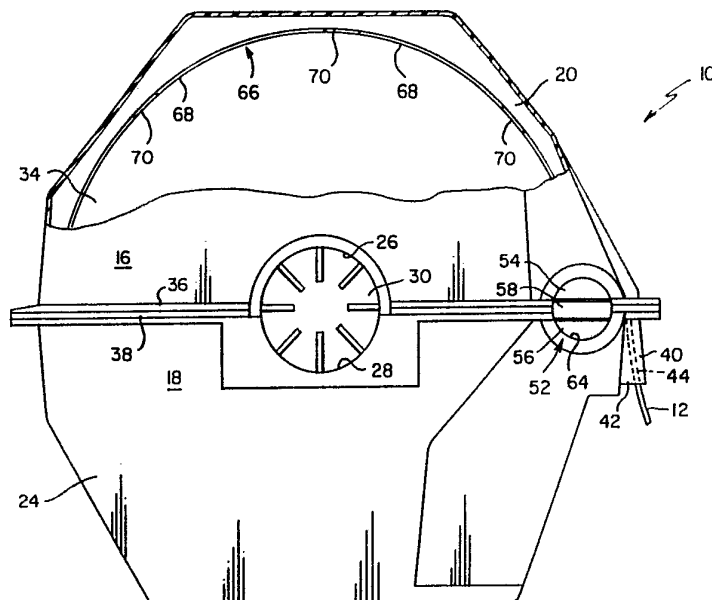




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US91/06293</p> <p>(22) International Filing Date: 5 September 1991 (05.09.91)</p> <p>(30) Priority data: 579,762 10 September 1990 (10.09.90) US</p> <p>(71) Applicant: EASTMAN KODAK COMPANY [US/US]; 343 State Street, Rochester, NY 14650-2201 (US).</p> <p>(72) Inventors: ROBERTSON, Jeffrey, Charles ; 85 Echo Street, Rochester, NY 14609 (US). SEMMLER, Bruce, John ; 1063 Ogden-Parma Townline Road, Spencer, NY 14559 (US).</p> <p>(74) Agent: DIXON, William, C., III; 343 State Street, Rochester, NY 14650-2201 (US).</p>		<p>(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).</p> <p><b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>

## (54) Title: A WEB-ROLL ANTI-CLOCKSPRINGING MECHANISM



## (57) Abstract

An anti-clockspringing mechanism for a web-roll (14) in a cartridge (10) comprises a unitary lock member (52 or 78) having a cylindrical body (54 or 80) rotatably mounted in a sidewall (22, 24) of the cartridge (10). A flange (34 or 94) on a web-spool (35) on which the web-roll (14) is wound is provided with an annular lip (66 or 92) having alternately spaced lugs (68 or 98) and notches (70 or 96). The lock member body (54 or 80) has a handle (58 or 84) on one side thereof extending toward the cartridge exterior and at least one shoulder (62 or 90) projecting from the opposite side thereof into the cartridge interior. The shoulder (62 or 90) lies in the plane of the annular lip (66 or 92) in alignment with a sector thereof. The lock member (52 or 78) is rotatable between an unlocked position (Fig. 4 or Fig. 7), in which the shoulder (62 or 90) is withdrawn from a lip notch (70 or 96) and is out of alignment with the lip lugs (68 or 98) for allowing the web-spool (35) to freely rotate, and a locked position (Fig. 5 or Fig. 9) in which the shoulder (62 or 90) nests within a lip notch (70 or 96) in a position transverse to the lip lugs (68 or 98) for preventing the web-spool (35) from rotating.

**+ DESIGNATIONS OF "SU"**

**Any designation of "SU" has effect in the Russian Federation. It is not yet known whether any such designation has effect in other States of the former Soviet Union.**

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## A WEB-ROLL ANTI-CLOCKSPRINGING MECHANISM

BACKGROUND OF THE INVENTION

5

Field of the Invention

The present invention relates generally to web-roll  
cartridges, and more particularly to an anti-clock-  
10 springing mechanism for preventing a wound roll of web  
material on a web-spool within a cartridge from  
clockspringing during storage, handling, and shipment  
thereof.

15 Description of the Prior Art

In various packages or cartridges now in use for  
webs of photographic film and paper, the web is wound  
on a spool or core, with or without flanges, and is  
20 disposed within the cartridge which totally surrounds  
or encloses the web and protects it from light and  
other damaging effects. One end of the web is normally  
secured to the core or spool center, and the other end  
extends out of the cartridge through a slot therein.  
25 The other end is fastened to the exterior surface of  
the cartridge and is released therefrom for insertion  
into a camera or the like. It has been found that  
there is a tendency for the web in such cartridges to  
unwind during storage, handling and shipping. Inasmuch  
30 as the inner end of the web is connected to the core or  
the spool center and the outer end is normally secured  
to the outer surface of the cartridge, the web acts as  
a released clockspring, turning the spool as it  
unwinds. Such clockspringing can result in scratching  
35 or abrading the surface of adjacent web convolutions  
causing a deterioration in the quality of the image  
that may be recorded thereon. In other instances, the

web can clockspring outwardly to the extent that the  
outer convolution of web jams against the inner surface  
of the cartridge making subsequent unreeling of the web  
5 difficult or impossible. In situations in which the  
outer end of the web is not fastened to the outer  
surface of the cartridge, or is inadvertently released  
from the cartridge surface, the clockspringing can  
cause the outer end of the web to be pulled back  
10 through the slot into the cartridge interior cavity,  
resulting in a cartridge that is completely unusable.

Various attempts have been made to provide  
anti-clockspringing apparatus for preventing unwinding  
15 of the web in cartridges. For example, an anti-clock-  
springing device for a film cartridge is disclosed in  
U.S. Patent No. 3,613,876, which issued to Kohler et  
al. on October 19, 1971. In the disclosed film  
cartridge, one or more spot welds is provided between  
20 the surface of the core and the cartridge hub. The  
spot weld has sufficient strength to prevent the core  
from rotating during shipping, but will break as the  
film is withdrawn from the cartridge, permitting the  
core to rotate. In U.S. Patent No. 3,784,001, which  
25 issued to Bushnell et al. on January 8, 1974, a film  
cartridge is disclosed in which clockspringing of a  
roll of film is prevented by providing a frangible  
connector between the core and a portion of the  
cartridge. The connector has sufficient strength to  
30 prevent the core from rotating during shipping, but  
which will break as the film is withdrawn from the  
cartridge, permitting the core to rotate. A  
core-locking device for a web dispensing cassette is  
disclosed and published as Item No. 16352 in the  
35 November 1977 issue of Research Disclosure. In that  
core-locking device, a web-winding core is provided  
with a slotted end, and a core-locking member is

provided that is captive and slidable (but yet light-tight) in one of two end caps of the cassette. In U.S. Patent No. 4,210,296, which issued to Frechette on July 1, 1980, a ribbon cartridge with an integral anti-spool rotation device is disclosed. The anti-spool rotation device comprises an axially movable spool core insert connected to the cartridge wall by flexible bridges or arms. The core insert is manually pressed into the open end of the core to frictionally hold the core against rotation. Upon mounting the cartridge in a machine, a post thereon will axially push the core insert out of frictional engagement with the spool core, thereby allowing free rotation of the web supply spool. It is also known in the prior art to prevent clockspringing of a wound roll of web material within a cartridge by providing aligned notches in outer surfaces of the core end and cartridge wall and placing a rubber band around the entire cartridge with the band nesting in the notches. In still another prior-art reference, U.S. Patent No. 4,756,418, which issued to Johanson et al. on July 12, 1988, prevention of clockspringing of a wound roll of web material within a cartridge is achieved by providing a notch in a core end alignable with an enclosed slot in a wall of the cartridge, and inserting a clip through the aligned notch and slot. In U.S. Patent No. 4,802,633, which issued to Beery on February 7, 1989, an anti-clock-springing mechanism is disclosed comprising a ring gear on the flange of the web-spool engageable by a "one-shot" bendable locking gear sector on the cartridge body. The gear sector is normally in engagement with the ring gear to prevent the web-spool from rotating and the web material thereon from clockspringing during shipment and storage of the cartridge. An operating pin is insertable through a light-tight opening in the cartridge for engaging the gear sector and disengaging it from the ring gear to allow web-spool rotation.

Although the aforementioned prior-art attempts at solving the problems of web-roll clockspringing in cartridges have had varying degrees of success, the need still exists for an improved anti-clockspringing mechanism that is of simple design and construction, reliable in operation, and economical to manufacture. An object of the present invention is to fulfill this need.

#### SUMMARY OF THE INVENTION

An object of the present invention is to provide an improved anti-clockspringing mechanism for a web-roll cartridge. The anti-clockspringing mechanism comprises a web-spool having a core onto which a web is wound to form a web-roll. A flange having an annular lip provided with angularly spaced alternating lugs and notches is attached to each end of the core. A cartridge encloses and rotatably supports the web-spool with a sidewall of the cartridge facing a flange in closely spaced relation. An anti-clockspringing lock member is rotatably mounted in the sidewall, and is provided with at least one shoulder facing a sector of the circular lip. The lock member is rotatably moveable in the cartridge between unlocked and locked positions. In the unlocked position, the shoulder is withdrawn from a lip notch and is out of alignment with the lip lugs, allowing the flange and web-roll to freely rotate. In the locked position, the lock member shoulder nests within a lip notch in a position in alignment with and transverse to the lip lugs for preventing the flange and web-roll from rotating.

35

Some advantages of the anti-clockspringing mechanism of this invention are (1) a reduction in the web-roll inertial forces on the core and possible  
5 damage thereto during storage, handling, and shipping, (2) simplicity of design and construction, (3) reuseability of the cartridge and anti-clockspringing mechanism, (4) reliability of operation, and (5) manufacturing economy.

10

The invention and its objects and advantages will become more apparent from the detailed description of the preferred embodiments presented below.

15

BRIEF DESCRIPTION OF THE DRAWINGS

In the detailed description of the preferred embodiments of the invention presented below, reference is made to the accompanying drawings, in which:

20

Fig. 1 is a side elevational view of a cartridge in which a preferred embodiment of the web-roll anti-clockspringing mechanism of this invention is embodied, with a portion thereof broken away to  
25 show a portion of the web-spool flange;

30

Fig. 2 is an end elevational view of the cartridge with a portion thereof broken away to expose a portion of the web-spool and web-roll;

35

Fig. 3 is an exploded view, in perspective, of the cartridge and anti-clockspringing lock member, with the web-spool omitted for clarity;

Fig. 4 is a segmental, enlarged, perspective view of a lower portion of the cartridge housing, showing the web-roll anti-clockspringing lock member of Figs. 1 and 3 in its unlocked position;

Fig. 5 is a segmental, enlarged, perspective view similar to Fig. 4, showing the web-roll anti-clock-springing lock member of Figs. 1 and 3 in its  
5 locked position;

Fig. 6 is a segmental, enlarged, rear perspective view of the web-roll anti-clockspringing lock member;  
10

Fig. 7 is a segmental, front perspective view of another preferred embodiment of the web-roll anti-clockspringing mechanism of this invention, with the lock member in its unlocked position;  
15

Fig. 8 is a segmental, rear perspective view of the lock member of Fig. 7; and

Fig. 9 is a segmental, front perspective view similar to Fig. 7, showing the lock member in its locked position.  
20

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

25 Because certain parts of web-spools, web-rolls, and cartridges are well-known, the following description is directed in particular to those elements forming, cooperating directly with, or relating to the present invention. Elements not specifically shown or  
30 described herein are selectable from those known in the art.

Illustrated in Figs. 1 and 2 is a cartridge 10 of a type suitable for supplying a computer output  
35 microfilmer or the like, not shown, with a long web 12 of 16mm and/or 105mm wide films from a web-roll 14. The cartridge typically comprises a pair of upper and

lower cartridge housings 16, 18 defining a central interior cavity 20 and having sidewalls 22, 24 provided with matching semi-cylindrical recesses forming

5 bearings 26, 28 for rotatably supporting cylindrical journals 30 on a pair of flanges 34 of a web-spool 35 mounted within the cavity. The cartridge housings 16, 18 are sealed together along mating rim surfaces 36, 38 for enclosing the web-roll 14 on web-spool 35.

10 Housings 16, 18 have nose portions 40, 42 with opposed inner surfaces defining an exit slot 44 through which the web 12 is withdrawn from the cartridge. The opposed inner surfaces normally have a plush or foam material, not shown, applied thereto to prevent light

15 from entering the cartridge interior cavity 20.

With further reference to Fig. 2, the web-spool 35 comprises a core 50, shown dotted, onto which the long web 12 of film or paper is wound, forming the web-roll

20 14. The web-spool further comprises the aforementioned pair of flanges 34 which are attached to ends of the core 50 to prevent dishing and/or telescoping of the web-roll.

25 Referring to Figs. 1 and 3-6, a preferred embodiment of the web-roll anti-clockspringing mechanism of this invention comprises a unitary lock member 52 (Figs. 3 and 6) having a thin cylindrical body 54. The body has an outer flat surface 56 from

30 which a handle portion 58 extends laterally outwardly. The body 54 further has an inner, substantially flat surface 60 from which an arcuate eccentric lock shoulder 62 extends laterally outwardly.

35 With further reference to Figs. 3-5, the web-roll anti-clockspringing lock member 52 is rotatably mounted in sidewalls 22, 24 of the cartridge 10 by nesting the

periphery of the body 54 within matching semi-cylindrical grooved bearings 64 which together define a complementary opening in sidewalls 22, 24.

5 The grooves in the bearings cooperate with body 54 to provide a light-seal to prevent light from entering the cartridge cavity 20. In this mounted position, the handle portion 58 is accessible from the exterior of the cartridge, and the eccentric lock shoulder 62 faces

10 a sector of an annular lip 66 on the periphery of a flange 34. The lip is provided with angularly spaced alternate lugs 68 and notches 70 in substantial alignment with the lock shoulder 62 and all lying in substantially the same plane. The edges 72 of the lock

15 shoulder 62 are rounded to facilitate movement of the shoulder into a nesting position within a notch 70 upon rotatable movement of the lock member 52 to its locked position, as best seen in Fig. 5. In this locked

20 position, the lock shoulder 62 is positioned transverse to the lugs 68 and blocks the flange 34 and web-roll 14 from rotating. When the lock member 52 is rotatably moved to its unlocked position, as best seen in Figs. 1 and 4, the eccentric lock shoulder 62 is moved out of or withdrawn from a lip notch 70, and the inner surface

25 thereof is substantially parallel to and spaced from the lip 66, allowing the flange 34 and web-roll 14 to freely rotate.

Detent means may be interposed between the lock member 52 and cartridge 10 for releasably holding

30 the lock member in its locked or unlocked position. The detent means comprises a flexible finger 74 extending radially outwardly from a sidewall bearing 64, as best seen in Fig. 3, cooperating with a nipple 76 (Fig. 6) on the inner flat surface 60 of the lock

35 member 52. In the locked position, the nipple 76 is adjacent to one side of the finger 74, and is adjacent to the other side of the finger when the lock member is moved to its unlocked position.

With reference to Figs. 7-9, another preferred embodiment of the web-roll anti-clockspringing mechanism of this invention is disclosed, comprising a unitary cylindrical lock member 78 having a peripheral groove 80 for receiving semi-cylindrical bearing surfaces, not shown, in sidewalls of the housings at their juncture. The lock member 78 has a handle 84 on one side facing the exterior of the cartridge and a lock means on the opposite side extending into the cartridge interior cavity. The lock means comprises an annular, laterally extending rim 86 having a pair of diametrically opposed rim notches 88 forming a pair of diametrically opposed arcuate lock shoulders 90. When the lock member 78 is moved by the handle 84 to an unlocked position, as seen in Figs. 7 and 8, the rim notches 88 are in alignment with a flange lip 92, allowing the lip, flange 94, and web-roll 14 to freely rotate. When the lock member 78 is moved to its locked position, as seen in Fig. 9, the lock shoulders 90 nest within an elongated lip notch 96 in a position transverse to the lip lugs 98 for blocking and preventing the flange 94 and web-roll 14 from rotating.

This invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the scope of this invention as defined by the following claims.

30

35

CLAIMS

1. A web-roll anti-clockspringing mechanism  
5 comprising:
- a web-spool (35) onto which a web-roll (14) is wound;
- 10 a flange (34 or 94) on the web-spool (35) having an annular lip (66 or 92) provided with angularly spaced alternate lugs (68 or 98) and notches (70 or 96);
- 15 a cartridge (10) enclosing and rotatably supporting the web-spool (35), the cartridge (10) having a sidewall (22, 24) facing the flange (34 or 94) in closely spaced relation; and
- 20 an anti-clockspringing lock member (52 or 78) rotatably mounted in the sidewall (22, 24) and facing a sector of the annular lip (66 or 92), the lock member (52 or 78) further having an eccentric  
25 shoulder (62 or 90) lying substantially in the plane of the lip (66 or 92), the lock member (52 or 78) further adapted to be moveable between a locked position (Fig. 5 or Fig. 9), in which the lock shoulder (62 or 90) nests in a lip notch (70 or 96) and is transverse to the lugs (68 or 98) to prevent  
30 the flange (34 or 94) and web-spool (35) from rotating, and an unlocked position (Fig. 4 or Fig. 7) in which the lock shoulder (62 or 90) is withdrawn from a lip notch (70 or 96), allowing the flange (34 or 94) and web-spool (35) to freely  
35 rotate.

2. A web-roll anti-clockspringing mechanism according to Claim 1 wherein the annular lip (66 or 92) is on the periphery of the flange (34 or 94) and  
5 extends axially outwardly from the flange (34 or 94).

3. A web-roll anti-clockspringing mechanism according to Claim 1 wherein the lock shoulder (62 or 90) extends axially inwardly toward the flange (34 or  
10 94) and has an outer arcuate surface.

4. A web-roll anti-clockspringing mechanism according to Claim 1 wherein the lock member (52 or 78) comprises a unitary member (52 or 78) having a  
15 cylindrical body (54 or 80) rotatably mounted in an opening in the sidewall (22, 24) of the cartridge (10), the lock shoulder (62 or 90) being mounted on one side of the body (54 or 80), and wherein the unitary lock member (52 or 78) further has a handle (58 or 84) on  
20 the opposite side of the body (54 or 80).

5. A web-roll anti-clockspringing mechanism according to Claim 4 wherein the annular lip (66 or 92) is on the periphery of the flange (34 or 94) and  
25 extends axially outwardly from the flange (34 or 94), and wherein the lock shoulder (62 or 90) extends axially inwardly toward the flange (34 or 94) and has an outer arcuate surface.

30 6. A web-roll anti-clockspringing mechanism according to Claim 5 further comprising detent means (74) between the cartridge (10) and the lock member (52) for releasably holding the lock member (52) in its locked (Fig. 5) and unlocked (Fig. 4) positions.

35

7. A web-roll anti-clockspringing mechanism according to Claim 6 wherein the detent means (74) comprises a flexible finger (74) that extends from the  
5 sidewall (22, 24) partially across said opening therein and cooperates with a nipple (76) projecting from said one side of the body (54).

8. A web-roll anti-clockspringing mechanism  
10 according to Claim 2 wherein the lock member (78) has a pair of axially extending shoulders (90) defining a notch (88) therebetween.

9. A web-roll anti-clockspringing mechanism  
15 according to Claim 8 wherein the lock member (78) comprises a unitary member (78) having a cylindrical body (80) rotatably mounted in a bearing in the sidewall (22, 24) of the cartridge (10), wherein the pair of shoulders (90) are positioned in diametrically  
20 opposed relation on one side of the body (80), and wherein the lock member (78) further has a handle (84) on the opposite side of the body (80).

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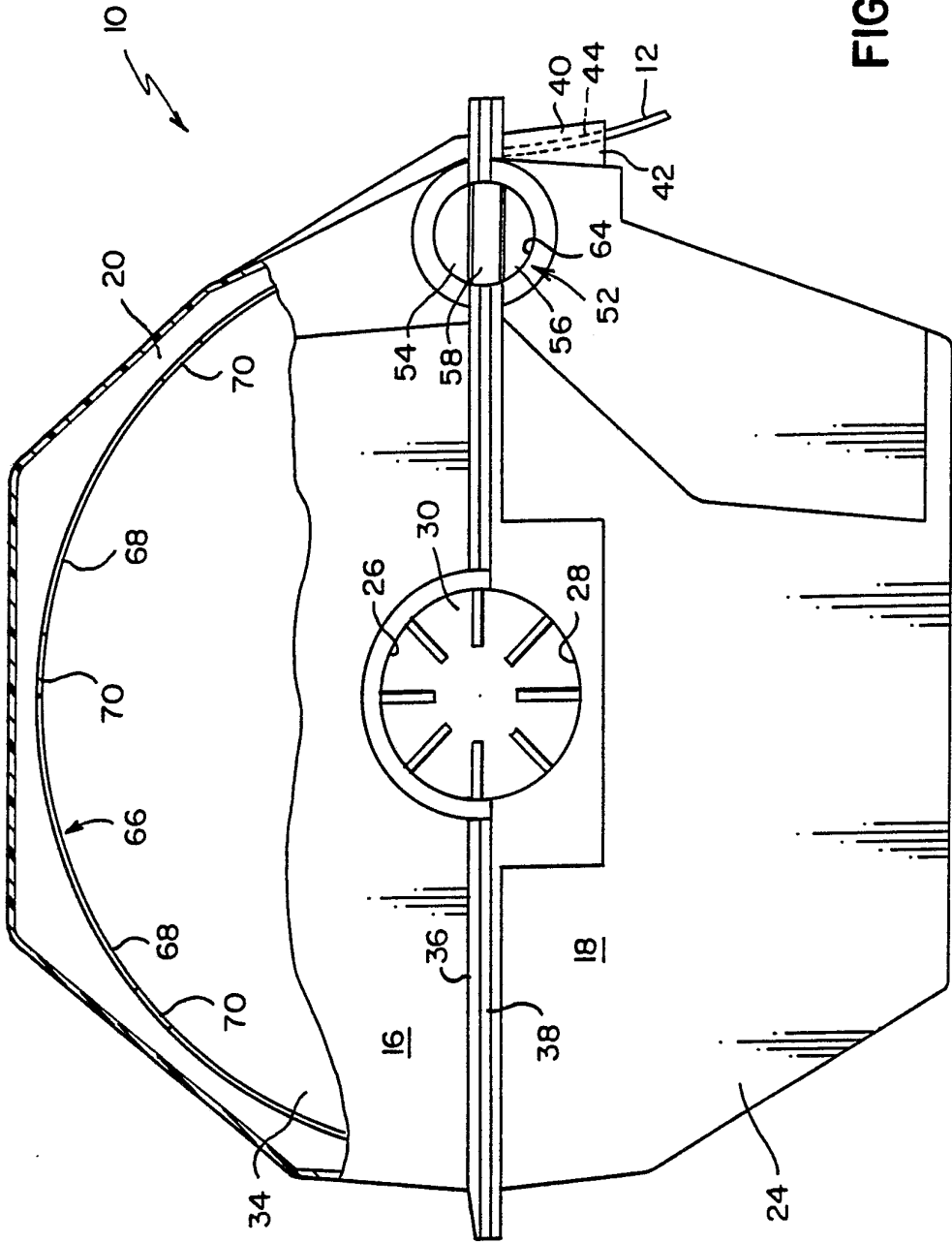


FIG. 1

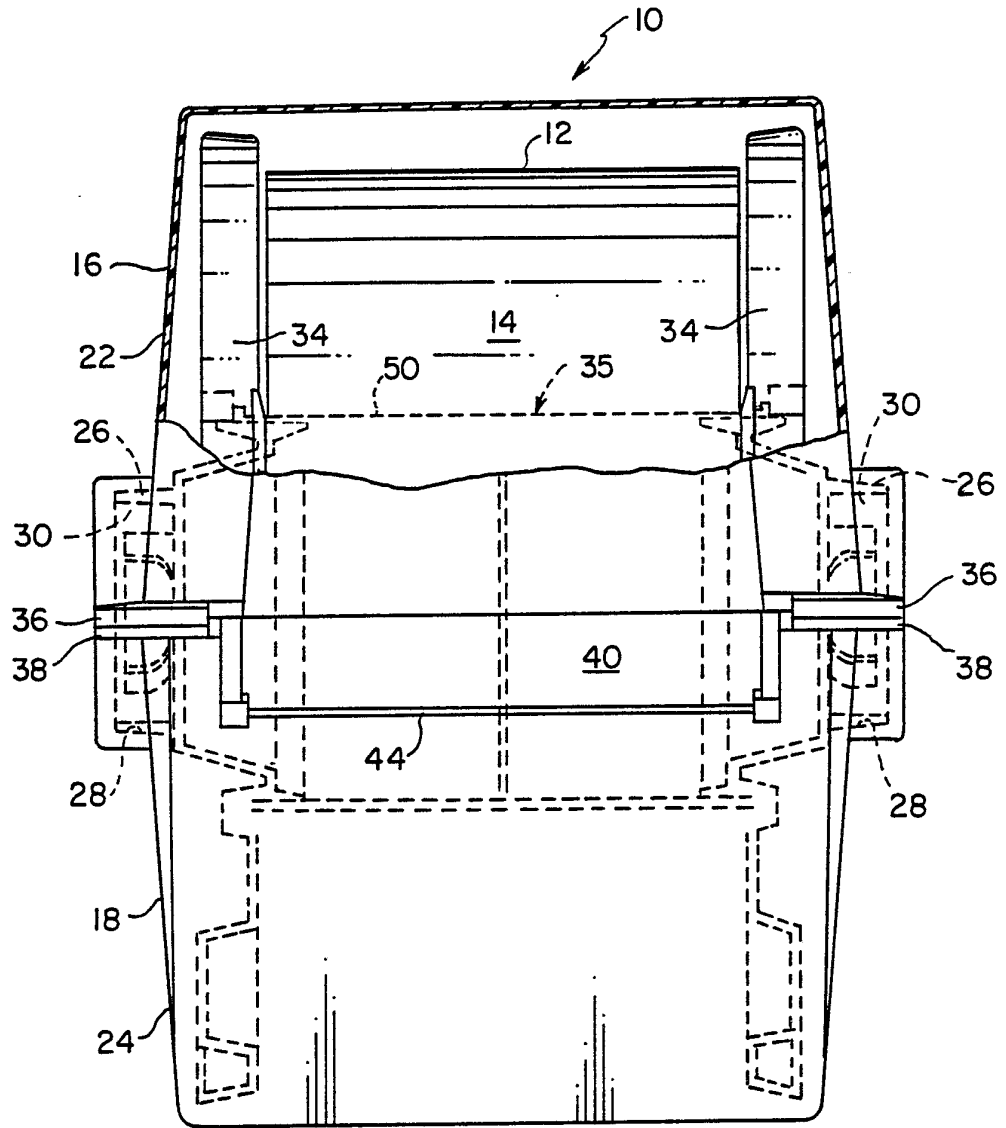


FIG. 2

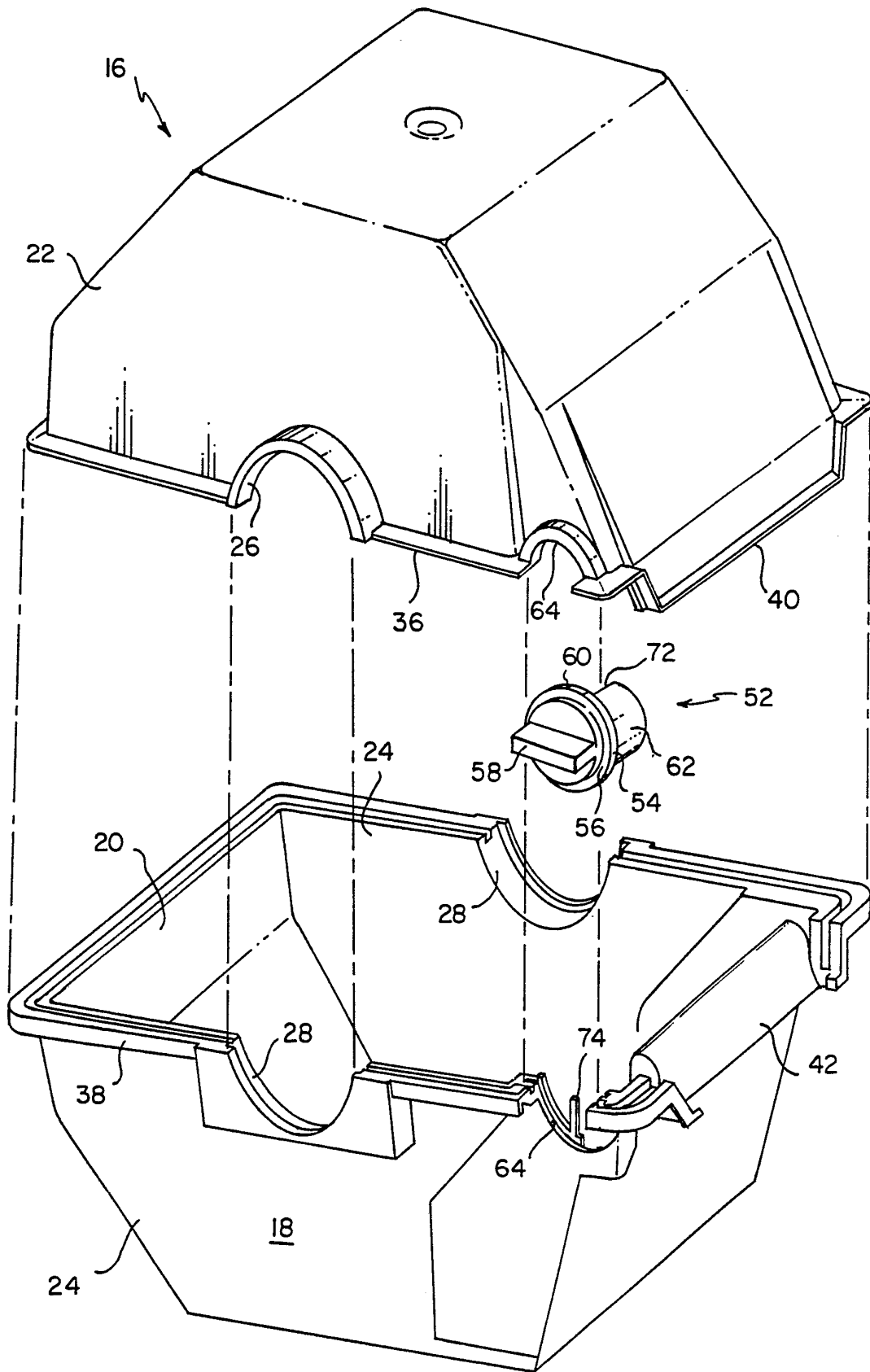


FIG. 3

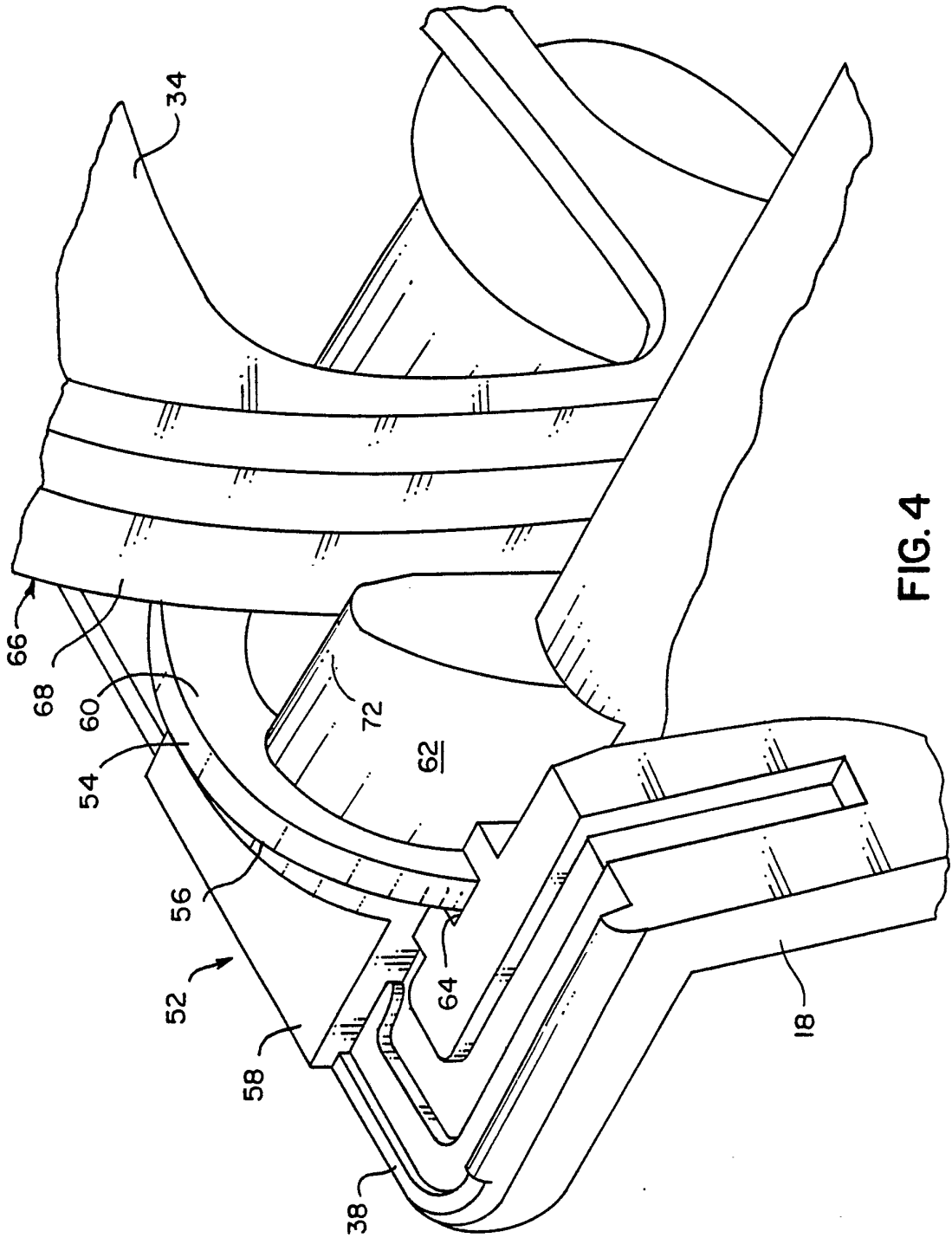


FIG. 4

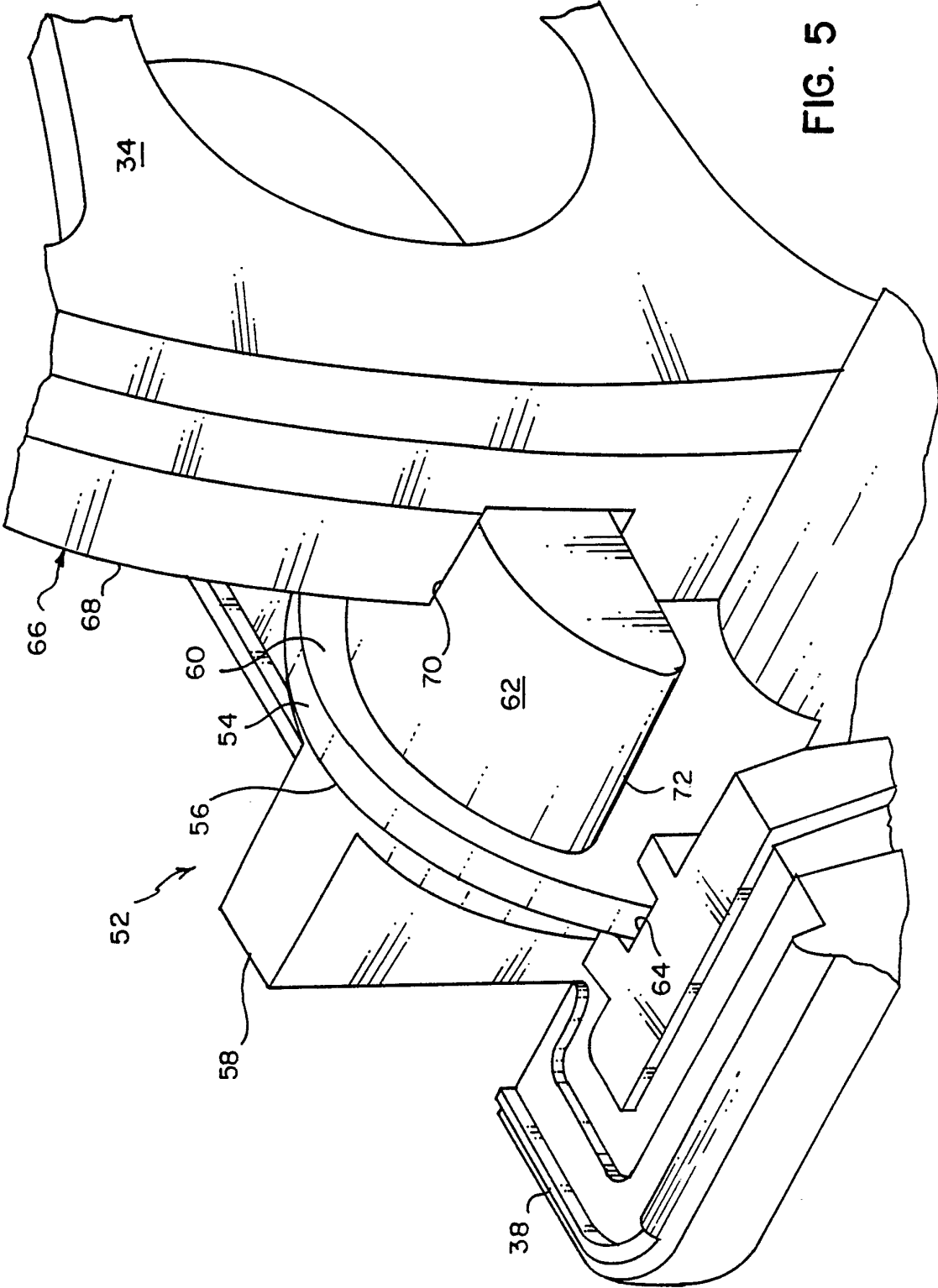


FIG. 5

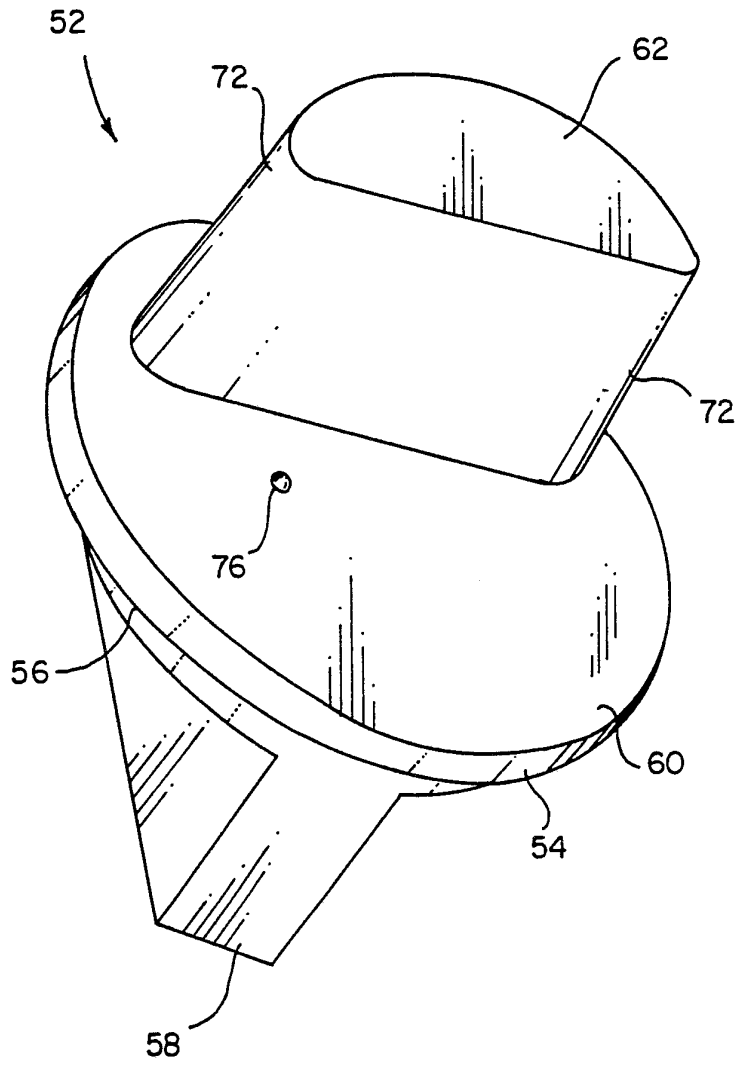


FIG. 6

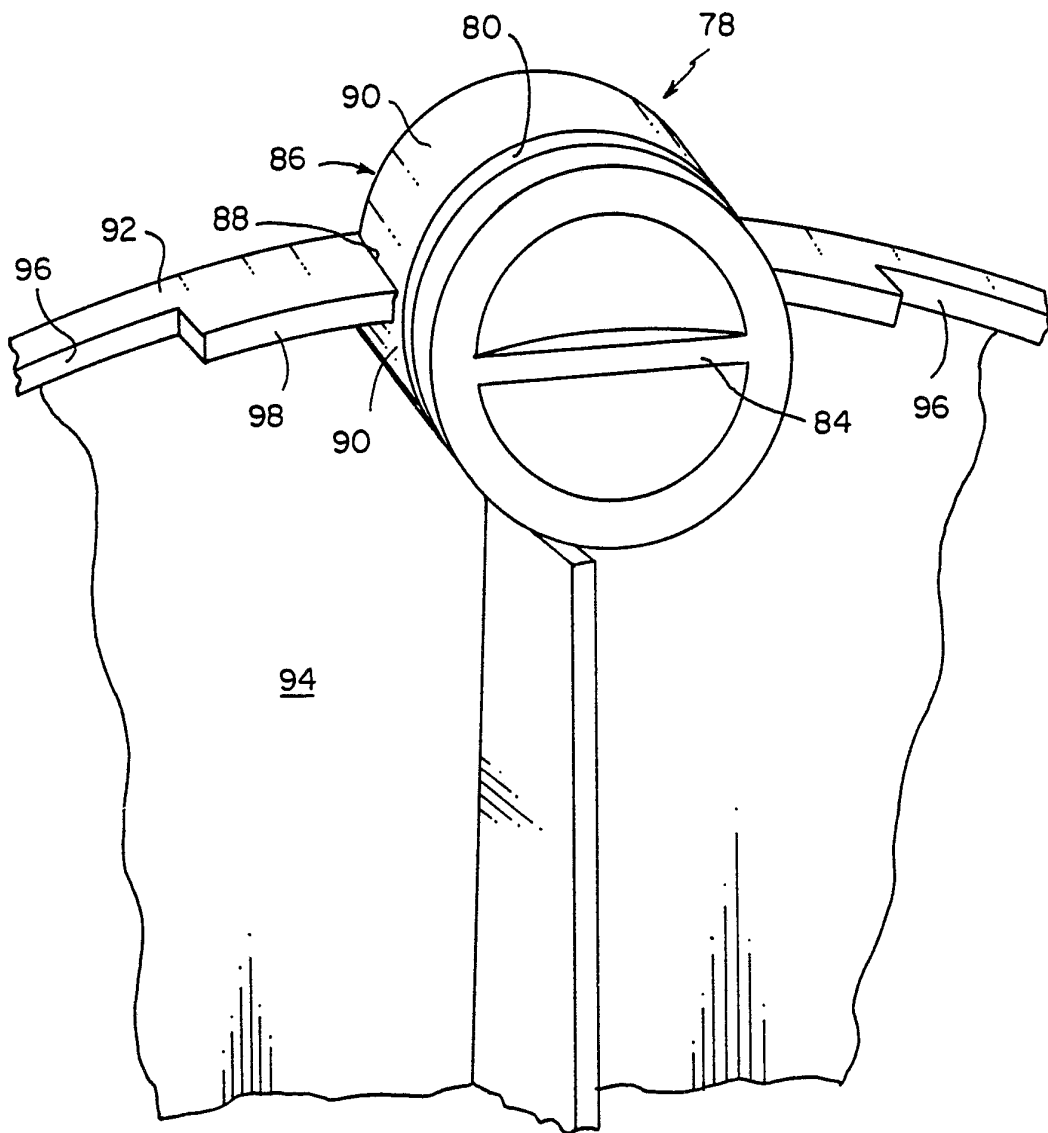


FIG. 7

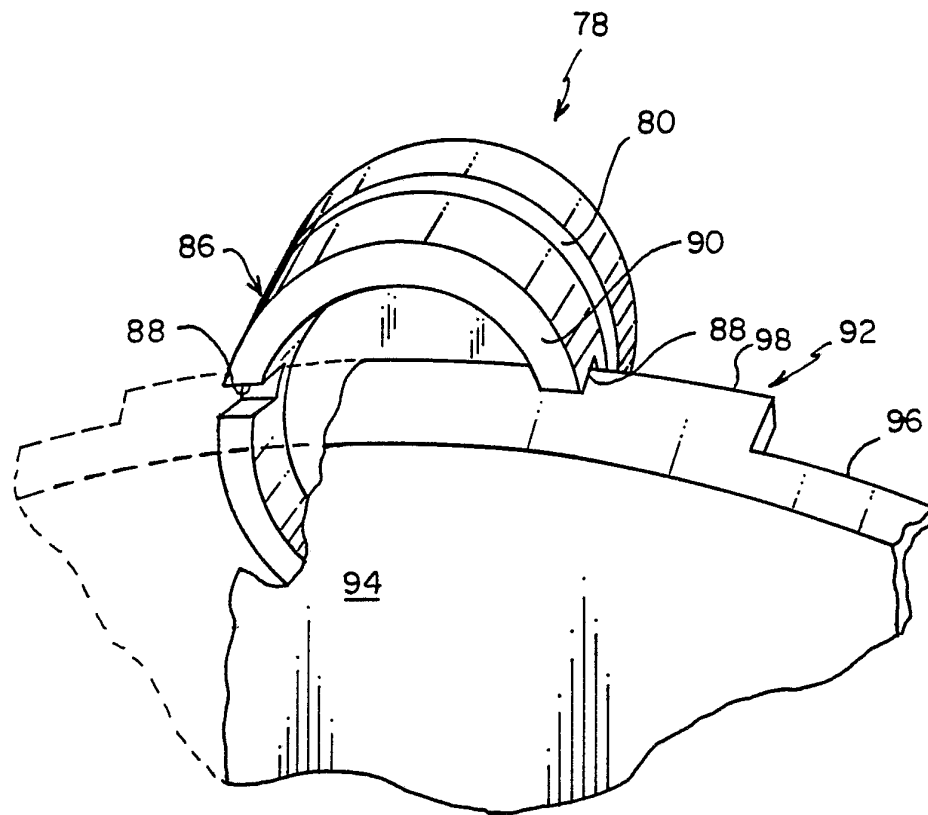


FIG. 8

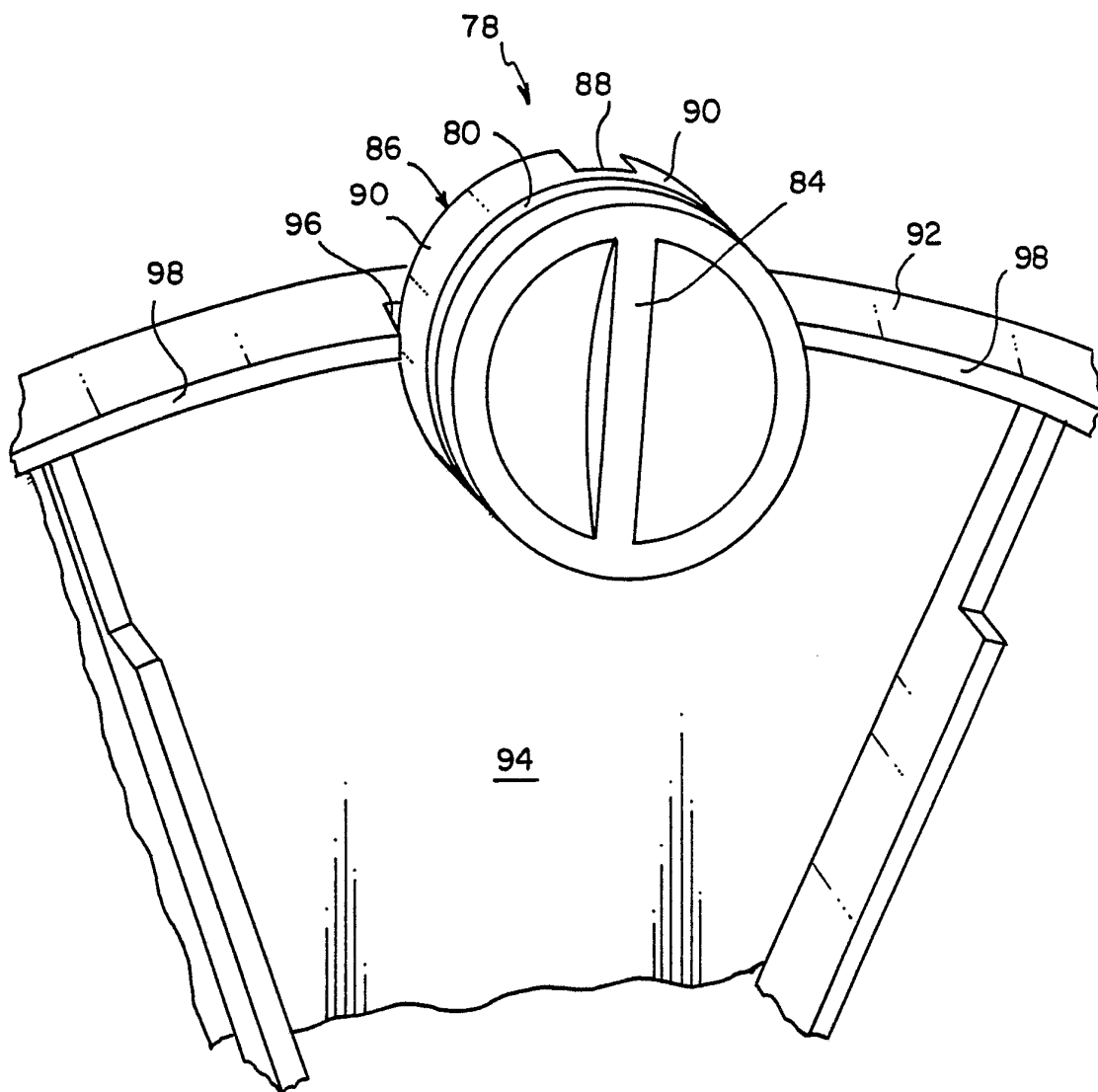
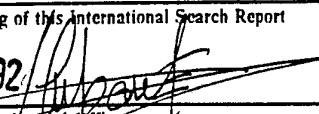


FIG. 9

**INTERNATIONAL SEARCH REPORT**

PCT/US 91/06293

International Application No

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl. 5 G03B27/58		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl. 5	G03B ;          B65H ;          D06F	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>o</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
A	NL,A,6 614 756 (JANSEN D.J.) 22 April 1968 see page 3, line 22 - line 33; figures 1-4 ---	1
A	US,A,4 802 633 (THE MEAD CORPORATION) 7 February 1989 cited in the application see figure 1 ---	1
A	CH,A,305 397 (SCHÜPBACH F.) 2 May 1955 see page 1, line 42 - line 63; figure 2 ---	1
<p><sup>o</sup> Special categories of cited documents : <sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"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</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search  23 DECEMBER 1991	Date of Mailing of this International Search Report  14. 01. 92 	
International Searching Authority  EUROPEAN PATENT OFFICE	Signature of Authorized Officer  THIBAUT E.E.G.C.	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO. US 9106293  
SA 51390**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 23/12/91

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
NL-A-6614756	22-04-68	None	
US-A-4802633	07-02-89	EP-A- 0348192 JP-A- 2040636	27-12-89 09-02-90
CH-A-305397		None	