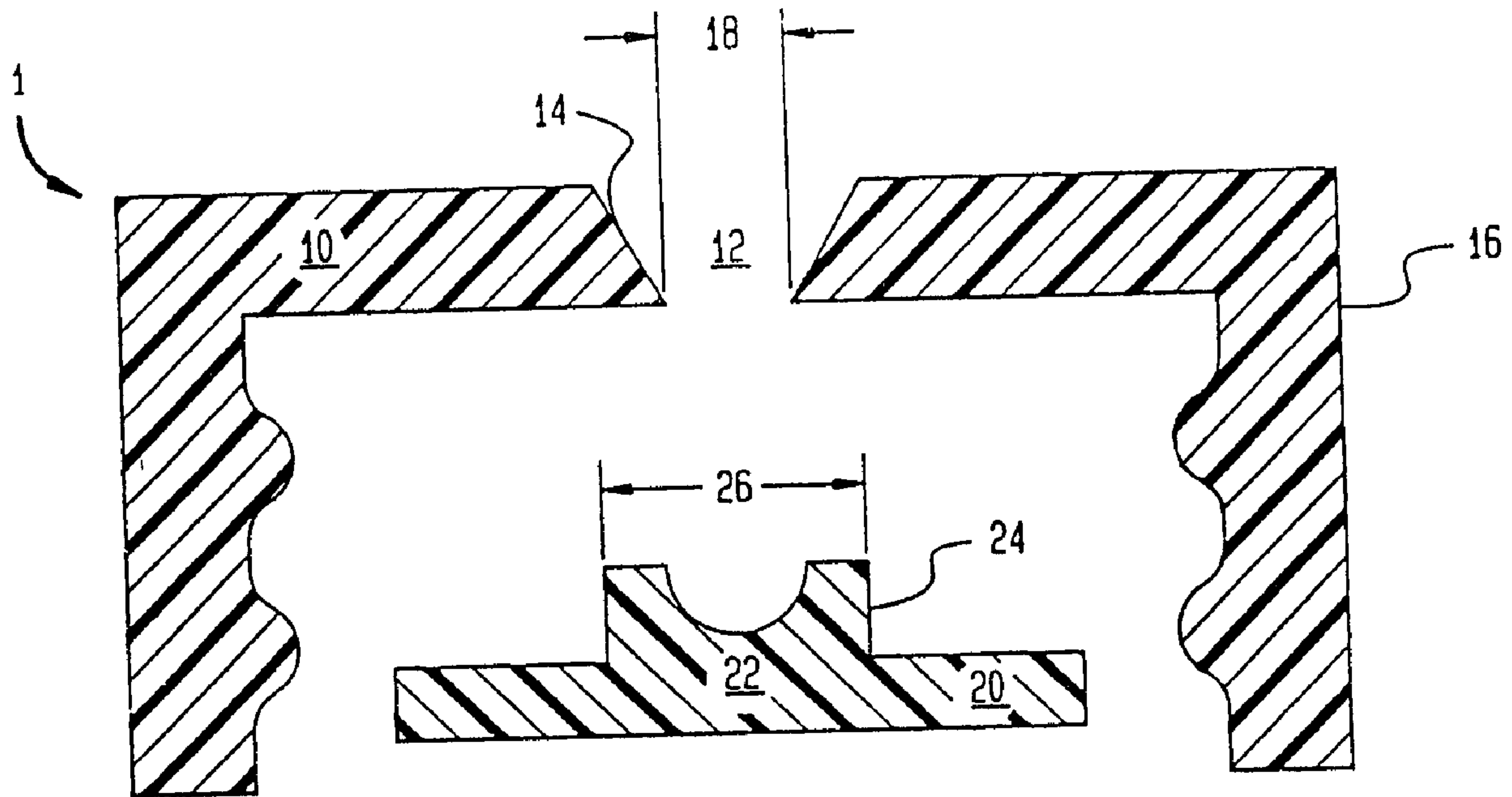




(86) Date de dépôt PCT/PCT Filing Date: 1991/08/29
 (87) Date publication PCT/PCT Publication Date: 1992/03/19
 (45) Date de délivrance/Issue Date: 2003/01/14
 (85) Entrée phase nationale/National Entry: 1993/03/01
 (86) N° demande PCT/PCT Application No.: US 1991/006171
 (87) N° publication PCT/PCT Publication No.: 1992/004245
 (30) Priorité/Priority: 1990/09/04 (07/577,270) US

(51) Cl.Int.⁵/Int.Cl.⁵ B65D 41/20
 (72) Inventeur/Inventor:
FINNERAN, JAMES G., US
 (73) Propriétaire/Owner:
J. G. FINNERAN ASSOCIATES, US
 (74) Agent: FETHERSTONHAUGH & CO.

(54) Titre : CAPUCHON A MEMBRANE
 (54) Title: CAP CLOSURE AND LINER



(57) Abrégé/Abstract:

A cap closure having a top member (10) with a center opening (12), a dependent skirt (16) and a liner (20). The liner has a central raised portion (22), which may be concave, which mates with the center opening in the top member by an interference fit, thus retaining the liner in the center opening and under the top member.



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ :

B65D 41/20

2090690

A1

(11) International Publication Number:

WO 92/04245

(43) International Publication Date:

19 March 1992 (19.03.92)

(21) International Application Number: PCT/US91/06171

(22) International Filing Date: 29 August 1991 (29.08.91)

(30) Priority data:

577,270

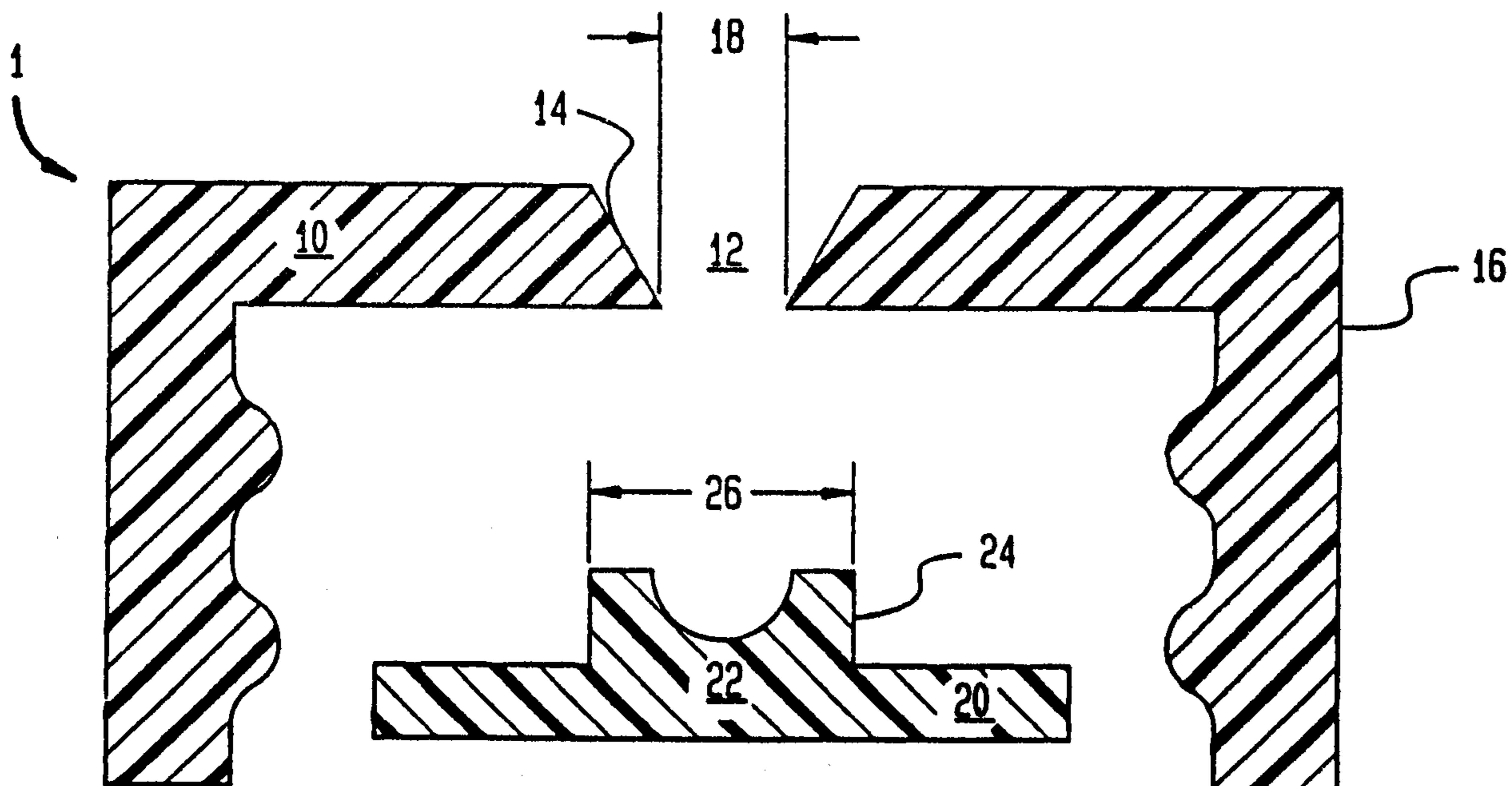
4 September 1990 (04.09.90) US

(71) Applicant: J.G. FINNERAN ASSOCIATES [US/US];
3600 Reilly Court, Vineland, NJ 08360 (US).(72) Inventor: FINNERAN, James, G. ; 636 Jefferson Avenue,
Vineland, NJ 08360 (US).(74) Agents: PRESTIA, Paul, F. et al.; Ratner & Prestia, 500
North Gulph Road, Suite 412, The Leighton Building,
P.O. Box 980, Valley Forge, PA 19482 (US).

(81) Designated States: AT (European patent), BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent).

Published*With international search report.**With amended claims.*

(54) Title: CAP CLOSURE AND LINER



(57) Abstract

A cap closure having a top member (10) with a center opening (12), a dependent skirt (16) and a liner (20). The liner has a central raised portion (22), which may be concave, which mates with the center opening in the top member by an interference fit, thus retaining the liner in the center opening and under the top member.

2090690

- 1 -

CAP CLOSURE AND LINER**Field of the Invention**

10 The invention relates to caps for bottles or
containers, especially caps for laboratory sample bottles
and dispensers containing pharmaceuticals and medicinal
agents, which include a penetrable segment for
introduction or withdrawal of material from a container
on which the cap is mounted. This type of container
15 requires a securely sealed cap which allows quick and
easy access to the container contents.

Background

20 Some conventional cap closures for sealing
bottles include a liner over the mouth of the bottle, and
a cap with a central opening which covers the liner and
engages the neck finish of the bottle. Known specific
examples are discussed below.

Boege et al., in U.S. Patent 4,773,552, disclose a
closure for sample bottles in which a plurality of
5 disks fit into a metal cap having a center hole. The
disks are retained in the cap by prongs around the
periphery of the disks which are frictionally fit to
the inside skirt of the cap. One of the disks is a
liner which does not protrude into the hole in the cap.

10

Other typical cap closures include a liner/stopper
combination which fits into a hole in the cap, and is
frictionally retained there. The stopper completely
fills the hole in the cap such that the top of the
15 stopper and the top of the cap form the outer surface
of the cap. In time, these liners tend to be released
from the surrounding cap, particularly when the
surrounding cap is a non-resilient material, such as
poly-propylene.

20

Brennan et al., in U.S. Patent 3,709,395, disclose
a container closure including a liner - top of the cap
- liner sandwich, wherein the liners are attached by a
stopper through a hole in the cap.

25

Brief Description of the Invention

In the present invention, there is provided a cap
closure comprising a top member with a center opening,
30 said center opening having a diameter and an opening
sidewall surrounding said opening, a dependent skirt
for engaging a neck finish of a container, and a liner
underlying said top member, said liner having an outer
surface, said outer surface having a central raised
35 portion with a central raised portion diameter

surrounded by a central raised portion sidewall, the diameter of said central raised portion being at least at one point, greater than the smallest center opening diameter of said top member, wherein said central raised portion sidewall is straight and said center opening sidewall has an outward flare and the height of said central raised portion sidewall is no greater than that of said opening sidewall, said opening sidewall and said central raised portion sidewall adapted to mate with one another with an interference fit therebetween.

The present invention also provides a cap closure comprising a top member with a center opening, said center opening having a diameter and an opening sidewall surrounding said opening, a dependent skirt for engaging a neck finish of a container, and a liner underlying said top member, said liner having an outer surface, said outer surface having a central raised portion with a central raised portion diameter surrounded by a central raised portion sidewall, the diameter of said central raised portion being at least at one point, greater than the smallest center opening diameter of said top member, wherein said central raised portion sidewall and said center opening sidewall are both outwardly flared and the height of said central raised portion sidewall is no greater than that of said opening sidewall, said opening sidewall and said central raised portion sidewall adapted to mate with one another with an interference fit therebetween.

Brief Description of the Figures

Figure 1 is a cross-sectional view of the cap closure and liner assembly of the claimed invention;

- 3a -

Figure 2 is a cross-sectional view of the disassembled cap closure and liner of the claimed invention.

5 Figure 3 is a cross-sectional view of one embodiment of the disassembled cap closure and liner of the claimed invention.

Detailed Description of the Invention

10 The present invention is a cap closure comprising a top member, having a center opening, a dependent skirt and liner.

15 As shown in Figures 1 and 2, top member 10 of cap 1 includes a center opening 12 surrounded by opening sidewall 14, which flares outwardly from a reduced diameter 18 at the lower or inner surface of top member 10 to an enlarged diameter 26 at the top or outer surface thereof.

20 Cap 1 also includes dependent skirt 16, integral with an extending from top member 10. Skirt 16 is adapted to engage the neck finish of a container or

25

2090690

- 4 -

bottle, usually by threads or snap rings (not shown). Top member 10 and dependent skirt 16 are typically composed of non-resilient material.

5 Liner 20 underlies top member 10 and is composed of a resilient material, silicone rubber for example. The resilient material facilitates puncturing with a needle or syringe and resealing of liner 20 such that liner 20 will self-repair a hole formed by such a
10 needle or syringe. Liner 20 includes central raised portion 22 on its top or outer surface with a central raised portion sidewall 24. Thus, central raised portion diameter 26 is surrounded by central raised portion sidewall 24. Sidewall 24 may be straight (as shown in
15 Figure 1) or have a slight outward flare corresponding or nearly corresponding to that of center opening sidewall 14 to facilitate mating there between.

 Central raised portion 22 mates with center
20 opening 12 of top member 10 and, upon deformation of portion 22, forms to some degree mating frusto-conical segments (as shown in Figure 2). Center opening 12 compresses central raised portion 22 such that central raised portion sidewall 24 assumes the outward flare of
25 opening sidewall 14. The diameter 26 of central raised portion 22 is, at least at one point, greater than the smallest center opening diameter 18. The deformation compression of sidewall 24 provides a mechanical lock, or interference fit, between liner 20 and top member 10.
30 Thus, central raised portion 22 of liner 20 is retained in center opening 12 by an interference fit. Accordingly, the interference mating prevents liner 20 from falling out of top member 10.

The dimensions of the cap closure are of particular importance to ensure an interference fit. To best accomplish this, the diameters of center opening 12 and central raised portion 22 of liner 20 are controlled, preferably to five thousandths of an inch. Further, the outward flare of the mating sidewalls is generally in the range of 15 to 30 degrees from vertical, preferably about 20 degrees.

10 Preferably also, central raised portion 22 of liner 20 is concave (as shown), such that a minimum vertical length of liner 20 exists in the middle of central opening 12 of top member 10. Accordingly, a needle, or other instrument used to puncture liner 20,
15 passes through a liner thickness which is less than the total thickness of top member 10.

The interference mating of central raised portion 22 and center opening 12 of cap closure 1 of the present invention overcomes problems associated with conventional cap closures. Central raised portion 22 is not as likely to collapse into the container upon pressure from a needle. The interference fit also prevents liner 20 from falling out of cap closure 1 after
20 assembly such that the cap closure and liner need not be reassembled when the containers are ready for sealing. The assembly may be accomplished manually or by machine preassembly. In addition, the small mass and absence of projections of liner 20 reduces the likelihood of
25 contamination from the surrounding environment as well as from the container contents to cap closure 1.
30

While this invention has been disclosed with reference to specific embodiments, it is apparent that

PUBLISHED

2090690 -

other embodiments and equivalent variations of this invention may be devised by those skilled in the art without departing from the true spirit and scope of this invention. The appended claims are intended to be
5 construed to include all such embodiments and equivalent variations.

CLAIMS:

1. A cap closure comprising a top member with a center opening, said center opening having a diameter and an opening sidewall surrounding said opening, a dependent skirt for engaging a neck finish of a container, and a liner underlying said top member, said liner having an outer surface, said outer surface having a central raised portion with a central raised portion diameter surrounded by a central raised portion sidewall, the diameter of said central raised portion being at least at one point, greater than the smallest center opening diameter of said top member, wherein said central raised portion sidewall is straight and said center opening sidewall has an outward flare and the height of said central raised portion sidewall is no greater than that of said opening sidewall, said opening sidewall and said central raised portion sidewall adapted to mate with one another with an interference fit therebetween.

2. A cap closure comprising a top member with a center opening, said center opening having a diameter and an opening sidewall surrounding said opening, a dependent skirt for engaging a neck finish of a container, and a liner underlying said top member, said liner having an outer surface, said outer surface having a central raised portion with a central raised portion diameter surrounded by a central raised portion sidewall, the diameter of said central raised portion being at least at one point, greater than the smallest center opening diameter of said top member, wherein said central raised portion sidewall and said center opening sidewall are both outwardly flared and the height of said central raised portion sidewall is no greater than that of said opening sidewall, said opening sidewall and said central raised portion sidewall adapted to mate with one another with an interference fit therebetween.

3. A cap closure, as recited in claim 1 or claim 2, wherein said outer surface of said central raised portion is concave.

FIG. 1

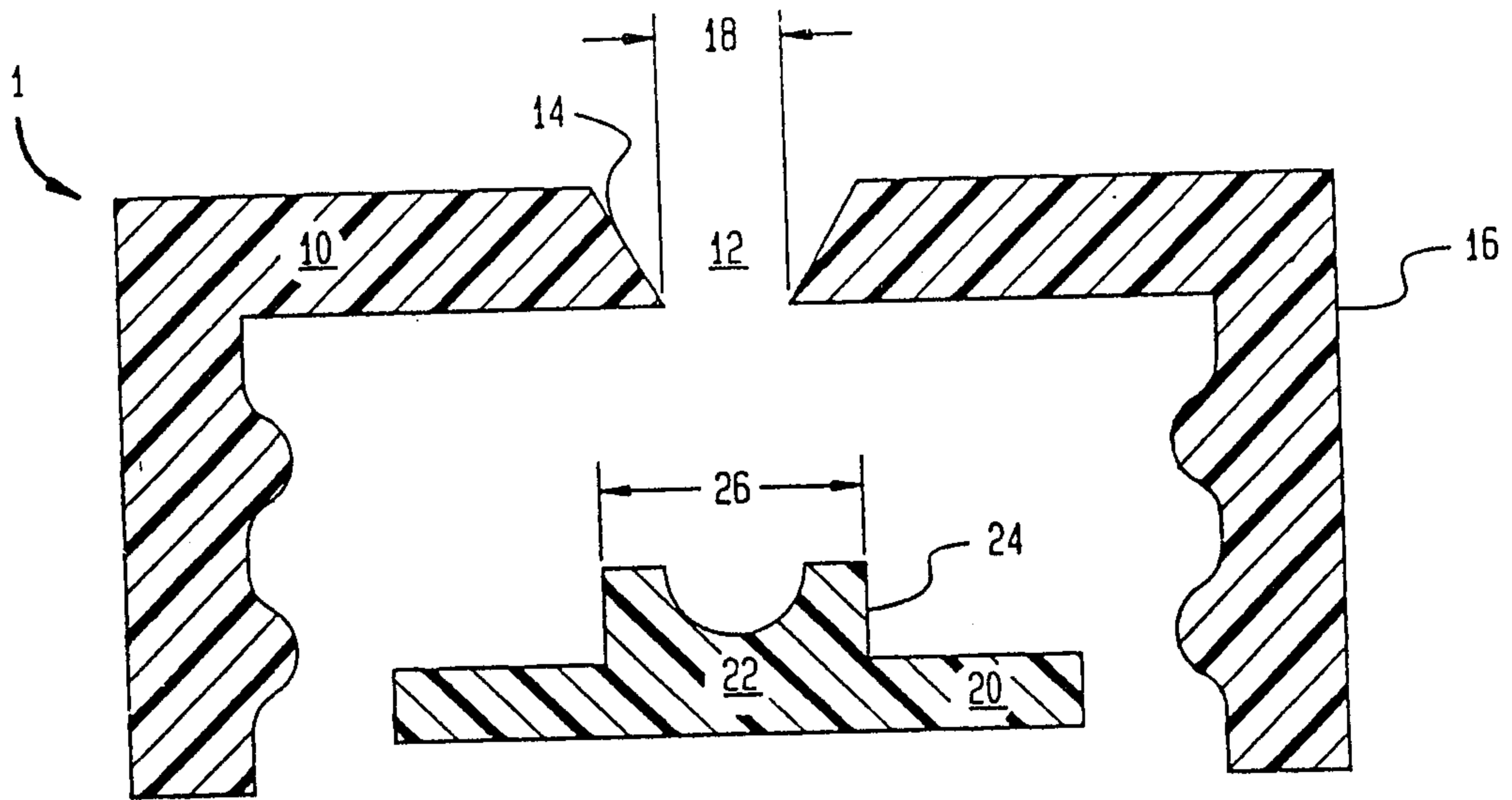


FIG. 2

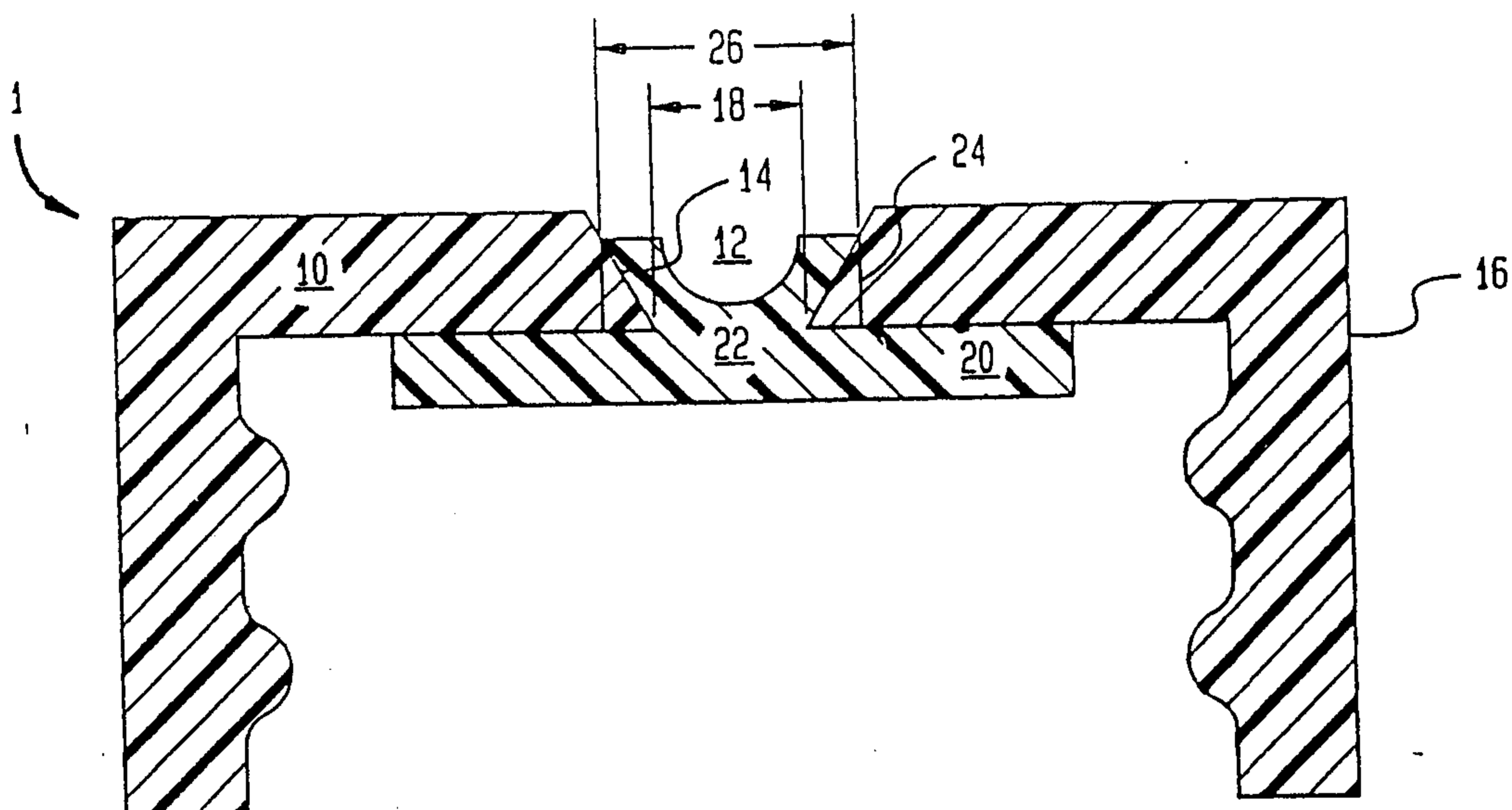


FIG. 3

