spaced apart flexible webs 265 which are inclined or curved toward the end wall 26 to allow forced flexing of the retainer to permit passage of the disc 262 past the retainers toward the end wall 26. The retainers are shaped to prevent the reverse direction movement, thus retaining the liner disc 262 near to the end wall 26. The retainers are preferably 0.010 inches thick, and 0.055 inches long. There are preferably 6 to 8 retainers, each accounting for 20 to 30 degrees of arc.

The liner disc 262 includes a liner 266 for sealing against a container C at a finish F. The liner disc 262 includes an annular flange 268 having spaced apart slots 270 (not shown) for integrating the liner 266 to the liner disc 262.

The caps illustrated in FIGS. 1, 4 and 8 can also be formed with a generally rectangular outer profile to provide an improved gripping shape for mechanical advantage in twisting off the cap. As illustrated in FIGS. 4 and 5 the outer profile can be enhanced for achieving mechanical advantage by adding molded curved loops 302, 304, 306, 308 at 90° points around the cap. The loops 302, 304, 306, 308 have a

depth substantially equal to the cap skirt 128 (into the page of FIG. 5). The loops are partial-circular shaped having a smaller diameter than the cap, and having axes parallel to an axis of the cap. An open space 310 is formed between each of the loops and an outer surface of the skirt 128. The space is open at both top and bottom faces of the cap 124. An outer surface 312 of each loop is knurled for ease of gripping and twisting of the cap.

The liner discs 32, 200, 262 can be provided with an index notch to preposition the liner disc with respect to the cap.

Although the removable panels are shown as circular areas, it is advantageous that the removable panels could be in the shape of letters or other insignias such that upon their removal, the colored disc would show through the letter shapes removed from the cap. The letters could spell "open" or the product name such as "cola" or other messages.

It is also contemplated by the invention that the liner disc be a contrasting color to the cap such that removal of the panels 34 gives a readily apparent indication of the tamper-evident condition. The cap can also be transparent giving additional visual evidence of the condition and fracturing of the tamper evident condition.

Also, it is contemplated by the invention that the aperture vacated by a removable panel or panels could also function as a spout for dispensing liquid through the cap. A provision such as an aperture through the liner disc, would be made for dispensing through the cap.

Thus, a highly effective tamper-evident closure assembly is disclosed which is configured for economical use on containers having either carbonated or non-carbonated contents. Because the liner disc of the assembly ordinarily is not subjected to any significant rotation during closure application and removal, application torques are desirably low to facilitate high-speed bottling, and removal torques are desirably low to facilitate ease of use by consumers. Various types of liner configurations can be employed, including liners effecting a so-called top/side seal on the top, outside surface of the associated container, or a so-called plug-type seal on the generally inwardly facing surface of the container.

An additional feature of the subject design is the audible nature of the interengagement of the tabs of the outer closure cap with the ratchet teeth of the inner liner disc. Because the closure assembly need not be configured to mechanically interlock with the typical flange-like locking ring of a container finish (positioned beneath the container threads), significant material savings can be obtained. If desired, associated containers can be configured to exact with the closure assembly of the present invention, without the need to configure containers to include the typically required annular locking ring and thread formation.

While the illustrated embodiments of the present closure are each configured to include a cap having at least one stop surface for engagement with a respective tab during closure application, it is within the purview of the present invention to optionally provide one or more stop members on the liner disc. Such an arrangement can be employed to limit relative rotation of the outer cap and inner disc during closure application. By way of example, the disc could be provided with three stops or dogs, and the outer cap provided with one stop or dog, engageable with any one of the three stops on the disc. Relative rotation would thus be limited to no more than about 120°. Limitation of such relative rotation can desirably act to minimize deformation of the teeth and tabs (which interact to provide tamper-indication) during closure application, and can enhance sealing engagement of the inner liner disc with the associated container.

From the foregoing, it will be observed that numerous modifications and variations can be effected without departing from the spirit and scope of the novel concept of the present invention. It is to be understood that no limitation with respect to the specific embodiments disclosed herein is intended or should be inferred. The disclosure is intended to cover by the appended claims all such modifications as fall within the scope of the claims.

What is claimed is:

1. A tamper-evident closure for a container, said closure rotatably attached to said container, comprising:
 - a cap having a removable panel with a weakened perimeter;
 - an resiliently flexible elongated tab connected to said removable panel;
 - a stationary portion, arranged to be held substantially stationary relative to the container, said stationary portion having a member extending therefrom and pressing said elongated tab, and said tab and said member shaped to resist movement of said tab when said cap is unscrewed from the container to remove said removable panel from said cap.
2. The closure according to claim 1, wherein said member comprises a plurality of teeth arranged along a circular path on said stationary portion.
3. The closure according to claim 1 wherein said cap further comprises a cam extending downwardly toward said stationary portion and pressing said tab against said stationary portion adjacent said member, and a stop surface engageable with said tab when said closure is applied to said container.
4. The closure according to claim 1 wherein said cap comprises a pair of cams extending toward said stationary portion and arranged on opposite lateral sides of said member, said cams pressing said tab against said stationary portion and restraining said tab when said cap is unscrewed from the container.
5. The closure according to claim 4 wherein said cams are arranged around circular paths, and said member comprises a plurality of spaced-apart ratchet teeth arranged around a circular path, said cap including a generally U-shaped stop surface engageable with said tab.
6. The closure according to claim 5 wherein said tab comprises a toothed profile in cross-section allowing said tab to pass by said ratchet teeth in a screwing-on direction of said closure to a container but resisting relative movement between said tab and said ratchet teeth in a screwing-off rotational direction of said closure from the container.
7. The closure according to claim 1, wherein said stationary portion comprises a disc extending across said cap, said disc having a liner for sealing said closure to said container.
8. The closure according to claim 1, further comprising a second removable panel on said cap and a second tab extending from said second removable panel and held against a second member on said stationary portion, said second member and said second tab shaped to resist movement of said second tab when said cap is unscrewed from the container.
9. The closure according to claim 1, wherein said member comprising a plurality of teeth, said cap further comprises a pair of cams, spaced apart and extending downwardly toward said stationary portion on opposite sides of said teeth, said tab bent between said cams and said teeth.
10. The closure according to claim 1, wherein said cap comprises a cam extending downwardly toward said stationary portion, said member comprises a plurality of first teeth around a first circular path and a plurality of second

teeth around a second circular path having a radius which differs from the radius of said first circular path, said cam located between said first and second circular paths to bend said elongate tab in serpentine fashion against said cam and at least one tooth of said first teeth and at least one tooth of said second teeth.

11. The closure according to claim 10 wherein said cap comprises a second cam concentric to said first cam and arranged on an arcuate path on an inside of said first circular path, said tab bent in serpentine fashion over said second cam, at least one of said first teeth, said first cam, and at least one of said second teeth.

12. The closure according to claim 1 wherein said cap includes a plurality of extending members applied on an outer surface of said cap for providing twisting leverage to a user.

13. The closure according to claim 12 wherein said extending members comprise knobs having an axis parallel to an axis of said cap.

14. A tamper-evident closure for a container, the container having a threaded neck and said closure having internal threads for threading said closure onto said neck, comprising:

- a cap for screwing onto the container neck having an end wall with a plurality of spaced apart removable panels, each panel defined by a weakened perimeter;
 - a plurality of tabs, each tab connected to one of said removable panels on an inside surface thereof;
 - a plurality of pairs of cams, a pair of said cams formed on said end wall adjacent each removable panel, each of said cams extending on an inside surface of said end wall, said pair of cams being located on inner and outer concentric circular paths, said tabs arranged extending across each respective pairs of cams; and
 - a liner disc arranged within said cap to seal against the container neck when said cap is screwed onto the container neck, said liner disc including a plurality of first ratchet teeth extending toward said end wall of said cap and arranged on an intermediate circular path located between said inner and outer circular paths of said two cams, to interfit therebetween; and
- said tabs being pressed against at least one of said ratchet teeth by said cam pairs, and said tabs having a cross-section with extending tab teeth allowing said tabs to ride over said ratchet teeth in a screwing-on direction of said cap to said container, but resisting relative displacement between said tabs and said ratchet teeth in a screwing-off direction of said cap, said resisting sufficient to remove said removable panels from said end wall.

15. The closure according to claim 14 wherein said removable panels are arranged radially inwardly of said cams.

16. The closure according to claim 14 wherein said removable panels are arranged radially outwardly of said cams.

17. The closure according to claim 14 wherein said liner disc includes an annular rim having a plurality of spokes.

18. The closure according to claim 14 wherein said weakened perimeter is defined by a substantially continuous groove through said end wall and a plurality of bridges which cross said groove and connect said panels to a surrounding portion of said end wall.

19. The closure according to claim 14 wherein said cap includes a stop surface extending perpendicularly with respect to said end wall and located to prevent differential

47 46

11

movement between said tab and said end wall during screwing on of said cap to the container neck.

20. The closure according to claim 14 wherein said liner further comprises a plurality of second teeth arranged around another circular path spaced from said intermediate circular path, said second teeth extending toward said end wall of said cap, said tabs bent in serpentine fashion over said pair of cams and at least one of each of said first and second teeth.

21. A tamper-evident closure for a container, comprising:

a cap having an end wall with a removable portion defined by a weakened perimeter and a skirt having threads;

a resiliently flexible tab portion extending from said removable portion;

a stationary portion held stationary to the container when the closure is screwed on and having a member for abutting said tab portion;

a ratchet arrangement applied between said tab portion and said stationary member to allow relative displacement therebetween in a screwing-on rotational direction and resistance to relative displacement in a screwing-off rotational direction to remove said removable portion from said end wall.

22. The closure according to claim 21 wherein said ratchet arrangement comprises at least one tab tooth applied on said

12

tab portion having a first surface sloped downward and oblique to a tangent in said screwing-on rotational direction, and said stationary member comprises at least one ratchet tooth extending from said stationary portion to engage said tab tooth.

23. The closure according to claim 22 wherein said stationary member includes a plurality of ratchet teeth arranged spaced apart around a circle.

24. The closure according to claim 22 wherein said cap comprises a pair of cam portions extending from said cap and located to be on opposite sides of said ratchet tooth, said tab portion bent by said cam portions and said ratchet tooth to thread under said cam portions and over said ratchet tooth, and at least one of said cam portions include an end stop surface extending perpendicularly to said wall to restrain said tab portion from moving on said cam portions.

25. The closure according to claim 24 wherein said ratchet arrangement comprises a second ratchet tooth extending from said stationary portion at a position spaced radially from said first ratchet tooth for engaging an end of said tab portion.

26. The closure according to claim 21, wherein said cap includes a stop surface engageable with said tab during application of said closure to said container.

* * * * *

7 47

United States Patent [19]
Abrams

[11] Patent Number: 4,458,820
[43] Date of Patent: Jul. 10, 1984

[54] TAMPER-INDICATING ARRANGEMENT
FOR A CONTAINER
[76] Inventor: Martin Abrams, 201 E. Chestnut,
Chicago, Ill. 60611
[21] Appl. No.: 465,915
[22] Filed: Feb. 14, 1983
[51] Int. Cl.³ B65D 55/02
[52] U.S. Cl. 215/230; 215/250
[58] Field of Search 215/230, 252, 253, 250

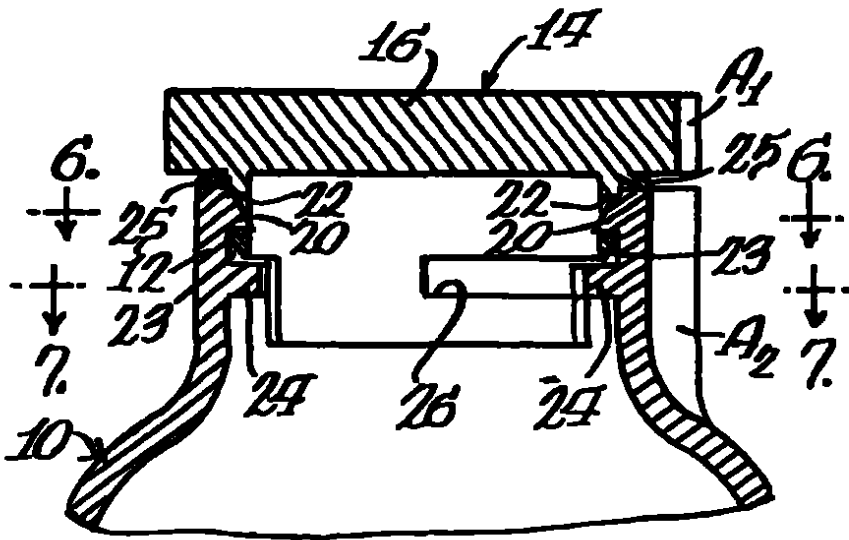
[56] References Cited
U.S. PATENT DOCUMENTS
575,248 1/1897 Kochler 215/230
2,939,597 6/1960 Grasse 215/230

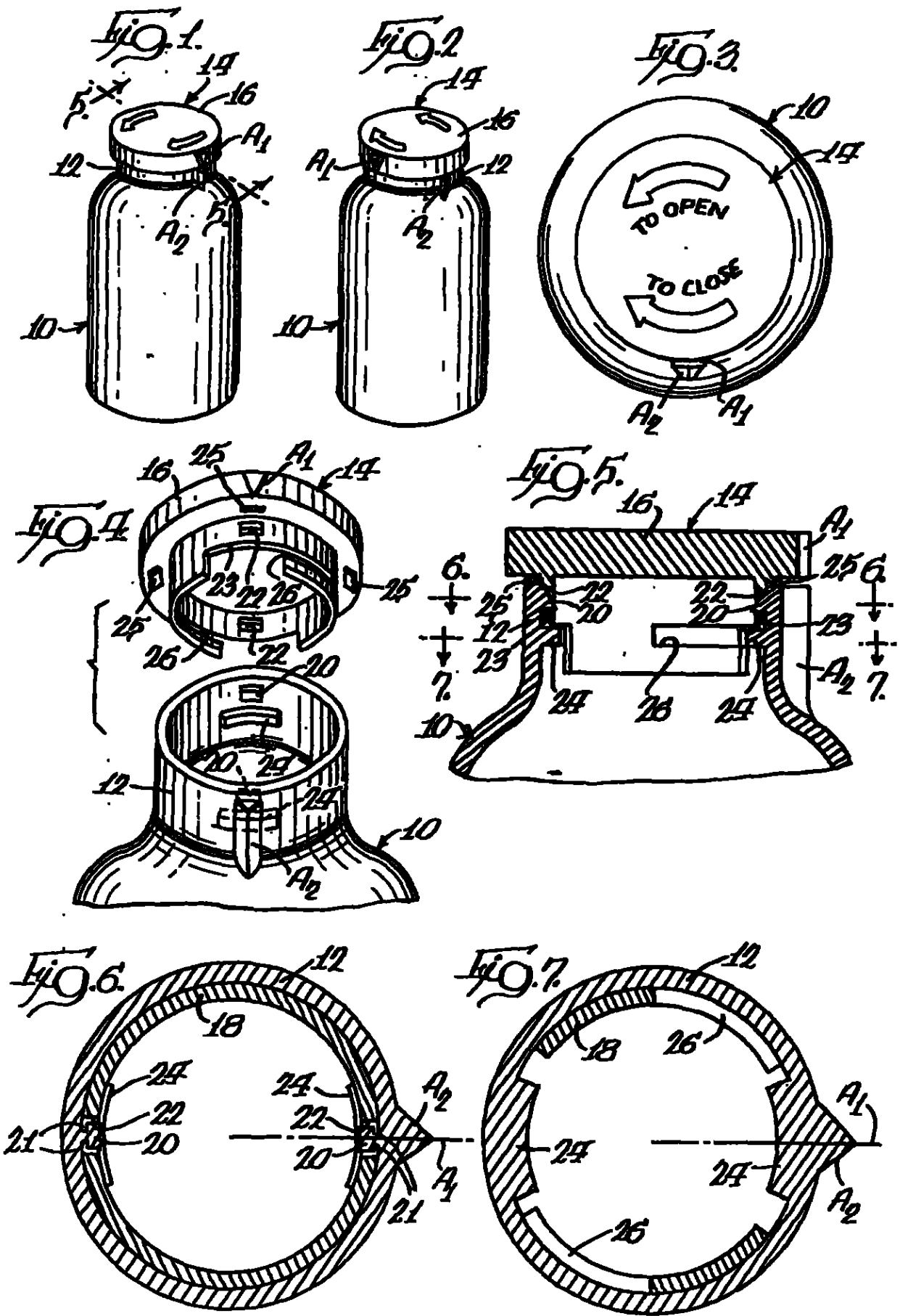
Primary Examiner—Donald F. Norton

Attorney, Agent, or Firm—Dressler, Goldsmith, Shore,
Sutker & Milnamow, Ltd.

[57] ABSTRACT
A tamper-indicating arrangement for a container is disclosed which functions to provide a clear visual indication that the container has been opened. The arrangement includes a closure which is adapted to be fitted to the container, and further includes first and second coacting means for respectively retaining the closure on the container in distinct first and second positions with respect to the container. In this way, the closure can be initially applied to the container in its first position, and can only be reapplied and retained on the container in a reoriented second position. Suitable indicia are preferably provided on the closure and the container for visually indicating reorientation of the closure from its first position to its second position.

19 Claims, 17 Drawing Figures





48

Fig. 8.

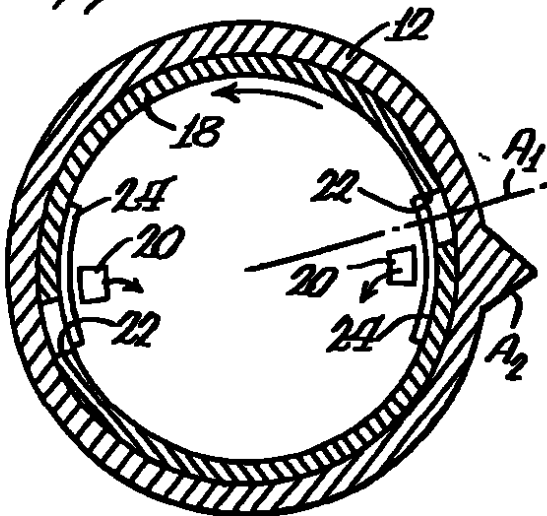


Fig. 9.

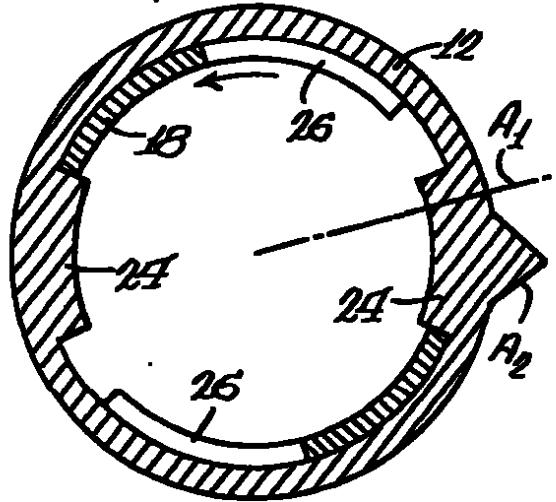


Fig. 10.

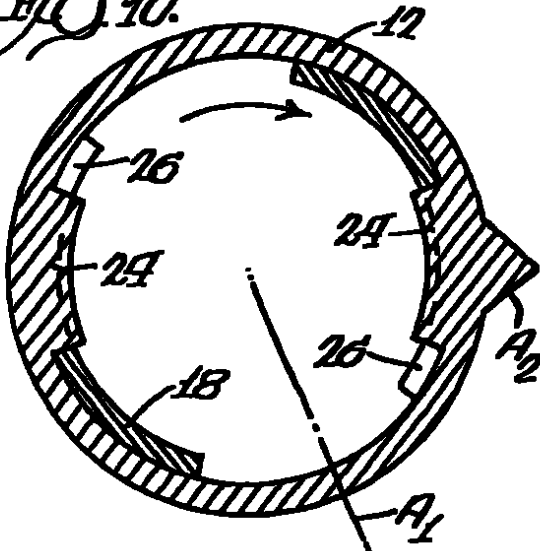


Fig. 11.

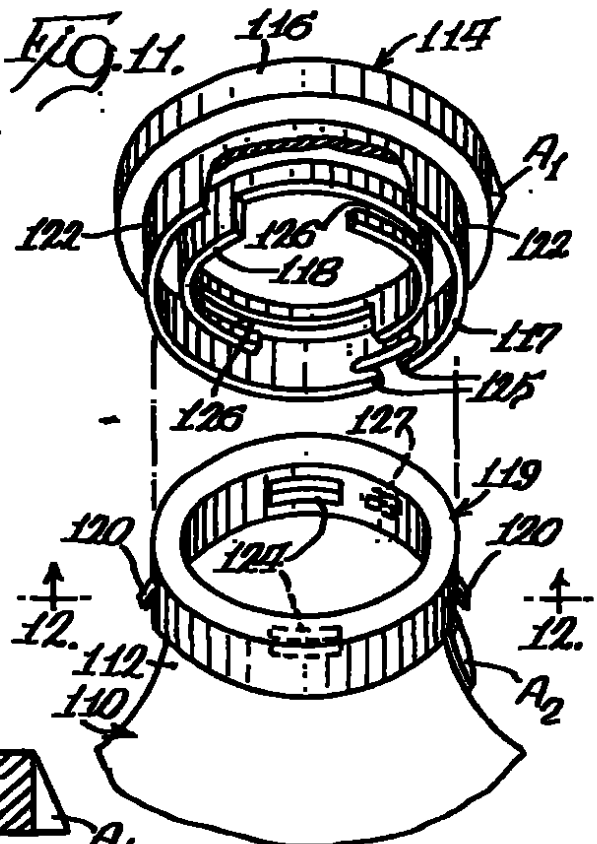
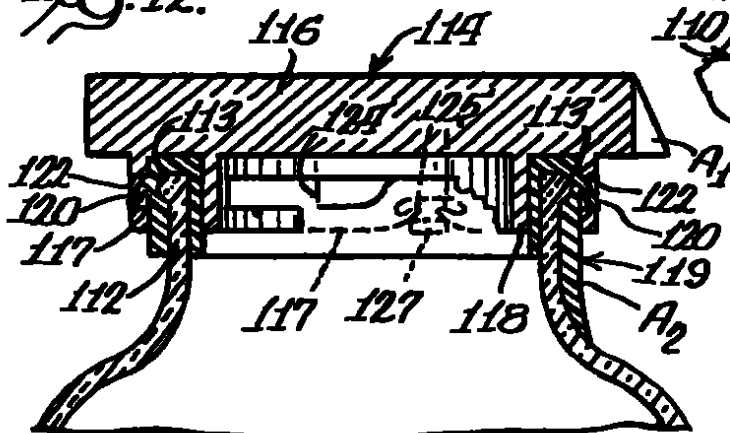
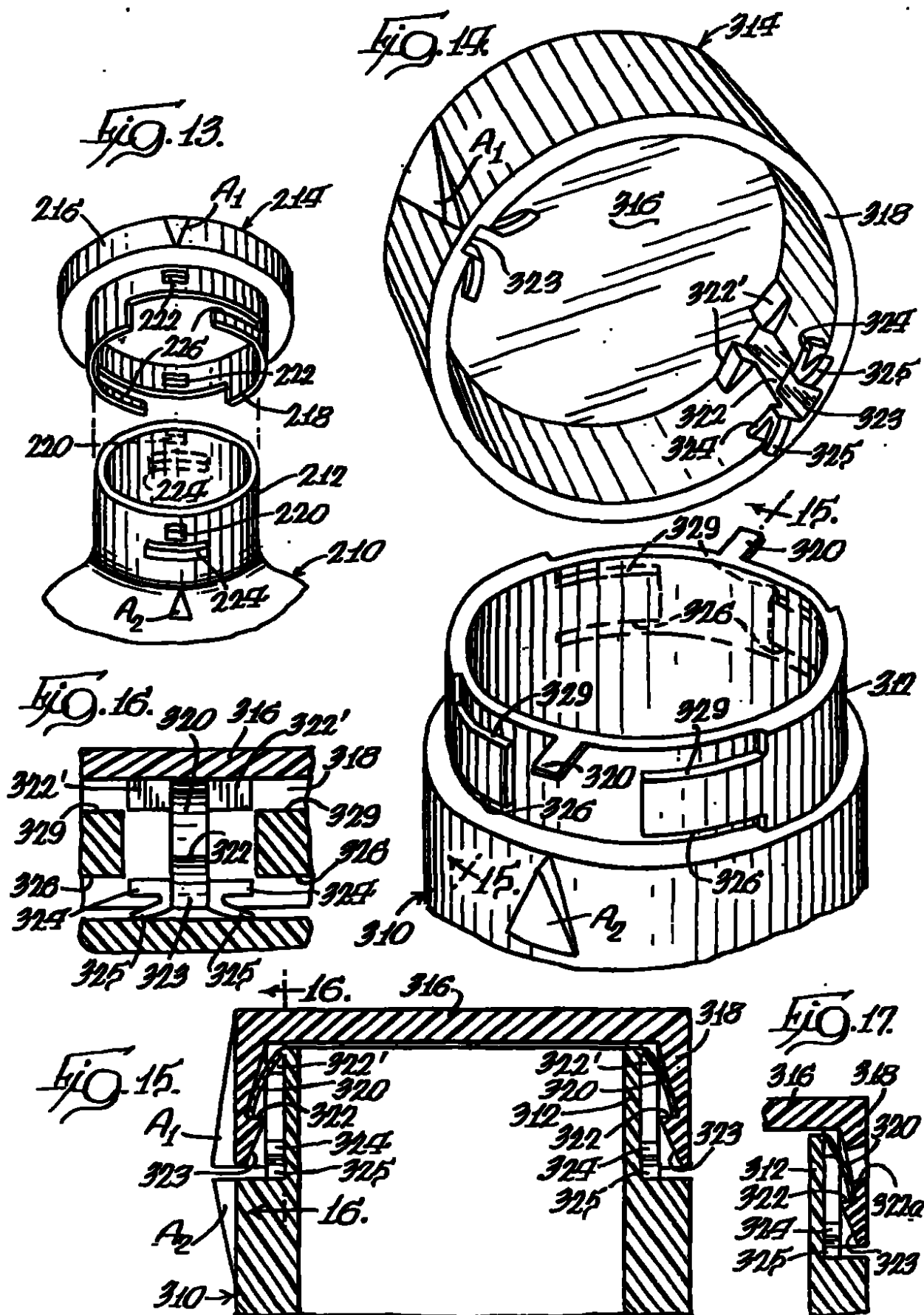


Fig. 12.





TAMPER-INDICATING ARRANGEMENT FOR A CONTAINER

TECHNICAL FIELD

The present invention relates generally to tamper-indicating closure arrangements for a container, and more particularly to a tamper-indicating arrangement which permits a closure to be initially fitted to a container in a first position with respect thereto, and subsequently reapplied to the container in a reoriented second position.

BACKGROUND OF THE INVENTION

It is extremely desirable to provide tamper-indicating arrangements for containers such as for food products and drugs. Such arrangements should provide a clear verification for a purchaser that the product being purchased is in its original, unopened container.

While the desirability of tamper-indicating arrangements is well-recognized, it is also important that such arrangements be straightforward in construction for economical manufacture, as well as reliable for indicating tampering. Additionally, such arrangements should not be unduly difficult to operate when access to the contents of the container is desired. Such arrangements should also permit a closure to be easily reapplied to a container after it is initially opened.

The present tamper-indicating arrangement meets these desired goals with a straightforward and highly effective tamper-indicating construction. Notably, the present invention is readily adaptable for retrofit to existing container constructions.

SUMMARY OF THE INVENTION

The present tamper-indicating arrangement contemplates a construction which permits a closure to be initially applied to a container and retained thereon in a first position, and subsequently reapplied to the container and retained thereon in a second, reoriented position. Suitable indicia preferably provided on the closure and the container provide a clear visual indication of the relative position of the closure with respect to the container, thus permitting a purchaser to easily verify that the container is unopened.

The present tamper-indicating arrangement includes a closure adapted to close the open mouth defined by the neck portion of a container. A first coacting arrangement is provided on the closure and the container for permitting the closure to be applied thereto and retained in place in a first position with respect to the container. In the preferred embodiment, this first coacting arrangement includes one or more first projections provided on one of the closure and container, and one or more first openings on the other of the container and closure. The first openings are adapted to respectively receive the first projections, preferably by generally axial movement of the closure onto the container, such as by a press-fit, for retention of the closure on the container in a first position with respect thereto.

In the preferred embodiment, the first projections are fractureable, such as by manual relative rotation of the closure and the container. These first projections are intended to fracture when the closure is first removed from the container, and function such that the closure can no longer be retained in its first position with respect to the container after it is removed therefrom.

The present tamper-indicating arrangement further includes a second coacting arrangement on the closure and the container for retaining the closure thereon in a second position which is reoriented from the first position. The second coacting arrangement preferably comprises one or more second projections on one of the closure and the container, and one or more second openings on the other of the closure and container. The second openings are adapted to respectively receive the second projections to permit the closure to be reapplied to the container in its second reoriented position. In the preferred embodiment, the second openings comprise open-ended slots which are adapted to receive the second projections by generally axial movement of the closure onto the container, followed by relative rotation therebetween.

The tamper-indicating arrangement preferably includes means for visually indicating reorientation of the closure from its first position to its second position with respect to the container. In the illustrative embodiments, the indicating means are shown as arrow-like markings respectively provided on the closure and the container. This arrangement is illustrated for clarity of the following detailed description. However, it is presently contemplated that the reorientation indicating means of the present invention can be provided in many different ways, such as by suitable coloring of the closure and the container, suitable labels applied thereto, or any number of other like markings. The preferred indicating arrangement will in part depend upon the type of container for which the present arrangement is used.

In three of the illustrated embodiments, the components of the first and second coacting arrangements which are provided on the container are illustrated as integrally formed therewith. However, it will be recognized that these components can easily be provided by an annular adapter adapted to fit generally about the mouth of an existing container. This flexibility permits the present invention to be readily adapted for use with existing containers, with such an annular adapter member shown in another illustrated embodiment of the present invention.

Numerous other features and advantages of the present invention will become readily apparent from the following detailed description of the invention and the embodiments thereof, from the claims and from the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a closure and a container embodying the present tamper-indicating arrangement, with the closure retained on the container in a first, unopened position;

FIG. 2 is a perspective view of the closure and container shown in FIG. 1 illustrating the closure retained on the container in a second position reoriented from the first position;

FIG. 3 is a top plan view of the closure and container illustrated in FIG. 1;

FIG. 4 is an enlarged, partial perspective view of the closure and container of FIG. 1 shown before initial application of the closure to the container;

FIG. 5 is a cross-sectional view taken generally along lines 5-5 of FIG. 1;

FIG. 6 is a cross-sectional view taken generally along lines 6-6 of FIG. 5;

FIG. 7 is a cross-sectional view taken generally along lines 7-7 of FIG. 5;

FIG. 8 is a view similar to FIG. 6 illustrating the function of the present tamper-indicating arrangement when the container is initially opened;

FIGS. 9 and 10 are views similar to FIG. 7 illustrating functioning of the present tamper-indicating arrangement when the closure is reapplied to the container;

FIG. 11 is a perspective view of an alternate embodiment of the present tamper-indicating arrangement illustrating a closure and an associated container before initial application of closure to the container;

FIG. 12 is a view taken generally along lines 12--12 of FIG. 11;

FIG. 13 is a perspective view of another alternate embodiment of the present invention;

FIG. 14 is a perspective view of a further embodiment of the present invention;

FIG. 15 is a view taken generally along lines 15--15 of FIG. 14;

FIG. 16 is a view taken generally along lines 16--16 of FIG. 15; and

FIG. 17 is fragmentary view similar to FIG. 15 illustrating a modification of the embodiment shown in FIGS. 13-16.

DETAILED DESCRIPTION

While the present invention is susceptible of embodiment in different forms, there is shown in the drawings and will hereinafter be described various embodiments, with the understanding that the present disclosure is to be considered as an exemplification of the invention and is not intended to limit the invention to specific embodiments illustrated.

Referring now to FIGS. 1-5, therein is illustrated the tamper-indicating arrangement embodying the present invention. As will become apparent from the following description, the present invention can be readily adapted for use with existing containers, or can be embodied as a closure and a container particularly suited for use with each other.

The present invention is illustrated in association with a container 10 including a neck portion 12 defining an open mouth. It is contemplated that container 10 be suited for packaging and sale of products for which a tamper-indicating arrangement is desirable, such as food, drugs, beverages, and the like.

The present invention includes a closure 14 which is adapted to close the open mouth of container 10. In this embodiment, closure 14 includes a top wall portion 16, and an annular, skirt portion 18 depending from top wall portion 16. Depending upon the contents of container 10, closure 14 may include a suitable sealing arrangement such as a sealing liner or the like. Closure 14 can be formed from suitable plastic material, and can also be fabricated from metal, which can be desirable for some applications.

In accordance with the present invention, a first co-acting arrangement is provided on closure 14 and container 10 for retaining the closure on the container in a first position with respect thereto when the closure is initially applied to the container, such as during the packaging of the contents of the container. To this end, first locking projections are provided on one of the closure 14 and container 10, with the first locking projections being receivable within first openings defined by the other of the closure and the container.

Thus, the neck portion 12 of container 10 includes one or more first locking projections 20 (two being

illustrated) with first locking projections 20 projecting inwardly of the neck portion 12 of container 10. As will be described, first projections 20 are frangible, and are intended to fracture, break, or be otherwise permanently deformed attendant to the initial removal of closure 14 from container 10. Thus, projections 20 preferably comprise plastic material, and are preferably dimensioned to result in their fracture attendant to manual removal of closure 14 from container 10. If desired, projections 20 can be scored or otherwise preferentially weakened, such as by scores 21 as shown in FIG. 6.

First locking projections 20 are adapted to be respectively received within one or more first openings 22 defined by skirt portion 18 of closure 14. First openings 22 are preferably close-sided as shown, and can either extend through skirt portion 18 (as illustrated), or be provided by indentations in the skirt portion. First openings 22 coact with first locking projections 20 to retain closure 14 on container 10 in a first position with respect thereto. In the preferred embodiment, projections 20 are receivable within openings 22 by generally axial movement of closure 14 onto container 10, in the nature of a press-fit. This facilitates convenient initial application of the closure to the container during the packaging process.

Cam means are preferably provided on at least one of the closure and the container to facilitate correct positioning of projections 20 in openings 22 during initial application of the closure to the container. As best shown in FIG. 5, the preferred cam means can be provided by suitably inclining or angling the inwardly facing surface of projections 20 and/or by angling or inclining the portion of skirt portion 18 which engages projections 20 during closure application, as shown at 23. If desired, projections 20 can be configured to deflect downwardly during initial application of closure 14 to container 10, with the projections exhibiting sufficient resiliency and strength to prevent them from deflecting upwardly in a manner which would permit closure 14 to be removed without fracture or like permanent deformation of the projections 20.

In order to provide a purchaser with a clear indication that container 10 is unopened, suitable indicia are preferably provided on container 10 and closure 14 to afford a visual indication that the closure is in its first, unopened position on the container. Any number of suitable indicia can be provided for this purpose. In the illustrated embodiments, an arrow-like projection A₁ is shown provided on closure 14, with a similar arrow A₂ being provided on container 14. When closure 14 is in its first position with respect to container 10, arrows A₁ and A₂ are illustrated as being in alignment. While arrows such as A₁ and A₂ can be provided for visually indicating reorientation of closure 14 with respect to container 10, and have been shown for clarity of explanation, it is presently contemplated that suitable color coding labels, or other like markings be provided on the closure and the container for visually indicating the position of the closure on the container.

To further provide a visual indication that container 10 has not been opened, biasing means can be provided on one of the container 10 and the closure 14 for biasing the closure from the container. In this embodiment, such biasing means are provided by one or more resiliently flexible biasing tabs 25 on closure 14 which are adapted to engage container 10. When closure 14 is initially applied to container 12, the closure is held in a fully seated position on the container in opposition to

biasing tabs 25 by the coaction of first locking projections 20 with first openings 22, as shown in FIG. 8. After initial opening of the container by fracture of projections 20, the closure can no longer be retained in its first position on the container, with biasing tabs 25 acting to tilt or "prop-up" the closure on the container in a visually discernible manner. Thus, after projections 20 are fractured, biasing tabs 25 prevent closure 14 from fully seating on the container in the first position of the closure, and act to visually space the closure from the container.

In accordance with the present invention, a second coacting arrangement is provided on closure 14 and container 10 for retaining the closure on the container in a second position with respect thereto when the closure is subsequently reapplied to the container after its initial removal. While various arrangements can be provided for this purpose, it is presently contemplated that one or more second locking projections be provided on one of the closure and the container, with one or more second openings provided on the other of the closure and the container for receiving the second projections, and for coacting therewith to retain the closure on the container in a second position distinct from the first position.

Thus, in this embodiment, second locking projections 24 are provided on the inwardly facing surface of neck portion 12 of container 10. The second locking projections 24 are adapted to be received within second openings 26 defined by skirt portion 18 of closure 14, with the second openings comprising open-ended slots as shown. Second openings 26 are open-ended in the sense that they open downwardly of skirt portion 18 for receiving second projections 24. While illustrated as extending through skirt portion 18, openings 26 can be in the nature of indentations or grooves. Second locking projections 24 cooperate with second openings 26 by moving closure 14 generally axially onto container 10 (in opposition to biasing tabs 25, if provided), and then relatively rotating the closure and the container so that projections 24 are positioned at the closed end of openings 26, preferably in the nature of a bayonet-type fit.

FIGS. 6-10 illustrate use of this first embodiment of the present tamper-indicating arrangement. In these figures, the radially extending phantom line indicates the relative position of arrow A₁ on closure 14.

FIGS. 6 and 7 illustrate closure 14 on container 10 after the closure has been initially applied to the container, preferably by the above-described press-fitting. In this first position of closure 14 (note alignment of arrow A₁ and arrow A₂) first locking projections 20 are disposed within first openings 22 in skirt portion 18, with the projections and openings cooperating to securely retain closure 14 on the container. FIG. 7 illustrates the disposition of the second locking projections 24 generally within the downwardly open portion of second openings 26 in skirt portion 18. When the present invention is configured as illustrated in these figures, second openings 26 and second projections 24 do not cooperate to retain the closure on the container in the first position of the closure thereon.

FIGS. 8 and 9 illustrate the action of the present tamper-indicating arrangement when closure 14 is first removed from container 10. As noted, first locking projections 20 are intended to fracture, such as by shearing, preferably by manual relative rotation of closure 14 with respect to container 10. If desired, the portion of skirt portion 18 which defines first openings

22 and which bears against and fractures projections 20 during rotation of the closure can be shaped to provide a cutting edge for more efficient shearing of projections 20. The desirability of providing such a cutting edge and/or scores such as 21 (FIG. 6) will depend upon the materials and dimensions of the coacting elements of the present tamper-indicating arrangement. FIG. 9 illustrates the preferred relative spacing of second locking projections 24 with respect to second openings 26 which permits relative rotation of closure 14 and container 12 for fracture of projections 20 without interference from locking projections 24. Notably, after closure 14 is initially removed from container 10 and first locking projections 20 fracture, closure 14 can no longer be retained in its first position on container 10. The provision of biasing tabs 25 prevents closure 14 from fully seating on container 10 in its first position after projections 20 fracture, thus providing a clear visual indication of opening.

Referring now to FIG. 10, reapplication of closure 14 to container 12 is shown, with the cooperation of second locking projections 24 and second openings 26 being illustrated. When closure 14 is reapplied to container 12 by generally axial movement thereon, followed by relative rotation, projections 24 are received within openings 26 for securely retaining closure 14 on container 10 in its second, reoriented position with respect to the container. FIG. 2 illustrates closure 14 in its second position on container 10, and as is evident from this figure as well as from FIG. 10, the misalignment of arrows A₁ and A₂ when closure 14 is in its second position on container 10 provides a clear visual indication that the closure has been removed and reapplied to the container.

For some applications of the present invention, it can be desirable to retrofit the invention to existing containers. While the above-described embodiment has been illustrated with the components of the first and second coacting arrangements on the container 14 (i.e., projections 20 and 24) as integrally formed therewith, it will be recognized that the present invention can be embodied with a generally annular member adapted to fit generally about the open mouth of the container on neck portion 12. Such an alternate embodiment is illustrated in FIGS. 11 and 12.

FIGS. 11 and 12 illustrate a container 110, such as a jar or the like, including a neck portion 112 defining an open mouth, with a thread formation 113 on the neck portion 112. Such a thread formation is usually provided on a container for coaction with an associated threaded closure.

In this embodiment, a closure 114 is provided, including a top wall portion 116 and first and second, generally concentric annular skirt portions 117 and 118 depending from top wall portion 116.

In order to permit the present tamper-indicating arrangement to be used on a container such as 110, an annular adapter member 119 is provided which is adapted to fit on neck portion 112 generally about the open mouth of the container. In this illustrated embodiment, adapter member 119 is adapted to be pressed, threaded, or otherwise fitted to neck portion 112 of container 110. Adapter member 119 is preferably secured against rotation on container 110 such as by swaging, shrink-fitting, interference fitting, or like deforming of the adapter member so that it closely fits and coacts with thread formation 113. Naturally, the manner in which adapter member 119 is secured to a con-

tainer such as 110 to substantially prevent rotation therebetween will depend upon the configuration of such a container, as well as the configuration of the adapter member.

This embodiment of the present invention is intended to function in a manner similar to that of the above-described embodiment. A first coacting arrangement is provided for retaining closure 114 on container 110, and comprises one or more first projections on one of the closure 114 and the adapter member 119, and one or more first openings defined by the other of the closure and the adapter member. Specifically, first locking projections 120 are provided on the outwardly facing surface of adapter member 119, with projections 120 being receivable within first openings 122 defined by the first skirt portion 117 of closure 114. First projections 120 are adapted to cooperate with first openings 122 for retaining closure 114 on container 110 in a first position with respect thereto. First projections 120 and first openings 122 are preferably configured to permit closure 114 to be initially applied by generally axial movement onto container 112, such as by press-fitting. To this end, projections 120 are illustrated as being undercut to provide them with a hinge-like action about their upper portions to facilitate their correct positioning within openings 122 (see FIG. 12).

In this embodiment, a second coacting arrangement is provided by one or more projections on one of closure 114 and adapter member 119, with one or more respective openings provided on the other of the closure and adapter member. To this end, second locking projections 124 are provided on the inwardly facing surface of adapter member 119, with second projections 124 being adapted to be received within second openings 126 defined by the second skirt portion 118 of closure 114. It will be noted that second openings 26 are generally configured as open-ended slots, and are adapted to receive second projections 124 by generally axial movement of closure 114 onto container 110, followed by relative rotation of the closure and the container. As with the previously described embodiment, second projections 124 cooperate with second openings 126 to retain closure 114 on container 110 in a second position which is reoriented from the first position of the closure with respect to the container.

In this embodiment, biasing means are provided for preventing closure 140 from fully seating on adapter member 119 on container 110 in the first position of the closure after fracture of first projections 120. The biasing means include resiliently flexible biasing tabs 125 defined by first skirt portion 117 of the closure, which are adapted to biasingly engage and coact with an abutment 127 on the outer surface of adapter member 119. When closure 114 is initially applied to container 110, the closure is fully seated and retained in its first position on the container by coaction of first projections 120 with first openings 122 in opposition to biasing tabs 125 (see FIG. 12). After closure 114 is initially removed by fracture of first projections 120, the biasing action of tabs 125 against abutment 127 prevents the closure from fully seating again in its first position on the container, thus providing a visual indication of opening.

After closure 114 has been initially applied to container 110, the closure can be removed by relative rotation with respect to the container and adapter member 119, resulting in fracture of first projections 120. To assure proper function, first projections 120 are preferably configured so that the force required for their fail-

ure is substantially less than the force required to relatively rotate adapter member 119 and container 110.

A further embodiment of the present invention is illustrated in FIG. 13, with the reference numerals in this figure indicating the correspondence of the various elements to the previous described embodiments. Essentially, this embodiment functions in the same manner as the embodiment of FIGS. 1-10, with first locking projections 220 and second locking projection 224 being provided on the outwardly facing surface of neck portion 212 of container 210. Projections 220 are respectively receivable within first openings 222 defined by skirt portion 218 of closure 214 for retaining the closure on the container in a first position. Projections 220 are fractureable attendant to relative rotation of the closure on the container, with second locking projections 224 being receivable within second openings 226 defined by skirt portion 218 for retaining closure 214 on the container in a second reoriented position.

A further embodiment of the present invention is illustrated in FIGS. 14-17, with the reference numerals in these figure indicating the correspondence of various elements to the previous described embodiments. This embodiment functions in essentially the same manner as the previously described embodiments, and includes first and second coacting arrangements for retaining the closure on the associated container in two distinct positions.

Accordingly, FIGS. 14-16 illustrate a container 310 including a neck portion 312 defining an open mouth. Closure 314 is adapted to fit on container 310 to close the mouth thereof, and includes a top wall portion 316 and a depending skirt portion 318.

In accordance with the present invention, a first coacting arrangement is provided on the closure 314 and the container 310 for retaining the closure on the container in a first position with respect thereto. Specifically, container 310 includes fractureable, first locking projections 320 which are adapted to be respectively received within first openings 322 defined by skirt portion 318 of closure 314 attendant to press-fitting. Cam surfaces 323 can be provided on skirt portion 318 to facilitate positioning of first projections 320 in first openings 322, with the first projections 320 exhibiting sufficient resilient flexibility to fit within first openings 322 and retain closure 314 on container 310 in a first position with respect thereto.

In a manner similar to the above-described embodiments, first projections 320 are intended to fracture attendant to initial opening of container 310. In this embodiment, a pair of shear bosses 322' are provided on opposite sides of each of first openings 322. Shear bosses 322' are adapted to engage first projections 320 attendant to relative rotation of the closure and the container when the container is initially opened to facilitate shearing of first projection 320. This configuration facilitates initial opening of the container by relative rotation of closure 314 in either direction.

In order to permit closure 314 to be reapplied to container 310 and retained thereon in a second, reoriented position, second locking projections 324 are provided on the inside surface of skirt portion 318 of closure 314. In this embodiment, a pair of second projections 324 are provided on respective opposite sides of the cam surfaces 323 provided on closure 314. Second projections 324 are adapted to be received within second openings 325 defined by the neck portion 312 of container 310. Each opening 326 is configured generally

as an open-ended slot, with each opening 326 being adapted to receive and retain a respective pair of second projections 324 when closure 314 is moved generally axially onto container 310 and relatively rotated. As will be appreciated, the configuration of second openings 326 in this embodiment permits closure 314 to be 5 reappplied to container 310 by generally axial movement of the closure onto the container, followed by relative rotation of the closure and the container in either direction. To facilitate reapplication of the closure to the container in this manner, slot-like openings 320 are provided for receiving shear joints 327 when the closure 314 is reappplied to container 310 in its second, reoriented position.

After initial opening of the container attendant to fracture of first projections 320, closure 314 can no longer be retained in its first position on container 310. In order to provide a visual indication that the container has been opened, this embodiment of the present invention includes spring tabs 325 which engage container 310, and prevent closure 314 from fully seating on the container in its first position after first projections 320 have fractured. In this embodiment, spring tabs 325 are illustrated as formed integrally with second locking projections 324. When closure 314 is reappplied to container 310 after its initial opening, spring tabs 325 resiliently deform, and are adapted to fit within second openings 326 (with projections 324) when closure 314 is reappplied to container 310 in its second, reoriented position.

As noted previously, embodiments of the present invention wherein the first openings adapted to receive first locking projections are defined by a skirt portion of the closure of the arrangement may be configured such that the first openings do or do not extend through the skirt portion of the closure. Thus, in the embodiment illustrated in FIGS. 14-16, first openings 322 are illustrated as not extending through skirt portion 312. FIG. 17 illustrates a modification wherein first openings 322 each include a portion 322a which extends through skirt portion 312, thus facilitating visual inspection of first locking projections 320 within first openings 322 before closure 314 is initially removed from container 310. By suitable coloring of first projections 320, their presence or absence can be more easily visually discerned.

Thus, a tamper-indicating arrangement for a container is disclosed which is straightforward in construction for economical manufacture, and which reliably indicates initial opening of a container in a manner which facilitates convenient use of the arrangement. Additionally, the arrangement can be readily retrofitted for use with existing container constructions.

From the foregoing, it will be observed that numerous variations and modifications may be effected without departing from the true spirit and scope of the concept of the present invention. It will be understood that no limitation with respect to the specific embodiments illustrated herein is intended or should be inferred. It is, of course, intended to cover by the appended claims all such modifications as fall within the scope of the claims.

What is claimed is:

1. A tamper-indicating arrangement for a container having a neck portion defining an open mouth comprising:

- a closure adapted to close said mouth;
- coacting means on said closure and said container for permitting said closure to be applied to said container and retained in place thereon in a first position

with respect to said container, and for permitting said closure to be reappplied to said container after removal therefrom, and retained on said container in a second position with respect to said container; and

indicating means for visually indicating reorientation of said closure from said first position to said second position with respect to said container.

2. The tamper-indicating arrangement in accordance with claim 1, wherein

said coacting means includes fractureable means which fracture when said closure is first moved from its first position after said closure is initially applied to said container.

3. The tamper-indicating arrangement in accordance with claim 2, wherein

said coacting means permits said closure to be moved generally axially onto said container and retained thereon in said first position when said closure is initially applied to said container, said fractureable means being adapted to fracture attendant to relative rotation of said closure and container for removal of said closure from said container.

4. The tamper-indicating arrangement in accordance with claim 1, including

biasing means on one of said closure and said container, said biasing means acting to prevent said closure from fully seating on said container in said first position after initial removal of said closure from said container.

5. The tamper-indicating arrangement in accordance with claim 1, wherein

said coacting means comprises first coacting means on said closure and said container for retaining said closure in said first position, and second coacting means on said closure and said container for retaining said closure in said second position.

6. The tamper-indicating arrangement in accordance with claim 5, wherein

said first coacting means comprises first projection means on one of said neck portion and said closure, and first opening means defined by the other of said neck portion and said closure, said first opening means being adapted to receive said first projection means when said closure is in said first position on said container for retaining said closure on said container.

7. The tamper-indicating arrangement in accordance with claim 6, wherein

said first projection means comprises fractureable means adapted to fracture when said closure is moved from said first position.

8. The tamper-indicating arrangement in accordance with claim 6, wherein

said second coacting means comprises second projection means on one of said neck portion and said closure, and second opening means defined by the other of said neck portion and said closure, said second opening means being adapted to receive said second projection means when said closure is in said second position on said container for retaining said closure on said container.

9. The tamper-indicating arrangement in accordance with claim 8, wherein

said second projection means is receivable within said second opening means by moving said closure generally axially onto said container, and relatively

11

rotating said closure and container to move said closure to said second position.

10. The tamper-indicating arrangement in accordance with claim 8, wherein

said first and second coacting means on said container are provided by annular means adapted to fit on the neck portion of the container generally about said open mouth.

11. A tamper-indicating arrangement for a container having a neck portion defining an open mouth, comprising

a closure adapted to close said open mouth;
first coacting means on said closure and said container for permitting said closure to be initially applied to said container by generally axial movement of said closure onto said container, said first coacting means being adapted to retain said closure on said container in a first position with respect thereto, said first coacting means including fractureable means adapted to fracture when said closure is first removed from said container;

second coacting means on said closure and said container for permitting said closure to be reapplied to said container after removal therefrom, and retained on said container in a second position with respect to said container.

12. A tamper-indicating arrangement in accordance with claim 11, including

indicating means for visually indicating reorientation of said closure from said first position to said second position with respect to said container.

13. A tamper-indicating arrangement in accordance with claim 11, wherein

said first coacting means comprises first projection means on said container which provides said fractureable means, and first opening means defined by said closure adapted to receive said first projection means in the first position of said closure with respect to said container.

14. A tamper-indicating arrangement in accordance with claim 13, wherein

said second coacting means comprises second projection means on said container, and second opening means defined by said closure adapted to receive said second projection means in the second position of said closure with respect to said container.

12

15. A tamper-indicating arrangement in accordance with claim 14, wherein

said closure includes a top wall portion and a depending skirt portion, said first and second opening means being defined by said skirt portion, said second opening means comprising open-ended slot means whereby said second projection means is receivable in said slot means by moving said closure generally axially onto said container and then relatively rotating said container and said closure to position said closure in said second position.

16. A tamper-indicating arrangement in accordance with claim 14, wherein

said closure includes a top wall portion and first and second depending skirt portions, said first skirt portion defining said first opening means, and said second skirt portion defining said second opening means.

17. A tamper-indicating arrangement in accordance with claim 14, wherein

said first and second projection means projects from an annular adapter adapted to fit on the neck portion of said container generally about the mouth thereof.

18. A tamper-indicating arrangement in accordance with claim 13, wherein

said closure includes a top wall portion, and a depending skirt portion defining said first opening means;

said second coacting means comprising second projection means on the inside surface of said skirt portion, said second opening means being defined by the outwardly facing surface of said neck portion of said container, said second opening means being adapted to receive said second projection means by generally axial movement of said closure onto said container followed by relative rotation of said closure and said container.

19. A tamper-indicating arrangement in accordance with claim 11, including

means for biasing said closure from said container on one of said closure and said container, said biasing means acting to prevent said closure from fully seating on said container in said first position after fracture of said fractureable means to visually indicating opening of said container.

* * * * *

30

35

60

65

①9 BUNDESREPUBLIK
DEUTSCHLAND



DEUTSCHES
PATENTAMT

⑫ Offenlegungsschrift
⑩ DE 42 29 604 A 1

⑤ Int. Cl.⁵:
B 65 D 51/20
B 65 D 41/62
B 65 D 39/08

⑲ Aktenzeichen: P 42 29 604.8
⑳ Anmeldetag: 4. 9. 92
㉑ Offenlegungstag: 10. 3. 94

DE 42 29 604 A 1

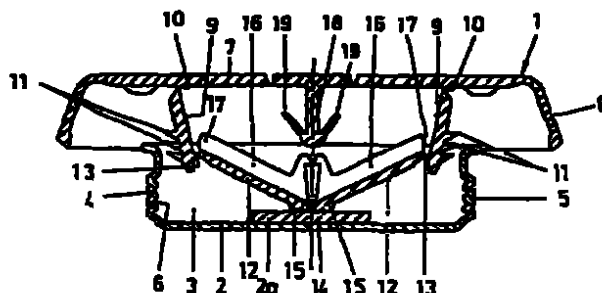
⑦1 Anmelder:
Merck Patent GmbH, 64283 Darmstadt, DE

⑦2 Erfinder:
Kraft, Dieter, 8101 Roßdorf, DE

Prüfungsantrag gem. § 44 PatG ist gestellt

⑤4 Siegelkappe für einen Sicherheitsverschluß

⑤7 Eine Siegelkappe (1) für einen Sicherheitsverschluß besteht aus Kunststoff und ist zur formschlüssigen Verbindung mit einer Verschlußschraube (2) des Sicherheitsverschlusses bestimmt. Zwei von der Deckfläche (7) der Siegelkappe (1) nach unten vorragende, gelenkig angebrachte Verankerungsklappe (8) sind über zwei gelenkig miteinander verbundene Spreizstreben (12) miteinander verbunden. Beim Aufdrücken der Siegelkappe (1) werden die beiden Spreizstreben (12) in eine im wesentlichen gestreckte Stellung gedrückt und spreizen dabei die beiden Verankerungsklappen (8) auseinander, wobei diese mit Ankerzähnen (11) in Rillen (6) am Innenrand der Verschlußschraube (2) eingreifen. Die beiden Spreizstreben (12) treten in Eingriff mit einem mit der Deckfläche (7) verbundenen Raststeg (18). Die Siegelkappe (1) kann nur durch Zerstörung geöffnet werden.



DE 42 29 604 A 1

Die Erfindung betrifft eine Siegelkappe für einen Sicherheitsverschluß, der eine Verschlußschraube mit einer nach oben offenen Ausnehmung mit mindestens einer Hinterschneidung aufweist, wobei die Siegelkappe eine die Verschlußschraube überdeckende Deckelfläche und einen den Rand des Sicherheitsverschlusses übergreifenden Kappenrand aufweist.

Die bekannten Siegelkappen solcher Sicherheitsverschlüsse (DIN 6643) bestehen aus Stahlblech. Sie haben die Form eines flachen tiefgezogenen Napfes. Der Rand der Siegelkappe greift über den äußeren Rand des Sicherheitsverschlusses und wird mittels eines speziellen Werkzeugs formschlüssig mit diesem verbunden, so daß die Siegelkappe zerstört werden muß, wenn der Sicherheitsverschluß geöffnet werden soll.

Der Arbeitsaufwand für das Aufbringen der Siegelkappe ist verhältnismäßig hoch, zumal ein spezielles Werkzeug hierfür erforderlich ist. Durch die beim Aufreißen der Siegelkappe entstehenden scharfen Blechkanten besteht eine Verletzungsgefahr. Da die Siegelkappen aus Stahlblech bestehen, kann es bei Rostbildung zu einer Verunreinigung des Behälterinhalts kommen.

Aufgabe der Erfindung ist es daher, eine Siegelkappe der eingangs genannten Gattung zu schaffen, die in einfacher Weise und ohne Verwendung eines speziellen Werkzeugs aufgebracht werden kann.

Diese Aufgabe wird erfindungsgemäß dadurch gelöst, daß die Siegelkappe aus Kunststoff besteht und mindestens ein von der Deckelfläche nach unten vorspringendes Verankerungselement aufweist, das die Hinterschneidung der Verschlußschraube in geschlossenem Zustand hintergreift und formschlüssig verrastet ist.

Die Siegelkappe kann in einfacher Weise von Hand auf die Verschlußschraube aufgesetzt werden, wobei das Verankerungselement mit der zugeordneten Hinterschneidung innerhalb der Ausnehmung der Verschlußschraube in Eingriff tritt. Ein besonderes Werkzeug ist hierfür nicht erforderlich. Da die einrastende Verbindung zwischen der Siegelkappe und der Verschlußschraube innerhalb der Ausnehmung der Verschlußschraube und nicht am äußeren Rand des Sicherheitsverschlusses erfolgt, ist diese Verbindungsstelle nach dem Einrasten nicht mehr von außen zugänglich, so daß eine nachträgliche Manipulation, insbesondere ein Öffnen des Verschlusses ohne Zerstörung der Siegelkappe nicht mehr möglich ist. Damit sind die Anforderungen an einen Originalitätsverschluß gegeben.

Da die Siegelkappe aus Kunststoff besteht, ist die Gefahr einer Rostbildung und somit einer Verunreinigung des Behälterinhalts ausgeschlossen. Beim Aufreißen der Siegelkappe entstehen keine scharfen Blechkanten, die eine Verletzungsgefahr herbeiführen.

Gemäß einer bevorzugten Ausführungsform der Erfindung ist bei Verwendung einer Verschlußschraube, die am Innenrand ihrer Ausnehmung mindestens eine umlaufende Rille aufweist, vorgesehen, daß als Verankerungselement zwei gelenkig mit der Deckelfläche verbundene Verankerungsklappen nach unten ragen, die jeweils an ihrer Außenkante in die umlaufende Rille am Innenrand der Verschlußschraube eingreifende Ankerzähne aufweisen, und daß die beiden Verankerungsklappen durch zwei sich am Boden der Ausnehmung der Verschlußschraube abstützende, gelenkig miteinander verbundene Spreizstreben miteinander verbunden sind.

Eine solche umlaufende Rille ist üblicherweise am In-

nenrand der Ausnehmung der Verschlußschrauben schon durch die Herstellung des Außengewindes der Verschlußschraube gebildet, so daß diese Rille oder mehrere Rillen, als Hinterschneidungen für die Verankerung der Siegelkappe genutzt werden können.

Durch die Verbindung der beiden schwenkbar an der Deckelfläche angebrachten Verankerungsklappen durch die gemeinsamen Spreizstreben wird erreicht, daß die beiden Verankerungsklappen in ihrer Verankerungsstellung mit großer Steifigkeit festgehalten werden, weil sich die beiden Verankerungsklappen über die Spreizstreben diagonal gegeneinander abstützen. Infolge des formschlüssigen Eingriffs der Ankerzähne der Verankerungsklappen an den Hinterschneidungen der Verschlußschraube kann die Siegelkappe, die im verschlossenen Zustand ein in sich weitgehend formstefes Bauteil darstellt, nur nach Zerstörung gelöst werden. Die Anforderungen an einen Originalitätsverschluß sind daher in hohem Maße erfüllt.

Das Aufsetzen der Siegelkappe erfolgt in einfacher Weise durch Druck oder Schlag von oben. Die hierfür benötigte Kraft ist verhältnismäßig gering, weil durch die Schwenkung der gelenkig miteinander verbundenen Spreizstreben eine hohe Kraftübersetzung nach Art eines Kniehebelgelenks erzielt wird. Die Siegelkappe kann daher mit verhältnismäßig geringer Kraft aufgebracht werden; sie stellt im verschlossenen Zustand jedoch ein in sich so formstefes Gebilde dar, daß sie nur nach Zerstörung gelöst werden kann.

Gemäß einer bevorzugten Ausführungsform ist vorgesehen, daß die beiden Spreizstreben im geschlossenen Zustand mit mindestens einem von der Deckelfläche vorspringenden Rastelement in Eingriff stehen. Dadurch werden die Spreizstreben im geschlossenen Zustand auch dann sicher in ihrer Verriegelungsstellung gehalten, wenn durch äußere Kräfte eine Verformung der Siegelkappe erfolgt.

Gemäß einer weiteren Ausführungsform der Erfindung ist für Verschlußschrauben, in deren Ausnehmung zwei seitlich offene Ösen angeordnet sind, vorgesehen, daß als Verankerungselemente zwei mit der Deckelfläche verbundene und sich im Abstand parallel zu dieser erstreckende Verankerungszungen vorgesehen sind, die durch eine Drehbewegung der Siegelkappe seitlich in die Ösen einführbar sind, und daß die Verankerungszungen an ihren freien Enden die Ösen hintergreifende Widerhaken aufweisen.

Solche seitlich offenen Ösen sind an den herkömmlichen Verschlußschrauben ohnehin vorgesehen. Die Verbindung mit der Siegelkappe erfolgt durch eine einfache Drehbewegung, bis die Verankerungszungen so weit in die Ösen eingesteckt sind, daß die Widerhaken an den Ösen einrasten. Eine Rückdrehbewegung zum Öffnen der Siegelkappe wird dadurch formschlüssig verhindert, so daß die Siegelkappe beim Öffnen zerstört werden muß.

Gemäß einer anderen Ausführung der Erfindung ist vorgesehen, daß die Verankerungselemente mindestens zwei von der Deckelfläche nach unten vorspringende Rasthaken sind, die elastisch und formschlüssig hinter gegenüberliegende Hinterschneidungen der Verschlußschraube einrasten.

Die Verbindung der Siegelkappe mit der Verschlußschraube erfolgt hierbei durch einfaches Aufdrücken, bis die Rasthaken hinter den Hinterschneidungen einrasten. Da es sich um eine formschlüssige Verbindung handelt, ist auch hier ein Lösen nur unter Zerstörung der Siegelkappe möglich.

493

Weitere vorteilhafte Ausgestaltungen des Erfindungsgedankens sind Gegenstand weiterer Unteransprüche.

Nachfolgend werden Ausführungsbeispiele der Erfindung in der Zeichnung erläutert. Es zeigt:

Fig. 1 eine Siegelkappe für einen Sicherheitsverschluß in einem Schnitt in der Stellung vor dem Aufbringen der Siegelkappe,

Fig. 2 die Siegelkappe nach Fig. 1 mit der zugehörigen Verschlußschraube im geschlossenen Zustand,

Fig. 3 einen Schnitt längs der Linie III-III in Fig. 2,

Fig. 4 eine andere Ausführungsform einer Siegelkappe mit zugehöriger Verschlußschraube, größtenteils in einem Schnitt,

Fig. 5 eine Draufsicht auf die Siegelkappe nach Fig. 4, teilweise geschnitten längs der Linie V-V in Fig. 4,

Fig. 6 in einem Schnitt ähnlich der Fig. 4 eine weitere Ausführungsform einer Siegelkappe mit Verschlußschraube und

Fig. 7 eine Draufsicht auf die Siegelkappe nach Fig. 6.

Die in den Fig. 1—3 dargestellte Siegelkappe 1 ist einstückig aus Kunststoff hergestellt und ist zur Verbindung mit einer Verschlußschraube 2 eines Sicherheitsverschlusses eines Flüssigkeitsbehälters bestimmt, insbesondere eines Sicherheitsverschlusses nach DIN 6643 für einen Spundbehälter aus Stahl.

Die Verschlußschraube 2 weist eine nach oben offene Ausnehmung 3 mit einem Rand 4 auf, an dem ein Außengewinde 5 ausgebildet ist. Bei der Herstellung des Außengewindes 5 an der aus Blech geformten Verschlußschraube 2 entstehen am Innenrand Rillen 6, die Hinterschneidungen darstellen.

Die Siegelkappe 1 weist eine die Verschlußschraube 2 überdeckende, im wesentlichen ebene Deckelfläche 7 auf, die in einen den Rand des Sicherheitsverschlusses übergreifenden Kappenrand 8 übergeht.

Von der Deckelfläche 7 springen an einander gegenüberliegenden Stellen zwei Verankerungsklappen 9 nach unten vor, die mit der Deckelfläche 7 jeweils über einen dünnen Gelenksteg 10 gelenkig verbunden sind.

Die beiden Verankerungsklappen 9 weisen jeweils an ihrer Außenseite mehrere Ankerzähne 11 auf. Die beiden Verankerungsklappen 9 sind durch zwei diametral angeordnete Spreizstreben 12 miteinander verbunden. Jede Spreizstrebe 12 ist über einen Gelenksteg 13 gelenkig mit der zugeordneten Verankerungsklappe 9 verbunden. In der Mitte der Siegelkappe 1 sind die beiden Spreizstreben 12 miteinander durch einen Gelenksteg 14 verbunden. Das durch den Gelenksteg 14 gebildete Gelenk liegt in dem in Fig. 1 dargestellten Ausgangszustand der Siegelkappe 1 am untersten Punkt der Spreizstreben 12, d. h. die beiden Spreizstreben 12 erstrecken sich von den Gelenksten 14 in flacher V-förmiger Anordnung schräg nach oben zu den beiden Verankerungsklappen 10, die gegenüber der Senkrechten nach innen geschwenkt sind.

In dieser Stellung kann die Siegelkappe 1 auf die Verschlußschraube 2 aufgesetzt werden, wie in Fig. 1 dargestellt ist. Mit ihren beiden inneren Enden, an denen jeweils ein unterer Stützwulst 15 vorgesehen ist, stützen sich die beiden Spreizstreben 12 am Boden der Ausnehmung 3 an einem dort üblicherweise angebrachten Blechstreifen 2a ab. Wenn die Siegelkappe 1 nun durch Druck oder Schlag von oben auf die Verschlußschraube 2 gedrückt wird, werden die inneren Enden der Spreizstreben 12 bis über ihre horizontale Stellung in die in Fig. 2 gezeigte Stellung gedrückt. Die Spreizstreben 12 spreizen dabei die beiden Verschlußklappen 9 auseinander

der bis in die dargestellte senkrechte Stellung. Zugleich werden deren Ankerzähne 11 in die Rillen 6 am Innenrand der Verschlußschraube 2 eingedrückt und bilden dort eine formschlüssige Rastverbindung.

Jede Spreizstrebe 12 weist an ihrer Oberseite eine Rippe 16 auf, die sich an ihrem äußeren Ende mit einem Vorsprung 17 im geschlossenen Zustand (Fig. 2) an der Innenseite der jeweils gelenkig angeschlossenen Verankerungsklappe 9 abstützt. Dadurch wird die Verankerungsklappe stabil in ihrer Stellung gehalten, in der die Ankerzähne 11 in die Rillen 6 eingreifen.

Ein mit der Deckelfläche 7 verbundener Raststeg 18 bildet ein von der Deckelfläche 7 nach unten vorspringendes Rastelement, das im geschlossenen Zustand mit den beiden Spreizstreben 12 in Rasteingriff tritt.

Hierzu ist der Raststeg 18 an seinem unteren Ende im Querschnitt im wesentlichen pfeilförmig ausgebildet und weist beiderseits eine Rastkante 19 auf, die im geschlossenen Zustand (Fig. 2) von jeweils einem Rasthaken 20 hintergriffen wird, der mit der zugeordneten Spreizstrebe 12 verbunden und als oberer Vorsprung der Rippe 16 ausgeführt ist.

Zugleich bildet der Raststeg 18 mit seinem unteren Ende einen Anschlag für die inneren Enden der beiden Spreizstreben 12. Dadurch wird verhindert, daß sich die Spreizstreben 12 nach Überschreiten ihrer gestreckten Stellung weiter nach oben bewegen. Wie die Fig. 2 zeigt, bleiben die Spreizstreben 12 im geschlossenen Zustand der Siegelkappe in einer im wesentlichen gestreckten Stellung, in der eine stabile Abstützung der beiden Verankerungsklappen 9 erfolgt. Der vom Raststeg 18 gebildete Anschlag verhindert eine Bewegung der Spreizstreben nach oben im geschlossenen Zustand.

Der Raststeg 18 ist mit einer Aufreiblasche 21 verbunden, die in der Deckelfläche 7 durch Schwächungslinien 22 umgrenzt ist. Zum Öffnen des Verschlusses kann die Aufreiblasche 21 an einer Griffzunge 23 erfaßt und hochgerissen werden. Dadurch werden die Spreizstreben 12 freigegeben, und die Siegelkappe 1, die entlang der Schwächungslinien 22 zerstört ist, kann abgenommen werden.

An der Unterseite der Deckelfläche 7 sind mehrere vorspringende Nocken 24 vorgesehen, die sich am oberen Rand der Verschlußschraube 2 abstützen und die dafür sorgen, daß die Oberseite des Sicherheitsverschlusses belüftet wird.

Die in den Fig. 4 und 5 dargestellte Siegelkappe 1' ist zur Verbindung mit einer Verschlußschraube 2 bestimmt, insbesondere einer Verschlußschraube nach DIN 6643; die in ihrer Ausnehmung 3 zwei seitlich offene Ösen 25 aufweist.

Als Verankerungselemente sind hierbei zwei Verankerungszungen 26 vorgesehen, die an ihrem einen Ende 26a mit der Deckelfläche 7 der Siegelkappe 1' einstückig verbunden sind. Die Verankerungszungen 26 erstrecken sich auf einem Kreisbogenabschnitt konzentrisch zur Mitt der Siegelkappe 1' im Abstand parallel zur Deckelfläche 7. Sie liegen auf einem Durchmesser, der dem Abstand der beiden Ösen 25 entspricht.

Nach dem Aufsetzen der Siegelkappe 1' wird durch eine Drehbewegung, die in Fig 5 mit einem Pfeil 27 angedeutet ist, jede Verankerungszunge 26 in die zugeordnete Öse 25 seitlich eingeführt. An ihren freien Enden weisen die Verankerungszungen 26 jeweils einen nach innen gerichteten Widerhaken 28 auf. Diese Widerhaken 28 greifen am Ende der Drehbewegung hinter die Ösen 25 und verhindern eine Rückdrehbewegung der Siegelkappe 1'. Die Siegelkappe kann nur durch

gewaltsame Zerstörung geöffnet werden.

Eine weitere abgewandelte Ausführungsform einer Siegelkappe 1'' ist in den Fig. 6 und 7 dargestellt. Hierbei springen von der Deckelfläche 7 mindestens zwei, im dargestellten Ausführungsbeispiel vier Rasthaken 29 nach unten vor. Diese Rasthaken 29 rasten elastisch und formschlüssig hinter gegenüberliegenden Hinterschnedungen 25a am Rand der Ösen 25 der Verschlußschraube 2 ein. Die Rasthaken 29 verhindern zugleich eine Drehung der Siegelkappe 1'', so daß es nicht möglich ist, die Rasthaken 29 durch eine Drehung außer Eingriff mit den Hinterschnedungen 25a zu bringen.

Um ein sicheres Einrasten der Rasthaken 29 zu gewährleisten, ist eine Zentrierung der Siegelkappe 1' an der Verschlußschraube 2 zweckmäßig. Hierzu sind von der Deckelfläche 7 nach unten ragende Zentriervorsprünge 30 in Form von Zylinderabschnitten vorgesehen, die konzentrisch zum Umfangsrand der Siegelkappe 1'' verlaufen und die die Siegelkappe 1'' am Innenrand der Verschlußschraube 2 zentrieren.

Patentansprüche

1. Siegelkappe für einen Sicherheitsverschluß, der eine Verschlußschraube mit einer nach oben offenen Ausnehmung mit mindestens einer Hinterschnedung aufweist, wobei die Siegelkappe eine die Verschlußschraube überdeckende Deckelfläche und einen den Rand des Sicherheitsverschlusses übergreifenden Kappenrand aufweist, dadurch gekennzeichnet, daß die Siegelkappe (1, 1', 1'') aus Kunststoff besteht und mindesten ein von der Deckelfläche (7) nach unten vorspringendes Verankerungselement (9, 26, 29) aufweist, das die Hinterschnedung (6, 25, 25a) der Verschlußschraube (2) im geschlossenen Zustand hintergreift und formschlüssig verrastet ist.

2. Siegelkappe nach Anspruch 1, wobei die Verschlußschraube (2) am Innenrand ihrer Ausnehmung (3) mindestens eine umlaufende Rille (6) aufweist, dadurch gekennzeichnet, daß als Verankerungselemente zwei gelenkig mit der Deckelfläche (7) verbundene Verankerungskappen (9) nach unten ragen, die jeweils an ihrer Außenseite in die umlaufende Rille (6) am Innenrand der Verschlußschraube (2) eingreifende Ankerzähne (11) aufweisen, und daß die beiden Verankerungskappen (9) durch zwei sich am Boden der Ausnehmung (3) der Verschlußschraube (2) abstützende, gelenkig miteinander verbundene Spreizstreben (12) miteinander verbunden sind.

3. Siegelkappe nach Anspruch 2, dadurch gekennzeichnet, daß die beiden Spreizstreben (12) im geschlossenen Zustand mit mindestens einem von der Deckelfläche (7) nach unten vorspringenden Rastelement (18) in Eingriff stehen.

4. Siegelkappe nach Anspruch 3, dadurch gekennzeichnet, daß das Rastelement ein mit der Deckelfläche (7) verbundener Raststeg (18) ist, der beiderseits eine Rastkante (19) aufweist, und daß jede Rastkante (19) im geschlossenen Zustand von jeweils einem mit der zugeordneten Spreizstrebe (12) verbundenen Rasthaken (20) hintergriffen wird.

5. Siegelkappe nach Anspruch 4, dadurch gekennzeichnet, daß der Raststeg (19) einen Anschlag für die Spreizstreben (12) bildet, der eine Bewegung der Spreizstreben (12) nach oben im geschlossenen Zustand verhindert.

6. Siegelkappe nach Anspruch 2, dadurch gekennzeichnet, daß jede Spreizstrebe (12) an ihrer Oberseite eine Rippe (16) aufweist, die sich im geschlossenen Zustand an der Innenseite der jeweils gelenkig angeschlossenen Verankerungskappe (9) abstützt.

7. Siegelkappe nach Anspruch 3, dadurch gekennzeichnet, daß das Rastelement (18) mit einer in der Deckelfläche (7) durch Schwächungslinien (22) umgrenzten Aufreißlasche (21) verbunden ist.

8. Siegelkappe nach Anspruch 1, wobei in der Ausnehmung (3) der Verschlußschraube (2) zwei seitlich offene Ösen (25) angeordnet sind, dadurch gekennzeichnet, daß als Verankerungselemente zwei mit der Deckelfläche (7) verbundene und sich im Abstand parallel zu dieser erstreckende Verankerungszungen (26) vorgesehen sind, die durch eine Drehbewegung der Siegelkappe (1') seitlich in die Ösen (25) einführbar sind, und daß die Verankerungszungen (26) an ihren freien Enden die Ösen (25) hintergreifende Widerhaken (27) aufweisen.

9. Siegelkappe nach Anspruch 1, dadurch gekennzeichnet, daß die Verankerungselemente mindestens zwei von der Deckelfläche (7) nach unten vorspringende Rasthaken (29) sind, die elastisch und formschlüssig hinter gegenüberliegende Hinterschnedungen (25a) der Verschlußschraube (2) einrasten.

10. Siegelkappe nach Anspruch 9, dadurch gekennzeichnet, daß von der Deckelfläche (7) Zentriervorsprünge (30) nach unten ragen, die die Siegelkappe (1'') am Innenrand der Verschlußschraube (2) zentrieren.

Hierzu 4 Seite(n) Zeichnungen

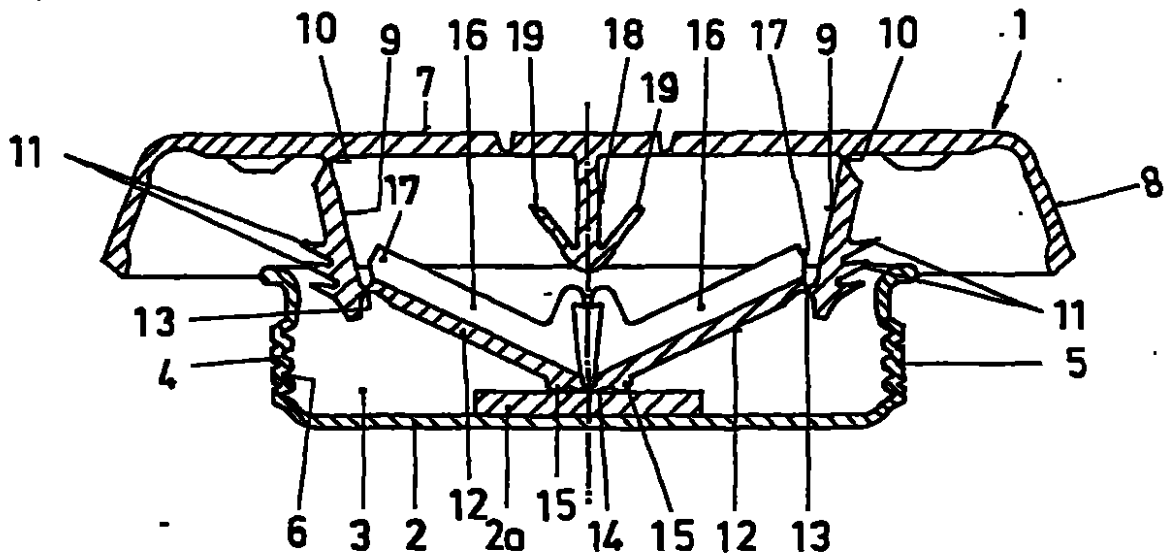


FIG. 1

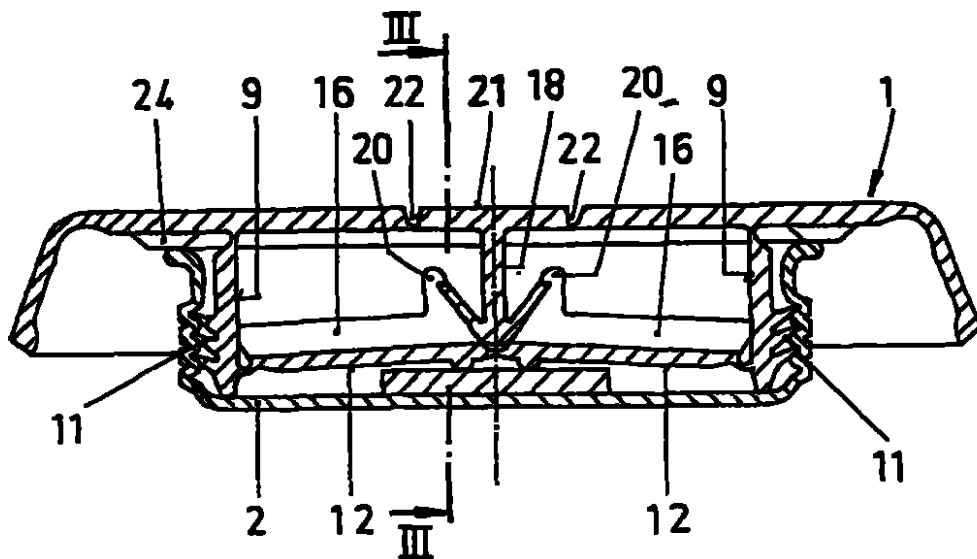


FIG. 2

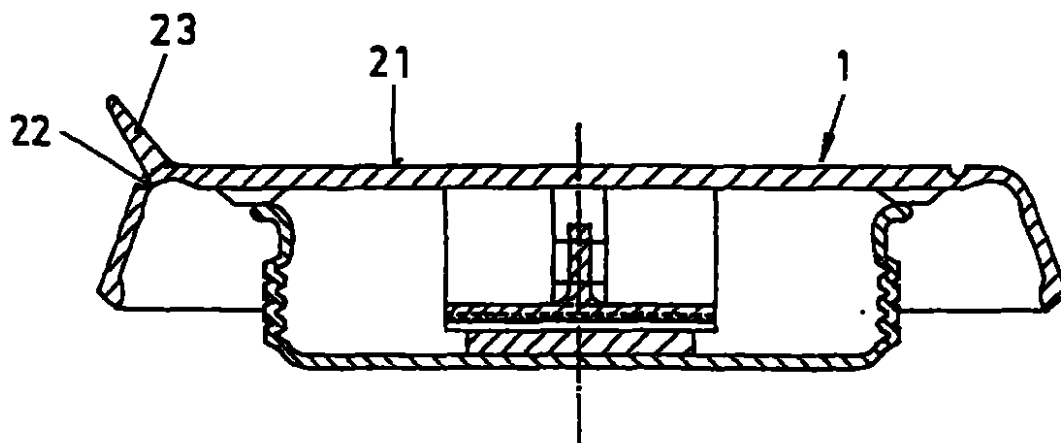


FIG. 3

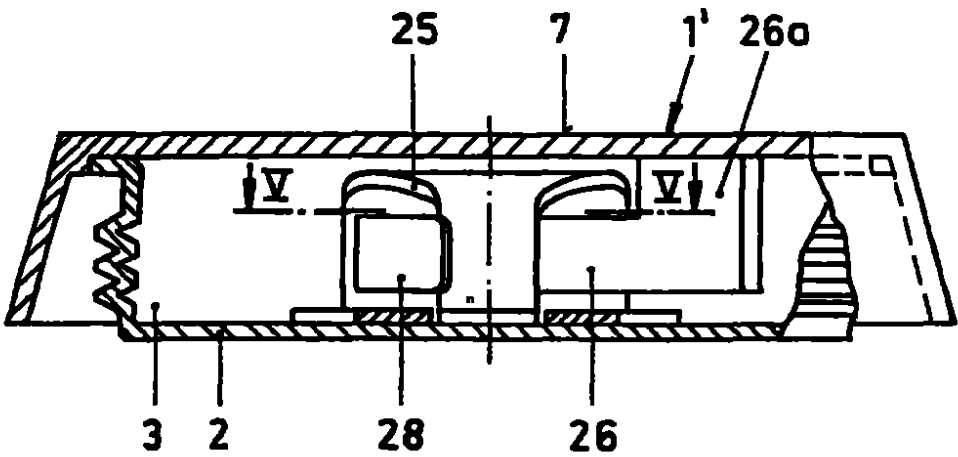


FIG. 4

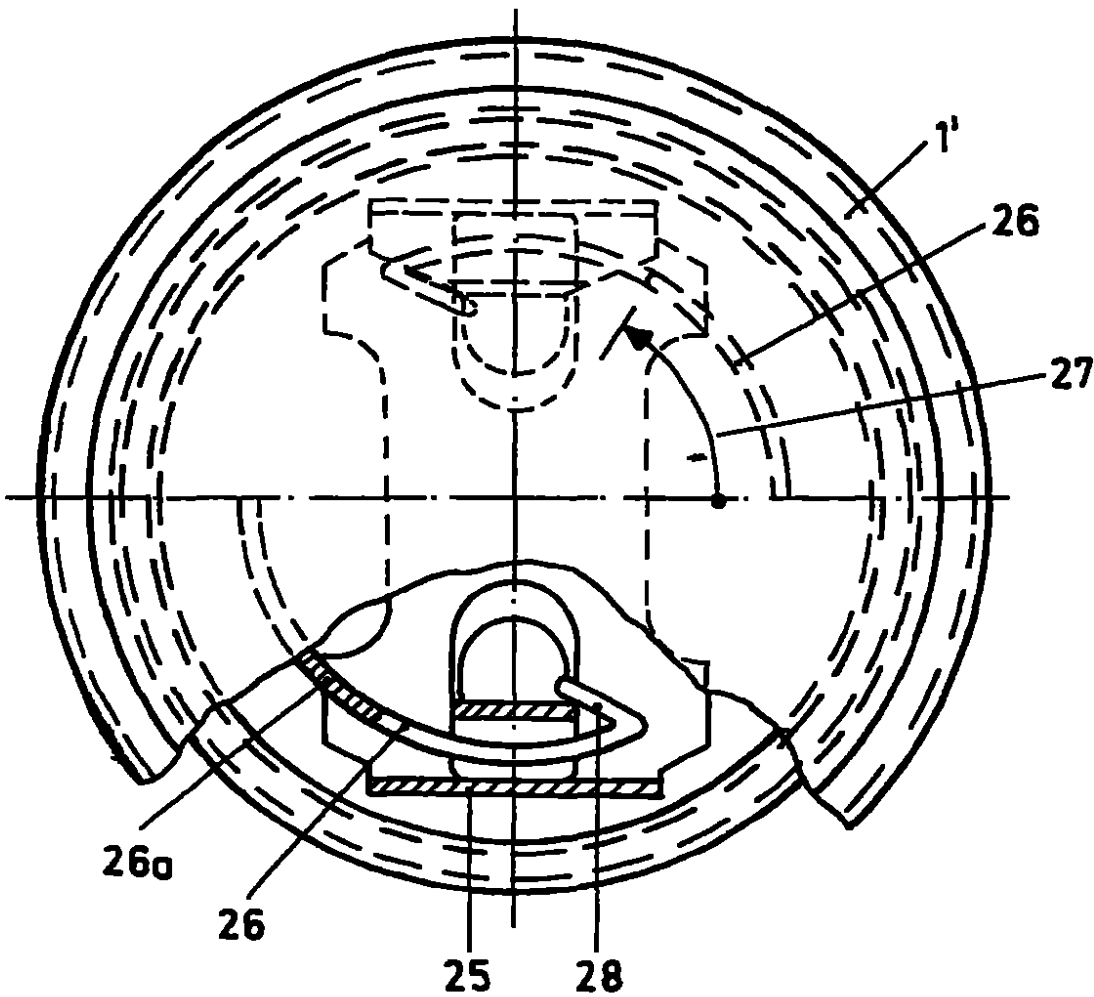
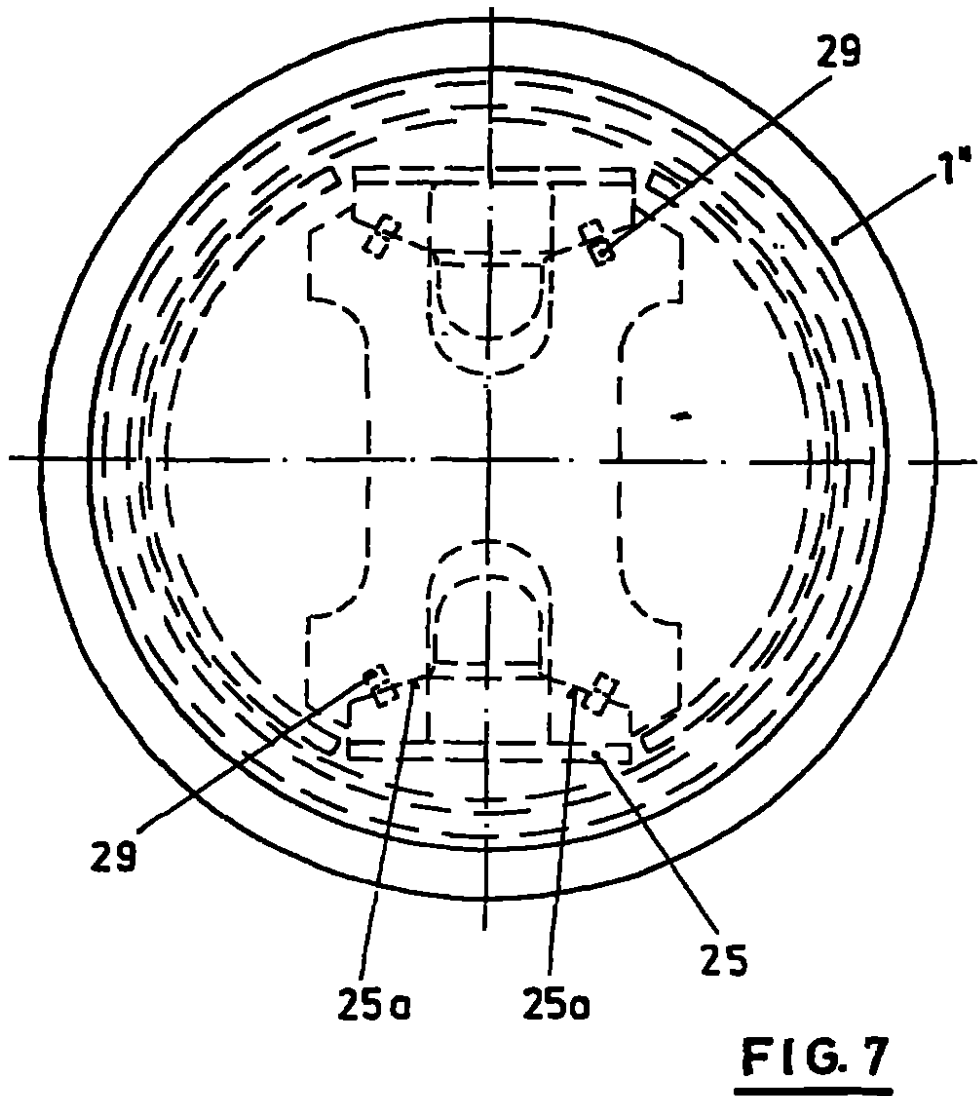
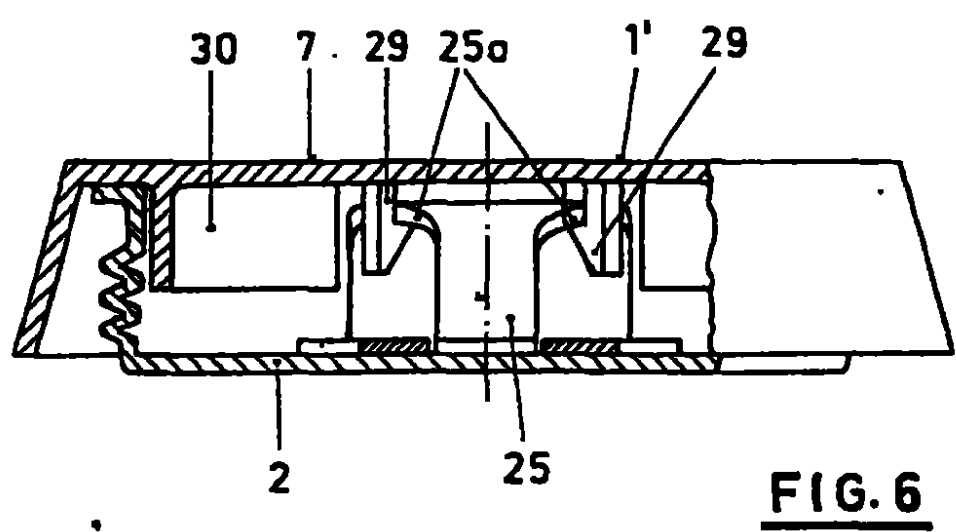


FIG. 5



(12) SOLICITUD INTERNACIONAL PUBLICADA SEGÚN EL TRATADO DE COOPERACIÓN INTERNACIONAL EN MATERIA DE PATENTES (PCT)

(19) Organización Mundial de Propiedad Intelectual
Oficina Internacional



(43) Fecha Internacional de Publicación
25 de Julio de 2002 (25.07.2002)



(10) Número Internacional de Publicación

PCT

WO 02/057141 A3

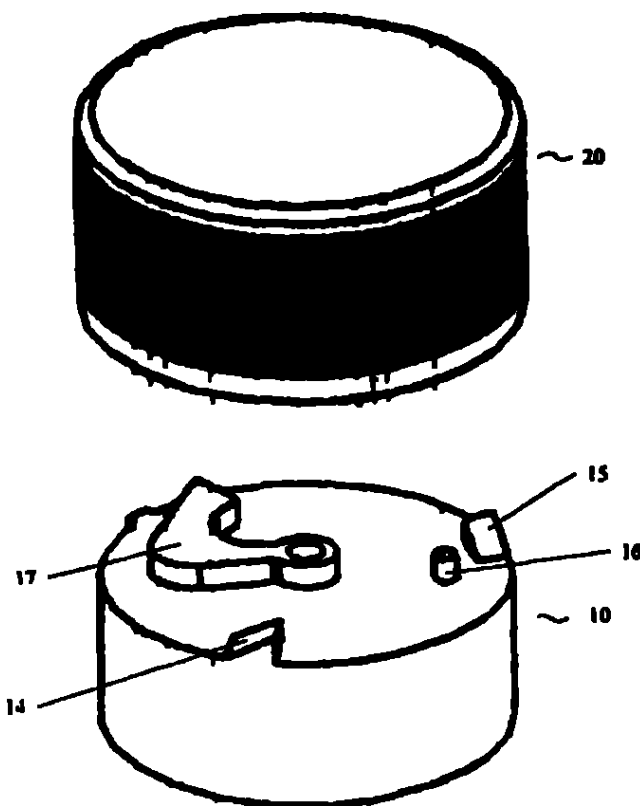
- (51) Clasificación Internacional de Patentes: B65D 41/34. (74) Agente: ALLAIX, Roberto: Ferrania S.p.A., Via Della Libertà 57, I-17014 Ferrania (IT)
- (21) No. Solicitud Internacional: PCT/EP02/00272
- (22) Fecha de Presentación Internacional: 14 de Enero de 2002 (14.01.2002)
- (25) Idioma de Presentación: Inglés
- (26) Idioma de Publicación: Inglés
- (30) Datos relativos a la Prioridad: SV01A000003 17 de Enero de 2001 (07.01.2001) IT
- (71) Solicitante: CERRACCHIO, Marco [IT/IT] Via Galileo Galilei, 328, I-18038 San Remo (IT).
- (81) Países destinatarios (nacional): AL, AU, BA, BG, BR, CA, CN, CO, CR, CU, CZ, DM, DZ, EC, EE, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LK, LR, LT, LV, MA, MD, MG, MK, MX, NO, NZ, PH, PL, RO, SG, SI, SK, TN, TR, UA, US, VN, YU, ZA.
- (84) Países destinatarios (regional): Patente ARIPO (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Patente Eursiática (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Patente Europea (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), Patente OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Declaración bajo regla 4.17:

— de titularidad de invención (Regla 4.17(iv)) para Estados Unidos únicamente

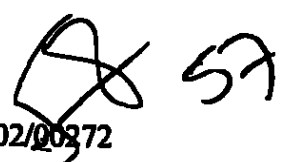
[Continúa en la siguiente página]

(54) Título: TAPA PARA ENVASE A PRUEBA DE MANIPULACIÓN INDEBIDA



(57) Extracto: La presente invención se relaciona con una tapa selladora para recipientes que incluye una tapa interna (10) y una tapa externa (20), comprendiendo dicha tapa interna (10) en su cara superior (13) medios retenedores (14, 15), medios de sujeción rompibles (16), y medios de recorrido final (17) y comprendiendo dicha tapa externa (20) en su cara inferior (21) un brazo en relieve (22) que comprende medios cortantes en relieve (23) y medios retenedores (24).

WO 02/057141 A3



TÍTULO: TAPA PARA ENVASE A PRUEBA DE MANIPULACIÓN INDEBIDA

CAMPO DE LA INVENCION

La presente invención se relaciona con una tapa mejorada para el cierre de recipientes, y, más en particular, se refiere a una tapa para el cierre de botellas, frascos, jarras, garrafrones, tanques y similares.

ANTECEDENTES DE LA INVENCION

El cierre de recipientes (donde recipiente significa cualquier envase previsto para un material fluido, con un cuello a través del cual puede verterse el material fluido, tal como, por ejemplo, botellas, frascos, jarras, garrafrones, tanques y similares) se realiza usualmente por medio de tapas. Recipientes y tapas se elaboran habitualmente de plástico, tal como, por ejemplo, polipropileno y polietileno. La porción final del cuello del recipiente es generalmente roscada para permitir el acoplamiento con una tapa roscada. Con el fin de evitar una apertura indeseada o manipulación indebida del contenido del recipiente, la tapa roscada se equipa usualmente con un anillo anti-manipulación indebida, conectado a la tapa por medio de dientes plásticos rompibles. El anillo anti-manipulación indebida se sujeta por una cresta fabricada en la posición adecuada en el cuello del recipiente. Cuando se retira la tapa, estos dientes plásticos rompibles se fracturan indicándole así claramente al consumidor que el recipiente ya ha sido abierto. Aunque esta solución brinda la ventaja de que no requiere herramientas para la apertura (destapador o sacacorchos), presenta aún varias desventajas e inconvenientes.

Primero que todo, la necesidad de fracturar los dientes plásticos rompibles requiere cierta fuerza por el consumidor, incrementándose dicha fuerza en caso que el recipiente contenga bebida carbonatada, debido a que la presión

del gas, que actúa contra la tapa, hace su rotación y apertura más y más difíciles.

Adicionalmente, la manufactura de tapa y recipiente requiere un estudio cuidadoso de los presupuestos, exige aparatos de manufactura muy costosos, y cuando la tapa se elabora de una resina diferente de la del recipiente, esto crea un problema de reciclaje, puesto que el anillo tiene que cortarse del recipiente antes que éste último pueda reciclarse. Más aún, en ocasiones es posible retirar dicha tapa sin separarla de su anillo anti-manipulación indebida.

Además, partículas de suciedad, residuos, y cualquier otra clase de polvo pueden acumularse en el pequeño espacio formado por los dientes plásticos rompibles entre la tapa y el anillo anti-manipulación indebida y esto aumenta el riesgo de contaminación del contenido del recipiente.

Por último, aunque no menos importante, la experiencia práctica ha demostrado que el presente sistema no es completamente seguro ya que a veces, y, en particular, con respecto a un recipiente que contiene agua natural u otra bebida no carbonatada, tanto la tapa como el anillo anti-manipulación indebida pueden retirarse conjuntamente sin la fractura de los dientes plásticos rompibles.

SUMARIO DE LA INVENCION

La presente invención se refiere a una tapa selladora para recipientes que comprende una tapa interna (10) y una tapa externa (20), comprendiendo dicha tapa interna (10) en su cara superior (13) medios retenedores (14, 15), medios de sujeción rompibles (16), y medios de recorrido final (17) y comprendiendo dicha tapa externa (20) en su cara inferior (21) un brazo en relieve (22) que incluye medios cortantes en relieve (23) y medios retenedores (24).

6059

BREVE DESCRIPCIÓN DE LOS DIBUJOS

Fig. 1 y 2 representan una vista en planta de una tapa selladora de acuerdo con una primera incorporación de la presente invención.

Fig. 3 comprende una vista en planta superior (A) e inferior (C) y una vista en corte (B) de la tapa interna, de acuerdo con una segunda incorporación de la presente invención.

Fig. 4 comprende una vista en planta superior (A) e inferior (C) y una vista en corte (B) de la tapa externa, de acuerdo con una segunda incorporación de la presente invención.

Fig. 5 representa una vista en corte de la tapa selladora, de acuerdo con una tercera incorporación de la presente invención.

Fig. 6 comprende una vista superior en planta de la tapa selladora, de acuerdo con la presente invención durante la fase inicial (A), intermedia (B) y final (C) de la apertura.

Fig. 7 comprende una vista axonométrica de la tapa interna 10 y de la tapa externa 20 de la tapa selladora de la presente invención.

DESCRIPCIÓN DETALLADA DE LA INVENCION

Con referencia a figuras 1 a 6, la tapa selladora de la presente invención incluye una tapa interna 10 y una tapa externa 20.

Con referencia a figura 3, la tapa interna 10 comprende, dentro de sus paredes internas, medios de sujeción 12 para sujetar dicha tapa interna 10 al cuello del recipiente para cerrar el recipiente mismo. De acuerdo con un

60

aspecto preferido de la presente invención, dichos medios de sujeción 12 se representan por una rosca apropiada (12a, 12b). Puede proporcionarse otra clase de medios de sujeción por el experto en el arte, tal como, por ejemplo, acoplamiento de bayoneta.

La tapa interna 10 comprende en su cara superior 13 medios retenedores 14 y 15, medios de sujeción rompibles 16, y medios de recorrido final 17. De acuerdo con una incorporación preferida de la presente invención, los medios retenedores 14 y 15 constan de dientes en relieve con una cara 31 perpendicular a la cara superior 13 y una cara 32 que forma un ángulo inferior a 80°, preferiblemente inferior a 45°, con la cara superior 13. De acuerdo con una incorporación preferida de la presente invención, los medios de sujeción rompibles 16 constan de un elemento plástico moldeado que sobresale del plano representado por la cara superior 13 y que cierra un orificio practicado a través de la cara superior 13 de la tapa interna 10. Los medios de sujeción rompibles 16 son preferiblemente coloreados con el fin de permitir una fácil identificación por el usuario. De acuerdo con una incorporación preferida de la presente invención, los medios de recorrido final 17 constan de una barrera semicircular que comprende un brazo 17a y un brazo 17b conectados conjuntamente y que forman un ángulo preferiblemente en el rango de desde 30° a 100° entre ellos.

Con referencia a figura 4, la tapa externa 20 comprende en su cara inferior 21 el brazo en relieve 22 que incluye medios cortantes en relieve 23 y medios retenedores 24. Los medios cortantes se representan preferiblemente por una cuchilla en relieve semicircular 23. Los medios retenedores 24 son similares a los medios retenedores 14 y 15 de la tapa interna 10. El brazo en relieve 22 puede comprender preferiblemente una proyección con forma y dimensión correspondientes a la forma y dimensión del orificio formado al retirar los medios de sujeción 16. La tapa externa 20 puede tener formas externas diferentes para permitir un mejor agarre por el usuario. En figuras 1 y 2 se muestra una forma octogonal; en figuras 3 a 6

se muestra una forma circular. En experto en el arte puede proveer otras formas, tales como, por ejemplo, una forma hexagonal, así como una superficie corrugada con el fin de incrementar aún más el agarre por el usuario. La tapa externa 20 se fabrica preferiblemente de material transparente para permitir la observación de la tapa interna 10.

La tapa externa 20 y/o la tapa interna 10 se proveen con medios de sujeción para permitir el ensamblado y la inserción de la tapa externa 20 en la tapa interna 10.

Con referencia a figura 4, los medios de sujeción se representan preferiblemente por una proyección interna 40 practicada en toda la porción circular final interna de la tapa externa 20 y capaz de sujetar la tapa interna 10 después de la inserción de la tapa interna 10 en la tapa externa 20. Con referencia a figura 4 nuevamente, los medios de sujeción pueden representarse alternativamente o al mismo tiempo por una proyección 43 practicada en la tapa interna 10 que, durante el ensamblado de la tapa, corre primero en una ranura vertical 44 practicada dentro de la tapa externa 20 y luego, durante la rotación de la tapa externa 20 sobre la tapa interna 10, en una ranura horizontal 45 que forma una configuración en L con la ranura vertical 44.

Con referencia a figura 5, los medios de sujeción se representan alternativamente por una ranura 18 practicada en toda la circunferencia en la mitad de la pared exterior de la tapa interna 10 y por una ranura correspondiente 26 practicada para toda la circunferencia en la mitad de la pared interna de la tapa externa 20.

Medios deslizantes pueden fabricarse preferiblemente en la cara superior 13 de la tapa interna 10 y en la cara inferior 21 de la tapa externa 20 para permitir una mejor suavidad durante la rotación de la tapa externa sobre la tapa interna.

62

Con referencia a figura 5, tales medios deslizantes se representan preferiblemente por una proyección circular 25 practicada en la cara inferior 21 de la tapa externa 20 acoplada con una ranura circular 19 practicada en la cara superior 13 de la tapa interna 10.

Con referencia a figura 6, la operación de funcionamiento de la tapa selladora de acuerdo con una incorporación de la presente invención se describirá de ahora en adelante.

En figura 6a se representa la posición inicial de la tapa como se fija al final de la línea de envasado. El brazo en relieve 22 que comprende la cuchilla semicircular en relieve 23 y los medios retenedores 24 se sujeta por los medios retenedores 14 y por medios de sujeción rompibles 16.

En figura 6b se representa la posición intermedia de la tapa luego del inicio de la rotación (en sentido de las manecillas del reloj) de la tapa externa 20. La cuchilla semicircular en relieve ha cortado los medios de sujeción rompibles 16 abriendo así el orificio 41 por el cual puede salir el exceso de carbonato presente en el recipiente. La apertura del orificio 41 y la consecuente salida del exceso de carbonato contenido en el recipiente reduce la presión del interior del recipiente, disminuyendo aún más la fuerza requerida para la rotación y la apertura de la tapa.

En figura 6c se representa la posición final de la tapa una vez concluida la operación de apertura. La cuchilla semicircular 23 ha alcanzado los medios de recorrido final 17 atrapando los medios de sujeción rompibles 16 dentro de la cavidad así formada 42. Los medios retenedores 24 del brazo en relieve 22 han pasado los medios retenedores 15 e impiden la rotación subsiguiente de la tapa externa 20. Correspondientemente, la tapa externa 20 se vuelve una con la tapa interna 10. La porción posterior del brazo en relieve 22 ha cubierto el orificio 41 evitando cualquier derrame accidental

63

del fluido contenido en el recipiente. La presencia de una proyección en el brazo en relieve 22 en correspondencia con el orificio 41 mejora aún más la sujeción de la tapa de la presente invención.

Aunque la presente invención se ha descrito en detalle con referencia a incorporaciones preferidas, tiene la intención de abarcar modificaciones obvias realizadas por el experto en el arte dentro del espíritu y la órbita de la presente invención, tal como se reivindica de ahora en adelante.

6564

REIVINDICACIONES

1. Una tapa selladora para recipientes que incluye una tapa interna (10) y una tapa externa (20), comprendiendo dicha tapa interna (10) en su cara superior (13) medios retenedores (14, 15), medios de sujeción rompibles (16), y medios de recorrido final (17), y comprendiendo dicha tapa externa (20) en su cara inferior (21) un brazo en relieve (22) que comprende medios cortadores en relieve (23) y medios retenedores (24).
2. La tapa selladora para recipientes de acuerdo con la reivindicación 1 caracterizada porque dichos medios retenedores (14, 15) se representan por dientes en relieve que tienen una cara (31) perpendicular a la cara superior (13) y una cara (32) que forma un ángulo inferior a 80° con la cara superior (13).
3. La tapa selladora para recipientes de acuerdo con la reivindicación 1 caracterizada porque dichos medios de sujeción rompibles (16) se representan por un elemento plástico moldeado que sobresale del plano representado por la cara superior (13) y que obtura un orificio practicado a través de la cara superior (13) de la tapa interna (10).
4. La tapa selladora para recipientes de acuerdo con la reivindicación 1 caracterizada porque dichos medios de recorrido final (17) se representan por una barrera semicircular que comprende un primer brazo (17a) y un segundo brazo (17b).
5. La tapa selladora para recipientes de acuerdo con la reivindicación 4 caracterizada porque dicho primer brazo (17a) y dicho segundo brazo (17b) se conectan conjuntamente para formar un ángulo en el rango de desde 30° a 100° entre ellos.
6. La tapa selladora para recipientes de acuerdo con la reivindicación 1

caracterizada porque dichos medios cortantes en relieve (23) se representan por una cuchilla semicircular en relieve (23).

7. La tapa selladora para recipientes de acuerdo con la reivindicación 1 caracterizada porque dichos medios retenedores (24) se representan por dientes en relieve que tienen una cara (31) perpendicular a la cara inferior (21) y una cara (32) que forma un ángulo inferior a 80° con la cara inferior (21).

8. La tapa selladora para recipientes de acuerdo con la reivindicación 1 caracterizada porque dicha tapa interna (10) comprende, dentro de sus paredes interiores (11), medios de sujeción (12) para sujetar dicha tapa interna 10 al cuello del recipiente.

9. La tapa selladora para recipientes de acuerdo con la reivindicación 8 caracterizada porque dichos medios de sujeción (12) se representan por una rosca (12a, 12b).

10. La tapa selladora para recipientes de acuerdo con la reivindicación 1 caracterizada porque dicha tapa interna (10) y dicha tapa externa (20) se sujetan juntas por medios de sujeción (18, 26, 40, 43, 44, 45).

11. La tapa selladora para recipientes de acuerdo con la reivindicación 1 caracterizada porque dicha tapa interna (10) y dicha tapa externa (20) se proveen con medios deslizantes (19, 25).

TRATADO SOBRE COOPERACIÓN INTERNACIONAL
EN MATERIA DE PATENTES

✓ 60

Remitente:

OFICINA ENCARGADA DEL EXAMEN PRELIMINAR INTERNACIONAL

A:

Allaix, Roberto
FERRANIA SPA
Via Della Liberta' 57
17014 Ferrania (SV)
ITALIA

PCT

COMUNICACIÓN SOBRE EL ENVÍO DEL
INFORME DE EXAMEN PRELIMINAR
INTERNACIONAL

(Regla 71.1 PCT)

Fecha de envío
(Día/Mes/Año)

23/10/2002

No. de Expediente del Solicitante o Apoderado

RX001

COMUNICACIÓN IMPORTANTE

No. de Solicitud Internacional

PCT / EP 02/ 00272

Fecha Internacional de Presentación

(día/mes/año)

14/01/2002

Fecha de Prioridad

(día/mes/año)

17/01/2001

Solicitante

CERRACCHIO, Marco

1. Se comunica al solicitante que la oficina encargada del examen preliminar Internacional le envía con el presente el informe de examen preliminar internacional, elaborado para la solicitud internacional, en caso dado con los anexos correspondientes.
2. Una copia del informe, en caso dado con los anexos correspondientes, se hace llegar a la Oficina Internacional para su envío posterior a todas las oficinas seleccionadas.
3. A solicitud de una de las Oficinas Seleccionadas, la Oficina Internacional preparará una traducción del informe (pero no de los anexos) al inglés y la remitirá a esta oficina.

4. RECORDATORIO

Para ingresar en la fase nacional el solicitante, dentro de los 30 meses a partir de la fecha de prioridad (o en algunas oficinas incluso después), tiene que realizar ante cada oficina seleccionada ciertos actos (entrega de traducciones y desembolso de honorarios nacionales) (Artículo 39 (1)) (véase también el recordatorio remitido por la Oficina Internacional en el Formulario PCT/IB/301).

Si se tiene que enviar a una Oficina Seleccionada una traducción de la solicitud internacional, entonces esta traducción tiene que incluir traducciones de todos los anexos al informe de examen preliminar internacional. Es obligación del solicitante elaborar dichas traducciones y hacerlas llegar directamente a cada Oficina Seleccionada respectiva.

Mayores detalles en cuanto a los plazos normativos y los requisitos de las Oficinas Seleccionadas se desprenden del Volumen II de la guía PCT para solicitantes.

Se llama la atención del solicitante al Artículo 33(5), que establece que los criterios de novedad, actividad inventiva y posibilidad de aplicación industrial descritos en Artículo 33(2) a (4) sirven meramente los propósitos del examen preliminar internacional y que "todo Estado Contratante puede aplicar criterios adicionales o diferentes para efectos de decidir si la invención reivindicada es patentable o no" (véase también Artículo 27 (5)). Los criterios adicionales pueden incluir, por ejemplo, exención de patentabilidad y los requerimientos, si se permite la divulgación, y de claridad y soporte de las reivindicaciones.

Nombre y dirección postal de la oficina encargada del examen internacional (IPEA)

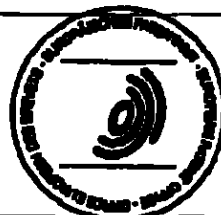


Oficina Europea de Patentes
D-80298 Munich
Tel.: (+49-89) 2399-0, Tx: 523856 epmu d
Fax: (+49-89) 2399-4465

Empleado Autorizado

MARRA E

Tel.: (+49-89) 2399 2828



**TRATADO SOBRE COOPERACIÓN INTERNACIONAL
EN MATERIA DE PATENTES**

PCT

INFORME DE EXAMEN PRELIMINAR INTERNACIONAL
(Artículo 36 y Regla 70 PCT)

6767

No. de Expediente del Solicitante o Apoderado RX001	PROCEDIMIENTO POSTERIOR véase comunicación sobre el envío del informe de examen preliminar internacional (Formulario PCT/IPEA/416)	
No. Solicitud Internacional PCT / EP 02/ 00272	Fecha Internacional de Presentación (día/mes/año) 14/01/2002	Fecha de Prioridad (día/mes/año) 17/01/2001
Clasificación Internacional de Patente (IPC) o Clasificación Nacional e IPC B65D41/34		
Solicitante CERRACCHIO, Marco		

1. Este informe de examen preliminar internacional fue elaborado por esta Oficina Encargada del Examen Preliminar Internacional y se envía al solicitante según Artículo 36.

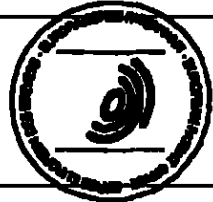
2. Este INFORME comprende un total de 2 hojas, inclusive esta portada

☐ Además se adjuntan ANEXOS al informe; en este caso se trata de hojas con descripciones, reivindicaciones y/o dibujos, que se modificaron y que sirven de base a este Informe, y/o hojas con correcciones efectuadas por esta oficina (véase Regla 70.16 y Sección 807 de las Instrucciones administrativas al PCT).

Estos anexos comprenden en total de _____ hojas.

3. Este informe contiene datos con respecto a los siguientes puntos:

- I ☒ Base del Informe
- II ☐ Prioridad
- III ☒ Sin elaboración de un dictamen sobre novedad, actividad inventiva y posibilidad de aplicación Industrial
- IV ☐ Uniformidad deficiente de la invención
- V ☒ Comprobación justificada según Artículo 35(2) con respecto a la novedad, la actividad inventiva y la posibilidad de aplicación Industrial; documentos y explicaciones en apoyo de esta comprobación
- VI ☐ Ciertos documentos enumerados
- VII ☐ Ciertas deficiencias del registro internacional
- VIII ☐ Ciertas observaciones relacionadas con la solicitud internacional

Fecha de presentación de la petición 01/08/2002	Fecha de la conclusión de este informe 19/10/2002
Nombre y dirección postal de la oficina encargada del examen internacional (IPEA)  Oficina Europea de Patentes D-80298 Munich Tel.: (+49-89) 2399-0, Tlx: 523858 epmu d Fax: (+49-89) 2399-4485	Empleado Autorizado ZIDI K Tel.: (+49-89) 2399 2828 

68
61

I. Base del Informe

La base de este informe de examen preliminar la constituye la solicitud tal como se radicó originalmente.

V. Declaración motivada bajo Regla 66.2(a)(II) en cuanto a la novedad, la actividad inventiva y la posibilidad de aplicación Industrial

A la luz de los documentos citados en el informe de búsqueda internacional, se considera que la invención, como se define en las reivindicaciones, satisface los criterios mencionados en Artículo 33(1) PCT, es decir, parece ser novedosa, implicar actividad inventiva y ser industrialmente aplicable.

69 70

INFORMACION Y LUGAR
Radicación : 03069199 00000000 Folios: 69
Fecha (MM): 2003-08-12 17:06:37
Trámite : 011 PCT-PATENT 379 FASE NACI 411 PRESENTAC
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

REQUISITOS NECESARIOS PARA PRESENTACION Y AGILIZACION DEL TRAMITE

	USUARIO	RADICADOR
PATENTE DE INVENCION	()	()
MÓDELO DE UTILIDAD	()	()
- Indicación de que se solicita la concesión de una patente.	()	(>)
- Datos de identificación del solicitante o de la persona que se presenta la solicitud.	()	(>)
- Descripción de la invención.	()	()
- Dibujos de ser estos pertinentes.	()	(✓)
- Comprobante de Pago de las tasas establecidas.	()	()
COMPLETA ()	INCOMPLETA ()	()
DISEÑO INDUSTRIAL ()		
- Indicación de que se solicita el registro de Diseño Industrial	()	()
- Datos de identificación del solicitante o de la persona que presenta la solicitud.	()	()
- Representación gráfica y fotográfica del Diseño Industrial o muestra del Material que incorpora el diseño.	()	()
- Comprobante de pago de las tasas establecidas	()	()
COMPLETA ()	INCOMPLETA ()	()
ESQUEMA DE TRAZADO ()		
- Indicación de que solicita el registro de un Esquema de trazado.	()	()
- Datos de identificación del solicitante o de la persona que presenta La solicitud.	()	()
- Representación gráfica del esquema de trazado	()	()
- Comprobante de pago de las tasas establecidas.	()	()
COMPLETA ()	INCOMPLETA ()	()

Firma Responsable:

Federico Novillo
12-08-2003

Fecha:



2020
Bogotá, D.C.,

Doctor:
RAMIRO CASTRO DUQUE
Apoderado
FAMART DISTRIBUTION CO. N.V.

Oficio N° 08198

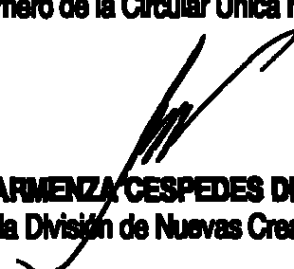
ASUNTO:	Radicación N°	03-89198
	Solicitud Internacional	PCT/EP2002/00272
	Fecha inicio fase nacional	17/08/2003
	Trámite	011
	Evento	379
	Actuación	430
	Folios	001

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

- ☐ La solicitud no contiene el poder debidamente otorgado, con el lleno de los requisitos exigidos por los artículos 63 y subsiguientes del Código de Procedimiento Civil. Adicionalmente, deberá presentar el documento que acredita la existencia y representación legal de la sociedad solicitante, cuando ésta fuere persona jurídica.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.


ALIX CARMENZA CESPÉDES DE VERGEL
Jefe de la División de Nuevas Creaciones.

03 OCT. 2003

El anterior requerimiento fue notificado por fijación en lista de fecha _____.