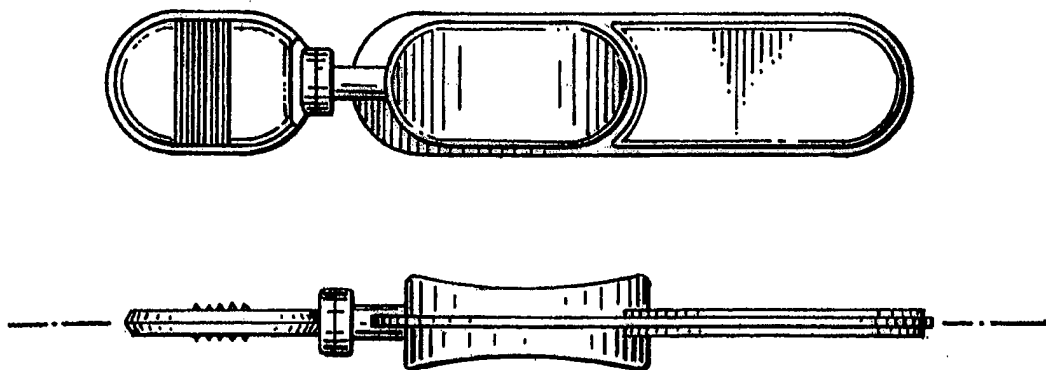




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B65D 1/09, A61J 1/06	A1	(11) International Publication Number: WO 98/25829 (43) International Publication Date: 18 June 1998 (18.06.98)
(21) International Application Number: PCT/US97/21647 (22) International Filing Date: 25 November 1997 (25.11.97) (30) Priority Data: 60/032,632 9 December 1996 (09.12.96) US (71) Applicant: BAUSCH & LOMB INCORPORATED [US/US]; One Bausch & Lomb Place, Rochester, NY 14604-2701 (US). (72) Inventor: HOYT, Earl; 135 Tinker Street, Woodstock, NY 12498 (US). (74) Agents: KONKOL, Chris, P. et al.; Bausch & Lomb Incorporated, One Bausch & Lomb Place, Rochester, NY 14604-2701 (US).		(81) Designated States: AL, AU, BB, BR, BY, CA, CU, EE, ES, FI, GB, HU, IL, JP, KE, KG, KP, KR, MD, MK, MN, MW, NO, NZ, PL, PT, RU, SE, SI, SK, TJ, TR, TT, UA, UZ, VN, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: SINGLE-USE FLEXIBLE CONTAINER



(57) Abstract

A single-use container (10) including: a vessel (12) for holding liquid wherein the vessel includes two opposing engagement surfaces (20, 20'), a removable seal top (16) for sealing the vessel, and a neck portion (14) interconnecting the vessel and the seal top, and wherein the improvement comprises the engagement surfaces of the vessel having a concave surface provided along the longitudinal axis of the container.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

SINGLE-USE FLEXIBLE CONTAINER

5

FIELD OF THE INVENTION

The present invention is a single-use container useful for storage and dispensation of small quantities of liquids. The subject container is particularly useful for dispensing sterile, preservative-free formulations, such as those used in single dose eye drop applications.

10

BACKGROUND

Single-use containers are commonly used for providing small quantities of sterile, preservative-free liquids, e.g. lubricating eye drops. Commercial examples of such containers are used in the following products: Dry Eye Therapy® Lubricating Eye Drops from Bausch & Lomb; Tears Naturale Free® and Bion® Tears Lubricating Eye Drops from Alcon; Celluvisc® and Refresh Plus™ Lubricating Eye Drops from Allergan; OcuCoat™PF Lubricating Eye Drops from Storz Ophthalmics; and Hypo Tears® PF Lubricating Eye Drops from IOLAB.

20

Such containers are typically molded from low density polyethylene using form-fill seal or blow-fill seal technology. The containers include: a vessel portion for containing a small quantity of liquid, (e.g. typically from 0.1 to 3.0 ml), a twist-off seal top for sealing liquid within the vessel, and a neck portion interconnecting the seal top and vessel. To dispense liquid from the container, the seal top is bent, twisted or otherwise broken from the neck. The vessel is then squeezed between the finger tips to force liquid from the vessel and through the neck portion where droplets are formed. Once the liquid has been dispensed, the container is discarded.

25

A significant drawback to current single-use containers is they are not adapted for engagement between the finger tips, (e.g. between the forefinger finger tip and the finger

30

tip of the thumb or other finger). That is, the outer surface of the vessel is egg-shaped, cylindrical, or wedge-shaped. As a consequence, when squeezing the vessel of current containers, the vessel tends to slip away from the opposing pressure of the finger tips. This problem is compounded with containers employing thicker vessel walls which are not easily deformed by squeezing. This situation is further compounded for persons suffering with arthritis or those otherwise having compromised hand and finger strength.

Another problem with current containers is the difficulty of removing the seal top. In order to avoid seal breakage during shipping and storage, the wall thickness of containers can be significant, thus making the seal tops difficult to remove. This problem is compounded by the small size of the seal top and its relatively smooth surface.

It is desired to provide a single-use container which provides greater ease of dispensation. It is further desired to provide such a container which is more easily opened.

SUMMARY OF THE INVENTION

The present invention provides a single-use container including: a vessel for holding liquid wherein the vessel includes two opposing engagement surfaces, a removable seal top for sealing the vessel, and a neck portion interconnecting the vessel and the seal top. In order to provide greater ease of dispensation, the engagement surfaces of the vessel are specifically adapted for engagement between the finger tips. More specifically, the engagement surfaces of the vessel are concave, (along the longitudinal axis of the container), thus trapping the vessel between the finger tips as the vessel is squeezed.

The seal top of the subject container is also provided with two opposing engagement surfaces. In order to provide a container which is easier to open, at least one, and preferably both engagement surfaces of the seal top are provided with a plurality of ridges, thus providing a surface which is easier to grip between the finger tips.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a top view of the subject single-use container;

Figure 2 is a side view of the subject single-use container;

Figure 3 is a front view of the subject single-use container;

5 Figure 4 is a rear view of the subject single-use container;

Figure 5 is a perspective view of the subject single-use container;

Figure 6 is a top view showing several container attached laterally forming a strip;

Figure 7 is a side view showing the container being opened; and

10 Figure 8 is a side view showing the container opened and liquid being dispensed therefrom.

DETAILED DESCRIPTION OF THE INVENTION

As indicated above, the present invention is a single-use container useful for storing and dispensing small quantities of liquids. Although the subject container is particularly
15 useful for dispensing sterile, preservative-free formulations, such as those used in single dose eye drop applications, the subject container may also be used with other liquids, e.g. dyes, adhesive, medicines such as those administered orally, ear drops, nasal drops, and the like. The subject container is particularly well suited for providing introductory or promotional sample size quantities of liquids.

20

With reference to the Figures, the subject container is generally shown at 10, including a vessel 12, neck 14, seal top 16, and tab 18. With most applications, the vessel 12 is designed to hold small quantities of liquid, i.e. typically from about 0.1 to 3 milliliters; however, vessels for accommodating larger quantities of liquid may be used. The vessel 12
25 includes two opposing engagement surfaces 20, 20' which are designed to accommodate the surface of one's fingers tips, thus making the container easier to hold and squeeze. As best shown in Figures 2, 7, and 8, the engagement surfaces 20, 20' have concave surface (provided along the longitudinal axis A of container) which corresponds to the rounded surface of the finger tips. Consequently, the vessel 12 is self-centering between ones finger
30 tips while being squeezed therebetween, rather than sliding away as with outwardly rounded, egg-shaped, cylindrical, or wedge-shaped vessels.

The seal top 16 is relatively flat and includes two opposing engagement surfaces 22, 22' which are designed to be grasped between the finger tips. During removal, the seal top 16 is bent, twisted, and removed from the neck 14. This process is best shown in Figure 7.

5 In order to provide for greater ease of removal, at least one and preferably both engagement surfaces 22, 22' are provided with a plurality of ridges or ribs 24. These ribs 24 permit the engagement surface(s) 22, 22' to be easier grasped, (i.e. the engagement surface is less smooth), thus permitting the seal top 16 to be more easily removed. Similarly, although not shown, such ribs may be used on the engagement surfaces 20, 20' of the vessel 12.

As previously indicated, the container 10 may further include a flat tab portion 18 extending longitudinally from the vessel 12, opposite the seal top 16. As shown in Figure 6, multiple containers 10 may be connected laterally by attaching the tabs 18 of each container 10 to form a strip, generally shown at 26. This is usually accomplished during manufacturing wherein several containers 10 are made simultaneously, in lateral arrangement, as indicated in Figure 6. With respect to eye drop applications, strips 26 including four or five containers 10 are packaged. When needed, a single container 10 is removed from the strip 26 by grasping the tab 18 and tearing the intended container 10 from the strip 26.

Unlike prior art containers which include sharp corners at the end of the tab, the subject container 10 includes a tab 18 having a rounded corner, shown at 28. Thus, the subject container is less likely to catch on articles and may be easily stored in pockets of clothing. Furthermore, the subject rounded end 28 of the tab 18 provides an area, best shown as 30 in Figure 6, which is not attached to adjacent containers during form-fill manufacturing. This area 30 provides a self-starting location for easing the removal of individual containers 10 from the strip 26.

Many modifications and variations of the instant invention are possible in light of the above teachings. It is therefor, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

CLAIMS

1. A single-use container including: a vessel for holding liquid wherein the vessel includes two opposing engagement surfaces, a removable seal top for sealing the vessel, and a neck portion interconnecting the vessel and the seal top, and
5 wherein the improvement comprises the engagement surfaces of the vessel having a concave surface provided along the longitudinal axis of the container.

2. The container of claim 1 wherein the seal top comprises two opposing
10 engagement surfaces, and
wherein the further improvement comprises the seal top including a plurality of ridges provided on at least one of the engagement surfaces of the seal top.

1/4

FIG. 1

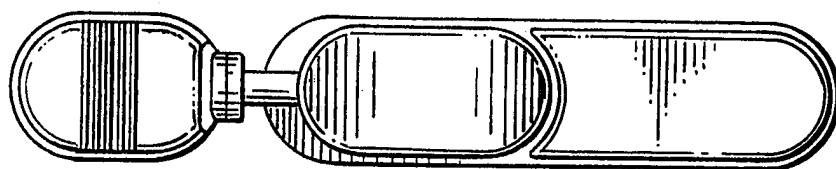


FIG. 2

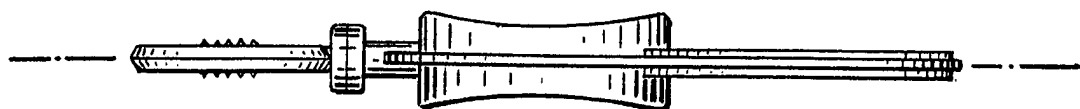


FIG. 3



FIG. 4

2/4

FIG. 5

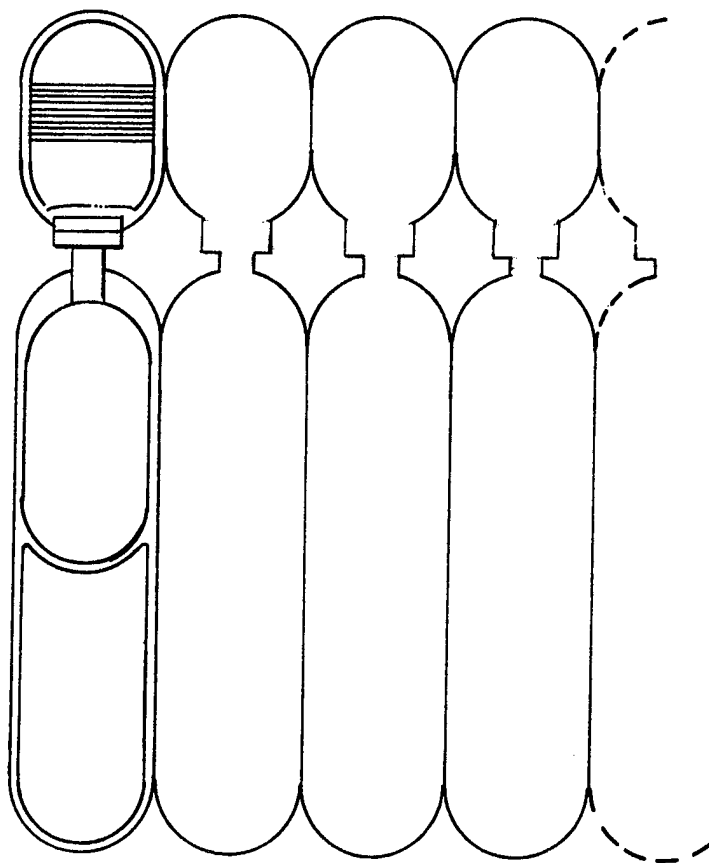
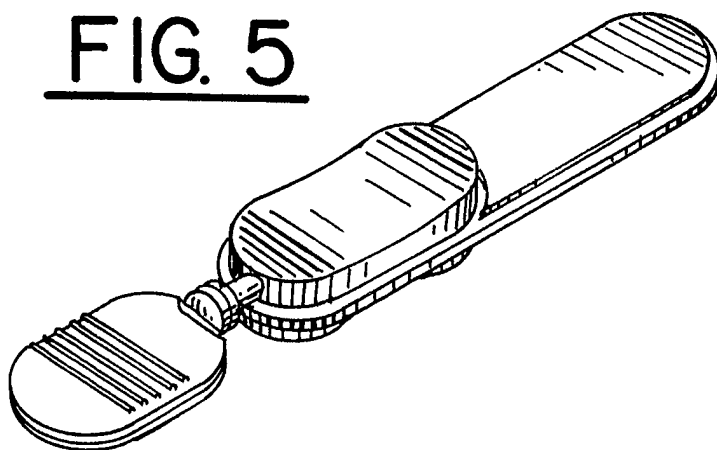


FIG. 6

3/4

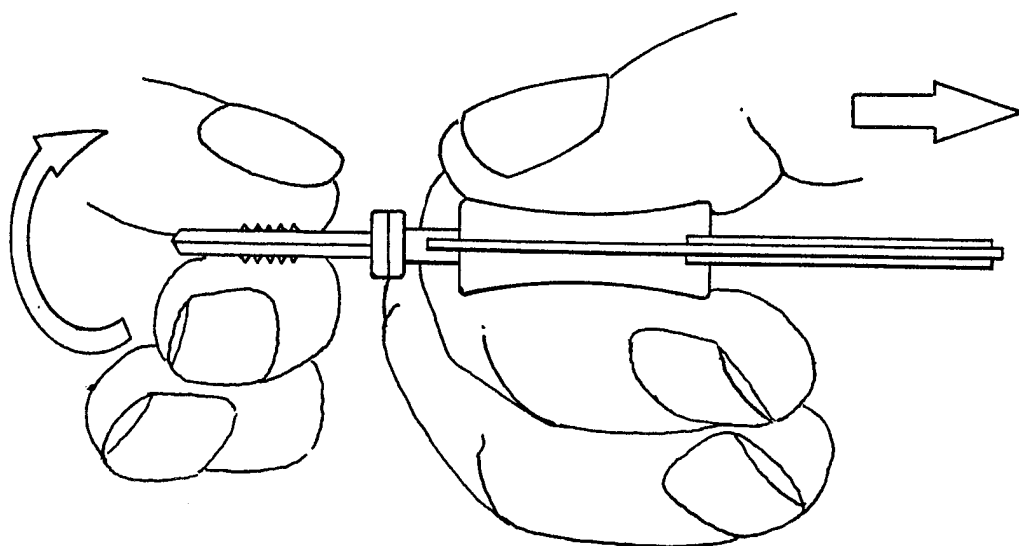


FIG. 7

4/4

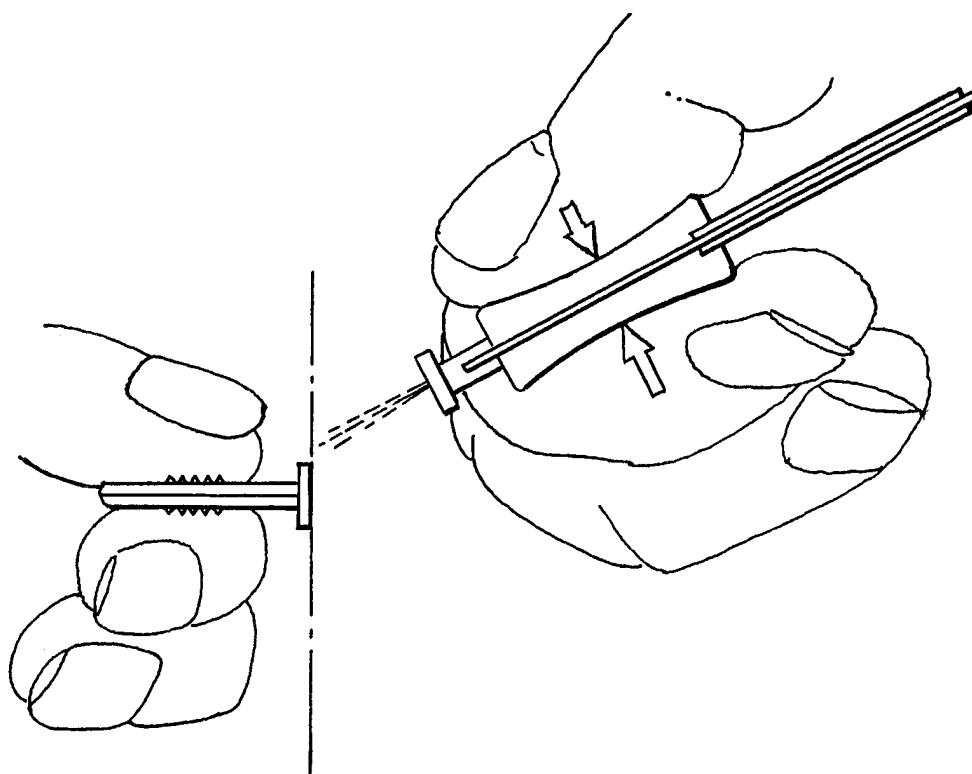


FIG. 8

INTERNATIONAL SEARCH REPORT

ational Application No
PCT/US 97/21647

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B65D1/09 A61J1/06

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 6 B65D A61J

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 832 056 A (HIND ET AL) 6 May 1960 see the whole document ---	1
X	FR 2 104 882 A (SMITH & NEPHEW) 21 April 1972 see page 7, line 22 - page 8, line 8; figures 2,3 ---	1,2
A	EP 0 743 057 A (SCHERER CORP.) 20 November 1996 see the whole document ---	1,2
A	EP 0 350 772 A (HANSEN) 17 January 1990 see the whole document ---	1,2
A	FR 1 074 325 A (CHIMIE ET ATOMISTIQUE) 5 October 1954 see the whole document ---	1
-/--		

☒ 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.
"&" document member of the same patent family

Date of the actual completion of the international search

11 March 1998

Date of mailing of the international search report

25/03/1998

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

Leong, C

INTERNATIONAL SEARCH REPORT

In tional Application No
PCT/US 97/21647

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 993 223 A (WELKER III ET AL) 23 November 1976 see the whole document -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/21647

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 832056 A		NONE	
FR 2104882 A	21-04-72	AU 3278071 A BE 771798 A DE 2142735 A NL 7111800 A ZA 7105702 A	01-03-73 28-02-72 13-04-72 29-02-72 26-04-72
EP 743057 A	20-11-96	AT 158714 T AU 673984 B AU 3056292 A BR 9207157 A CA 2142859 A DE 69222542 D DE 69222542 T EP 0655902 A JP 8502663 T NZ 244796 A WO 9404118 A US 5380534 A US 5484598 A ZA 9208259 A	15-10-97 05-12-96 15-03-94 11-07-95 03-03-94 06-11-97 05-02-98 07-06-95 26-03-96 26-05-95 03-03-94 10-01-95 16-01-96 21-06-93
EP 350772 A	17-01-90	DE 3823428 A JP 2065863 A	18-01-90 06-03-90
FR 1074325 A	05-10-54	NONE	
US 3993223 A	23-11-76	NONE	