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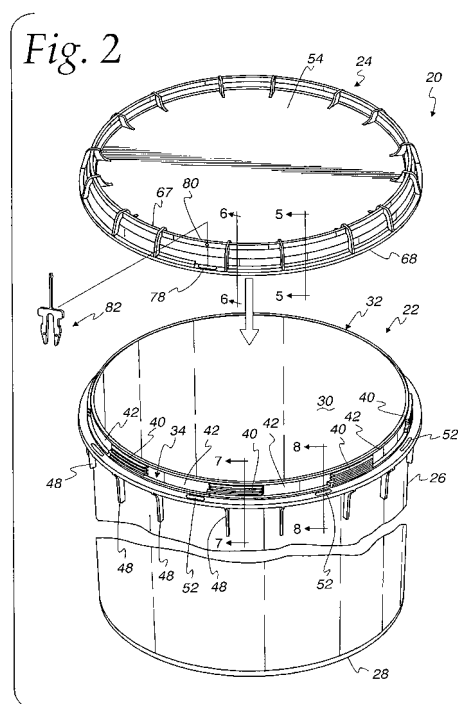
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(54) **Shipping and storage drum with screw-on locking cover**

(57) A shipping and storage drum (20) with a screw on locking cover comprises an open head drum (22), a plastic cover (24) and a locking member. The open head drum comprises a sidewall open at a top end by a threaded plastic chime (34). The chime (34) comprises an annular wall having a rounded top edge (38) with a plurality of thread segments (110) and a flange (46) extending outwardly from the annular wall below the thread segments and having a flange opening. Each thread segment (40) comprises a plurality of threads extending outwardly from the annular wall. The thread segments are circumferentially spaced by non-threaded portions. A circumferential length of each non-threaded portion is similar to a circumferential length of each thread segment. The plastic cover has a central circular wall surrounded by a downwardly opening generally U-shaped wall for receiving the chime. The U-shaped wall comprises an outer annular sidewall and an inner annular sidewall connected by a rounded channel for sandwiching the chime. A flange extends outwardly from the outer annular sidewall and has a flange opening. The outer annular wall has a plurality of inwardly extending thread segments each having a plurality of threads. The thread segments are circumferentially spaced by non-threaded portions. A circumferential length of each non-threaded portion is similar to a circumferential length of each thread segment. The cover is selectively screwed onto the chime

with a fractional turn of the cover with the chime rodged top edge being sealed in the rounded channel. The locking member is insertable through the flange openings to prevent the cover from backing off of the drum.



## Description

### FIELD OF THE INVENTION

[0001] This invention relates to a shipping and storage drum and, more particularly, to a drum with a screw on locking cover.

### BACKGROUND OF THE INVENTION

[0002] In one form of a conventional shipping and storage container, an enlarged drum is used. The drum may be, for example, a 55 gallon drum. Such drums have found wide usage for shipping and storing liquid or granular products. For example, such drums have been used for storing food products and for storing hazardous products.

[0003] A typical drum includes a tubular sidewall closed at one end by a bottom wall and at another end by a top wall. Such containers may have a fiberboard sidewall and metal top and bottom walls, may be made entirely of metal, or may be made entirely of plastic, or be of composite construction. Drums of fiberboard are generally not suitable for carrying liquids. While metal drums are, they tend to be expensive and heavy and are not usable in the food industry unless made of stainless steel.

[0004] Such drums are classified as open head drums or tight head drums. With a tight head drum, the top wall is generally permanently affixed to the sidewall. The top wall includes relatively small openings for access to the interior of the drum. Conversely, an open head drum has a cover removably received thereon. Typically, the container is filled by removing the cover.

[0005] More recently, plastic drums have found wide acceptance. Customers often desire that the drum be a one-piece drum having an integral cover. However, such a drum is typically made by blow molding, which is a time consuming and expensive process. Also, the drums tend to be of lesser quality as there may not be uniform distribution of the plastic material.

[0006] Even more recently, threaded drum plastic covers have been provided for selectively closing a unitary plastic open head drum to effectively provide a tight head drum. Such a drum and cover are illustrated in U.S. Patent No. 6,056,143. This patent includes a continuous thread on the drum. Multiple turns of the cover must be made to effectively secure the cover on the drum, with a gasket providing a seal.

[0007] The present invention is directed to further improvements in shipping and storage drums.

### SUMMARY OF THE INVENTION

[0008] In accordance with the invention, there is provided a screw on drum cover for selectively closing an open head drum with a fractional turn of the cover.

[0009] Broadly, there is disclosed herein a shipping

and storage drum comprising an open head drum and a plastic cover. The open head drum comprises a sidewall open at a top end by a threaded plastic chime. The chime comprises an annular wall having a rounded top edge with a plurality of thread segments extending outwardly from the annular wall. The thread segments are circumferentially spaced by non-threaded portions. A circumferential length of each non-threaded portion is similar to a circumferential length of each thread segment. The plastic cover has a central circular wall surrounded by a downwardly opening generally U-shaped wall for receiving the chime. The U-shaped wall comprises an outer annular sidewall and an inner annular sidewall connected by a rounded channel for sandwiching the chime. The outer annular wall has a plurality of inwardly extending thread segments. The thread segments are circumferentially spaced by non-threaded portions. A circumferential length of each non-threaded portion is similar to a circumferential length of each thread segment. The cover is selectively screwed onto the chime with a fractional turn of the cover and the chime rounded top edge is sealed in the rounded channel.

[0010] It is a feature of the invention that the drum chime and the cover each include eight thread segments.

[0011] It is another feature of the invention that each drum chime and cover thread segment comprises three threads.

[0012] It is a further feature of the invention that each chime thread segment comprises a stop for limiting threaded movement of the cover onto the chime.

[0013] It is still another feature of the invention that the drum further comprises a flange extending outwardly from the annular wall below the thread segments and the cover comprises a flange extending outwardly from the outer annular sidewall. Aligned openings are provided in each of the flanges and a locking member is provided for insertion in the openings to lock the cover on the drum.

[0014] It is still another feature of the invention that the inner annular sidewall comprises a plurality of outwardly extending ribs.

[0015] It is an additional feature of the invention that the chime rounded top edge seals against each of the outer annular sidewall and the inner annular sidewall.

[0016] It is still a further feature of the invention that the threads have about a 1/4" pitch.

[0017] It is yet another feature of the invention that the chime has a diameter of at least about 15".

[0018] There is disclosed in accordance with another aspect of the invention a shipping and storage drum with a screw on locking cover comprising an open end drum, a plastic cover and a locking member. The open head drum comprises a sidewall open at a top end by a threaded plastic chime. The chime comprises an annular wall having a rounded top edge with a plurality of thread segments and a flange extending outwardly from the annular wall below the thread segments and having a flange opening. Each thread segment comprises a plurality of threads extending outwardly from the annular wall. The

thread segments are circumferentially spaced by non-threaded portions. A circumferential length of each non-threaded portion is similar to a circumferential length of each thread segment. The plastic cover has a central circular wall surrounded by a downwardly opening generally U-shaped wall for receiving the chime. The U-shaped wall comprises an outer annular sidewall and an inner annular sidewall connected by a rounded channel for sandwiching the chime. A flange extends outwardly from the outer annular sidewall and has a flange opening. The outer annular wall has a plurality of inwardly extending thread segments each having a plurality of threads. The thread segments are circumferentially spaced by non-threaded portions. A circumferential length of each non-threaded portion is similar to a circumferential length of each thread segment. The cover is selectively screwed onto the chime with a fractional turn of the cover with the chime rodged top edge being sealed in the rounded channel. The locking member is insertable through the flange openings to prevent the cover from backing off of the drum.

[0019] Further features and advantages of the invention will be readily apparent from the specification and from the accompanying schematic drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

### [0020]

Fig. 1 is a perspective view of a shipping and storage drum with screw on locking cover according to the invention;  
 Fig. 2 is an exploded view of the drum of Fig. 1;  
 Fig. 3 is a bottom perspective view of the cover according to the invention;  
 Fig. 4 is a perspective view of a locking member;  
 Fig. 5 is a sectional view taken along the line 5-5 of Fig. 2;  
 Fig. 6 is a sectional view taken along the line 6-6 of Fig. 2;  
 Fig. 7 is a sectional view taken along the line 7-7 of Fig. 2;  
 Fig. 8 is a sectional view taken along the line 8-8 of Fig. 2;  
 Fig. 9 is a detailed partial perspective view of the drum;  
 Fig. 10 is a sectional view taken along the line 10-10 of Fig. 1;  
 Fig. 11 is a sectional view taken along the line 11-11 of Fig. 1; and  
 Fig. 12 is an enlarged sectional view taken along the line 12-12 of Fig. 1.

## DETAILED DESCRIPTION OF THE INVENTION

[0021] In the illustrated embodiment of the invention, as disclosed in the drawings, a shipping and storage container 20 is shown to comprise a unitary plastic open

head drum 22 and a unitary plastic threaded drum cover 24. With reference to Figs. 1 and 2, the drum 22 has a right circularly cylindrical sidewall 26 connected to a bottom wall 28 to define an interior space 30. The drum 26 is open at a top end 32. Particularly, and referring also to Figs. 7 and 8, the top end 32 comprises a threaded plastic chime 34. The chime 34 comprises an annular wall 36 having a rounded top edge 38 with a plurality of thread segments 40 extending outwardly from the annular wall 36. The thread segments 40 are circumferentially spaced by non-threaded portions 42. In the illustrated embodiment of the invention, the circumferential length of each non-threaded portion 42 is similar to a circumferential length of each thread segment 40.

[0022] The wall thickness of the chime annular sidewall 36 may be slightly greater than the wall thickness of the sidewall 26. However, the drum includes a seamless, continuous inner surface 44 between the chime annular wall 36 and the sidewall 26. A flange 46 extends outwardly at a junction between the annular wall 36 and the sidewall 26. A plurality of support ribs 48 extend outwardly from the sidewall 26 and are connected to the underside of the flange 46.

[0023] In the illustrated embodiment of the invention, the drum 22 is of one piece molded plastic construction and may be formed of polypropylene or polyethylene or the like. As will be apparent, the drum 22 could be a composite structure using fiberboard or metal, or the like, with a plastic chime secured thereto in any known manner. The drum 22 is adapted for storage of bulk materials and would typically have a dimension in the range of 15-1/2" to 23-1/2" diameter at the top end 32.

[0024] In the illustrated embodiment of the invention, there are eight thread segments 40 separated by eight non-threaded portion 42. Each thread segment would use up approximately 22.5° of circumference. Advantageously, the thread segments may use a slightly smaller amount such as about 21°. However, the lengths could be different, as could the number of thread segments 40. Each thread segment 40 comprises three threads 40-1, 40-2 and 40-3, see Fig. 9. A stop 50 is provided at one end of the lowermost thread 40-3. A plurality of circumferentially extending openings 52 are provided in the flange 46. An opening 52 is provided associated with each thread segment 40 but located circumferentially within the bounds of the non-threaded portions 42 proximate the stops 50, as is particularly illustrated in Fig. 9.

[0025] Referring to Figs. 1-3, the drum cover 24 is integrally formed of one-piece injection molded plastic construction. The cover 24 may be molded of polypropylene or polyethylene. The cover 24 is in the form of a closure having a central circular wall 54 of a size slightly smaller than the size of the chime 34. The circular wall 54 is surrounded by downwardly opening generally U-shaped wall 56 for receiving the chime. The U-shaped wall 56 comprises an outer annular sidewall 58 and an inner annular sidewall 60 connected by a rounded channel 62, see Figs. 5 and 6, for sandwiching the chime 34. An an-

nular ridge 64 extends upwardly from the channel wall 62. Inner reinforcing ribs 66 integrally connect to the circular wall 54, the channel wall 62 and the ridge 64. A flange 68 extends outwardly from the bottom of the outer annular sidewall 58. Outer reinforcing ribs 70 are integrally connected to the flange 68, the outer annular sidewall 58, the channel wall 62 and the ridge 64. The outer reinforcing ribs 70 are co-located with the inner reinforcing ribs 66.

**[0026]** Referring particularly to Fig. 3, a plurality of thread segments 72 extend inwardly from the outer annular sidewall 58 and are separated by non-threaded portions 74. In the illustrated embodiment of the invention, there are eight thread segments 72 separated by eight non-threaded portions 74. As with the drum 22, each thread segment 72 would utilize approximately 22.5° of circumference for each segment and advantageously may be slightly less, on the order of 21°. Thus, the cover includes a thread segment 72 for each drum thread segment 40.

**[0027]** Spacing between the cover outer annular sidewall 58 and inner annular sidewall 60 is greater than thickness of the drum chime 34. A plurality of ribs 76 are provided in the U-shaped wall 56 extending outwardly from the inner annular sidewall 58, see Fig. 3. The ribs 76 provide reinforcement for the chime 34, as described below.

**[0028]** Corresponding to the drum thread segments 40, each cover thread segment 72 includes three threads 72-1, 72-2 and 72-3, see Fig. 12. In accordance with the invention, the cover 24 is screwed onto the drum chime 34 with a fractional turn of the cover 24 with the chime rounded top edge 38 being sealed in the rounded channel wall 62, as is particularly illustrated in Fig. 12. The threads of the thread segments 40 and 72 may have a relief angle on the order of 10° and a pitch of about 1/4". This provides for approximately 15/1000 vertical movement of the cover 24 relative to the drum 22 to close with a turn of about 1/8 revolution. With this turn, the chime top end 38 is sealed in the rounded channel wall 62 at both an inside and an outside to provide a seal without use of a gasket, see Fig. 12. The internal ribs 76, while spaced from the chime 36, provide support during use. Each stop 50 limits rotational movement of the cover 24 and thus prevents over-tightening. Particularly, the stop 50 limits rotational movement of the lowermost cover threads 72-3, as will be apparent.

**[0029]** For preventing the cover 24 from backing off the drum 22, an opening 78 is provided in the cover flange 68 having a size corresponding to that of the drum flange openings 52. A circular opening 80 is provided through the upper wall 64. Referring to Figs. 2 and 4, a locking member 82 is illustrated. The locking member 82 comprises a bridge 84 connecting opposite fingers 86 having narrowed portions 88. A strap 90 extends upwardly from the bridge 84 and terminates in a bifurcated element 92. In use, the bifurcated element 90 is inserted through the opening 80 to loosely retain the locking member 82 to

the cover 24 with the strap 90 passing through the opening 80, as illustrated in Fig. 1. Thereafter, the locking member can be inserted through the cover flange opening 78 into one of the aligned drum flange openings 52, as shown in Fig. 1, by flexing the fingers 86 toward one another. This prevents the cover 24 from backing off after being closed and sealed.

**[0030]** The use of a broken thread in the form of a plurality of thread segments allows for less than a full turn to close the cover 24 on the drum 22 providing ease of use. A locking feature is retained by use of the locking member 82. Moreover, the drum 20 is self sealing. The drum is illustrated with eight flange openings 52, one for each thread segment 40. This enables the cover 24 to be threaded at any of eight angular positions. As is apparent, the drum could include a single opening 52 or the cover could include as many as eight angular openings 78, as necessary or desired. The locking member 82 is not required for performance, but is used to prevent the cover 24 from backing off the drum 22, as described.

**[0031]** Thus, in accordance with the invention, there is provided a shipping and storage drum wherein a cover is selectively screwed on with a fractional turn and providing a self sealing feature.

## Claims

### 1. A shipping and storage drum comprising:

an open head drum comprising a sidewall open at a top end by a threaded plastic chime, the chime comprising an annular wall having a rounded top edge with a plurality of thread segments extending outwardly from the annular wall, the thread segments being circumferentially spaced by non-threaded portions, a circumferential length of each non-threaded portion being similar to a circumferential length of each thread segment; and

a plastic cover having a central circular wall surrounded by a downwardly opening generally U-shaped wall for receiving the chime, the U-shaped wall comprising an outer annular sidewall and an inner annular sidewall connected by a rounded channel for sandwiching the chime, the outer annular wall having a plurality of inwardly extending thread segments, the thread segments being circumferentially spaced by non-threaded portions, a circumferential length of each non-threaded portion being similar to a circumferential length of each thread segment,

wherein the cover is selectively screwed on to the chime with a fractional turn of the cover and the chime rounded top edge being sealed in the rounded channel.

2. The shipping and storage drum of claim 1 wherein the drum chime and the cover each include eight thread segments.
3. The shipping and storage drum of claim 1 wherein each drum chime and cover thread segment comprises three threads. 5
4. The shipping and storage drum of claim 1 wherein each chime thread segment comprises a stop for limiting threaded movement of the cover onto the chime. 10
5. The shipping and storage drum of claim 1 wherein the drum further comprises a flange extending outwardly from the annular wall below the thread segments and the cover comprises a flange extending outwardly from the outer annular sidewall. 15
6. The shipping and storage drum of claim 5 further comprising aligned openings in each of the flanges and a locking member for insertion in the openings to lock the cover on the drum. 20
7. The shipping and storage drum of claim 1 wherein the inner annular sidewall comprises a plurality of outwardly extending ribs. 25
8. The shipping and storage drum of claim 1 wherein the chime rounded top edge seals against each of the outer annular sidewall and the inner annular sidewall. 30
9. The shipping and storage drum of claim 1 wherein the threads have about a 1/4" pitch. 35
10. The shipping and storage drum of claim 1 wherein the chime has a diameter of at least about 15 inches.
11. A shipping and storage drum with a screw on locking cover comprising: 40

an open head drum comprising a sidewall open at a top end by a threaded plastic chime, the chime comprising an annular wall having a rounded top edge with a plurality of thread segments and a flange extending outwardly from the annular wall below the thread segments and having a flange opening, each thread segment comprising a plurality of threads extending outwardly from the annular wall, the thread segments being circumferentially spaced by non-threaded portions, a circumferential length of each non-threaded portion being similar to a circumferential length of each thread segment; 45

a plastic cover having a central circular wall surrounded by a downwardly opening generally U-shaped wall for receiving the chime, the U-shaped wall comprising an outer annular sidewall and an inner annular sidewall connected by a rounded channel for sandwiching the chime, and a flange extending outwardly from the outer annular sidewall and having a flange opening, the outer annular wall having a plurality of inwardly extending thread segments each having a plurality of threads, the thread segments being circumferentially spaced by non-threaded portions, a circumferential length of each non-threaded portion being similar to a circumferential length of each thread segment; and 50

a locking member, 55

wherein the cover is selectively screwed on to the chime with a fractional turn of the cover and the chime rounded top edge being sealed in the rounded channel and the locking member is insertable through the flange openings to prevent the cover from backing off of the drum.
12. The shipping and storage drum with a screw on locking cover of claim 11 wherein the drum chime and the cover each include, eight thread segments.
13. The shipping and storage drum with a screw on locking cover of claim 1 wherein each drum chime and cover thread segment comprises three threads.
14. The shipping and storage drum with a screw on locking cover of claim 11 wherein each chime thread segment comprises a stop for limiting threaded movement of the cover onto the chime.
15. The shipping and storage drum with a screw on locking cover of claim 11 wherein the drum flange comprises an opening associated with each thread segment for receiving the locking member.
16. The shipping and storage drum with a screw on locking cover of claim 11 wherein the locking member is tethered to the cover.
17. The shipping and storage drum with a screw on locking cover of claim 11 wherein the inner annular sidewall comprises a plurality of outwardly extending ribs.
18. The shipping and storage drum with a screw on locking cover of claim 11 wherein the chime rounded top edge seals against each of the outer annular sidewall and the inner annular sidewall.
19. The shipping and storage drum with a screw on locking cover of claim 11 wherein the threads have about a 1/4" pitch.
20. The shipping and storage drum with a screw on lock-

ing cover of claim 11 wherein the chime has a diameter of at least about 15 inches.

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*Fig. 1*

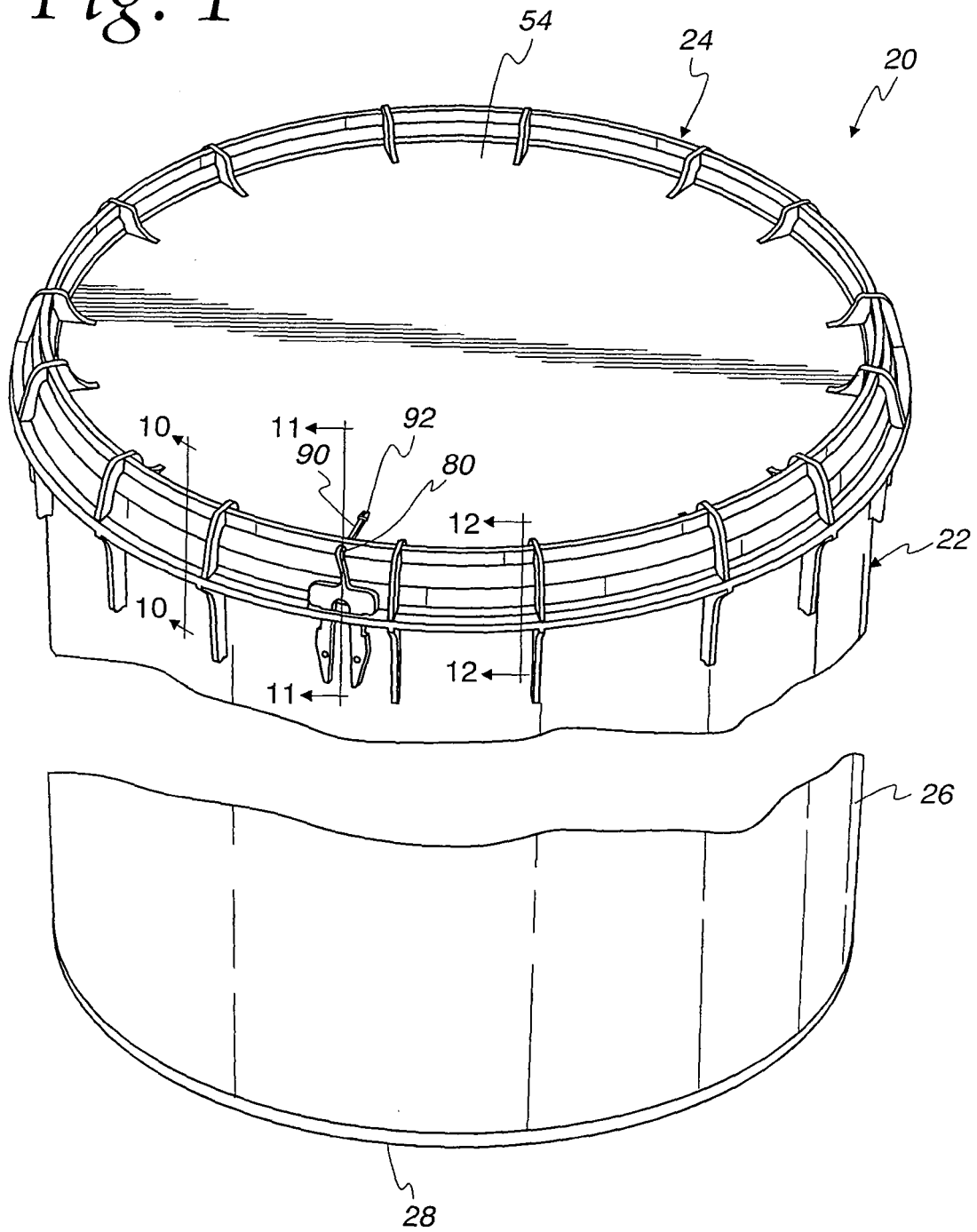


Fig. 2

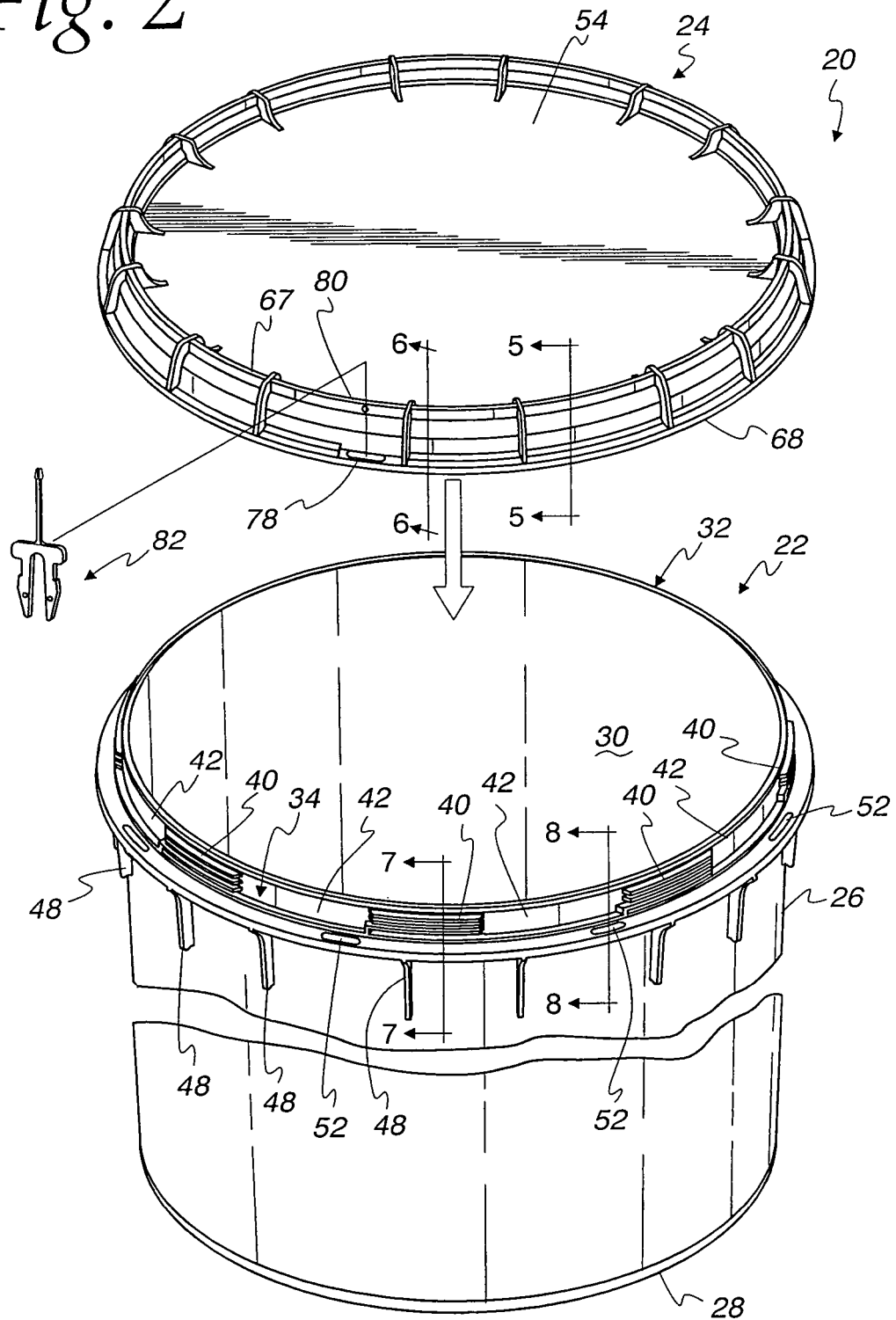
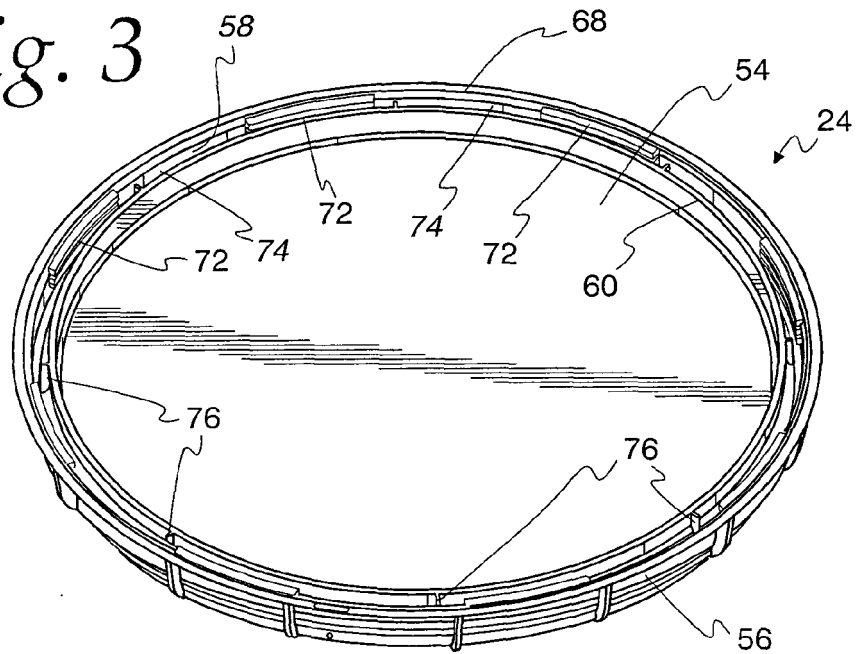
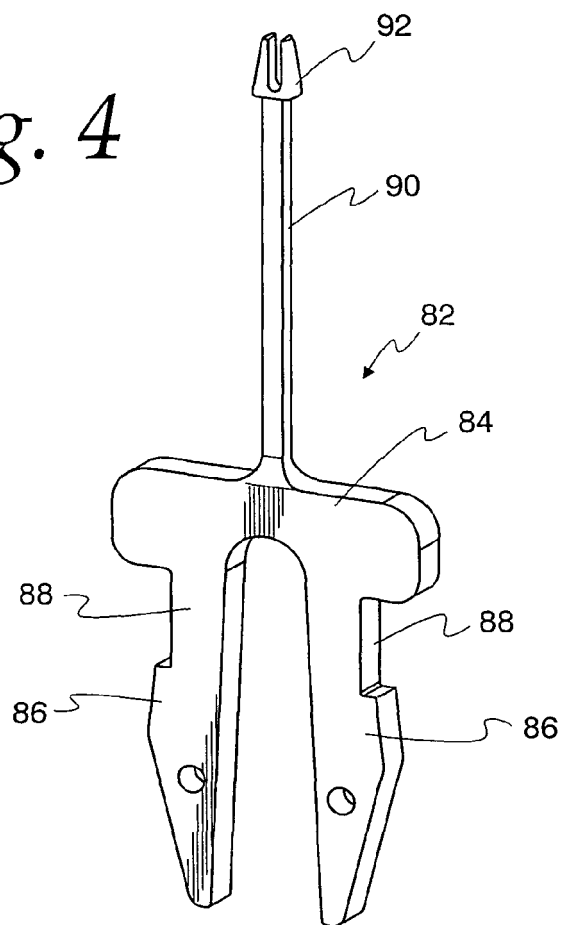




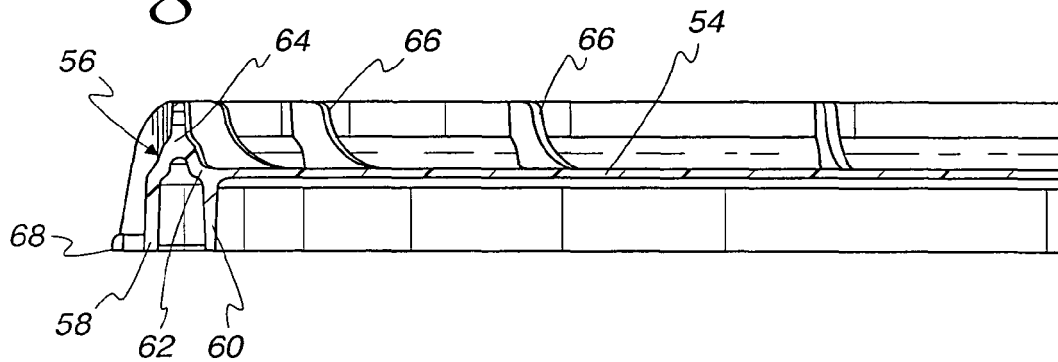
Fig. 3



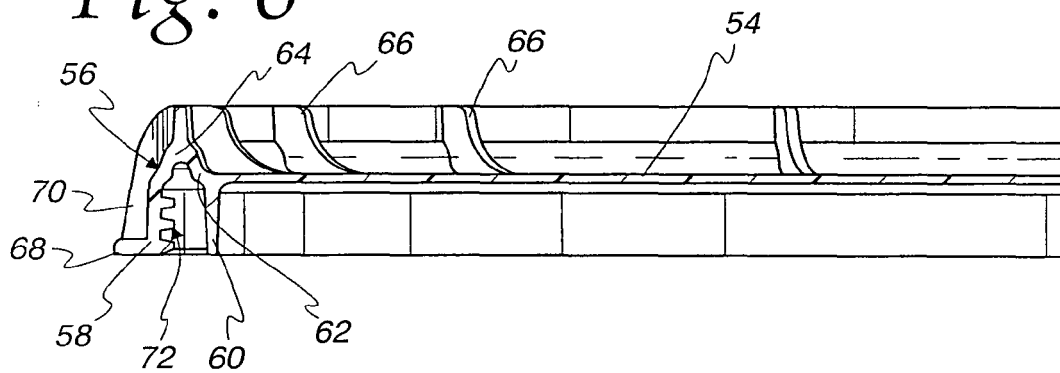
*Fig. 4*



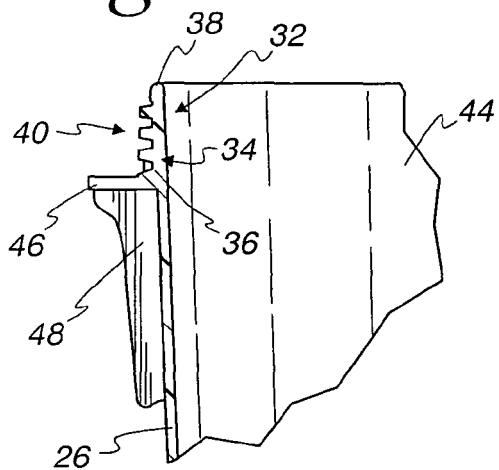
*Fig. 5*



*Fig. 6*



*Fig. 7*



*Fig. 8*

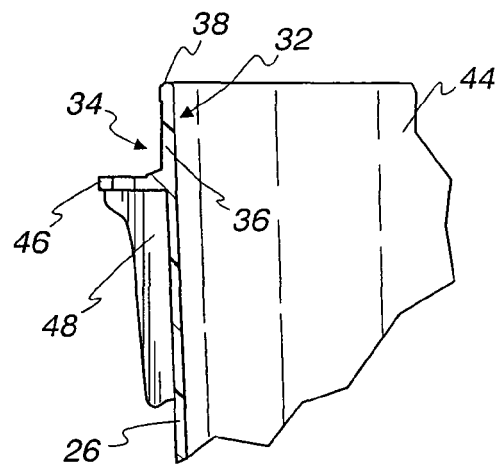


Fig. 9

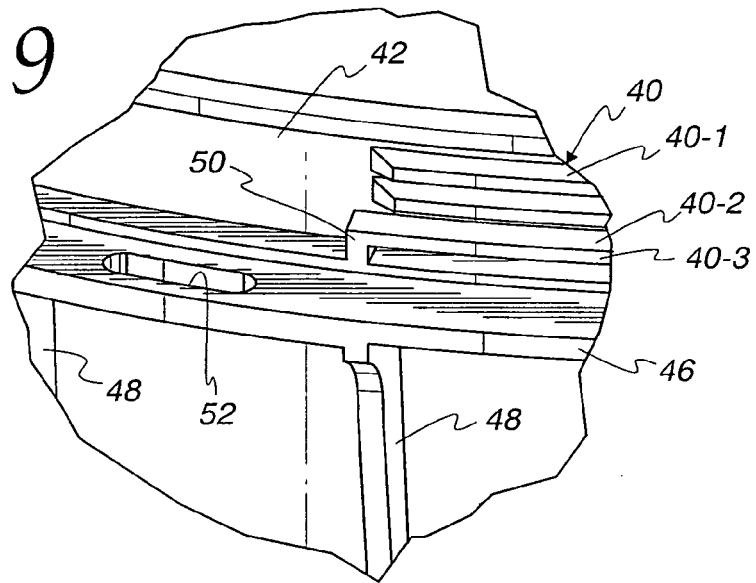


Fig. 10

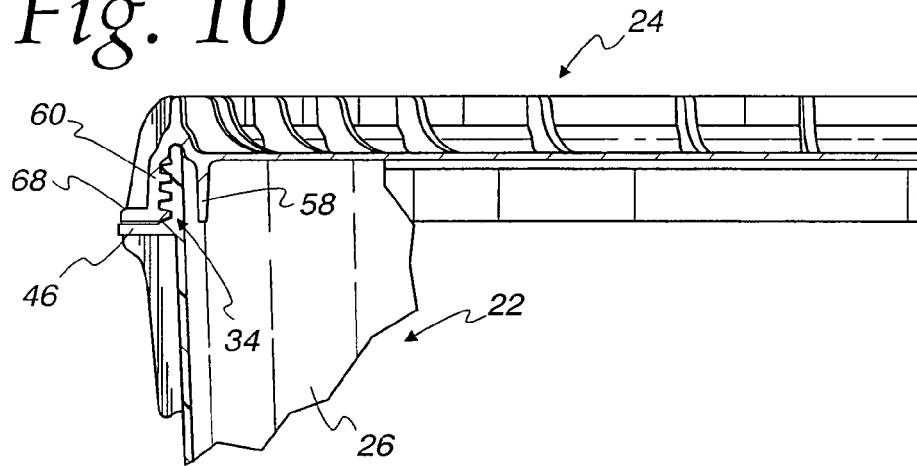


Fig. 11

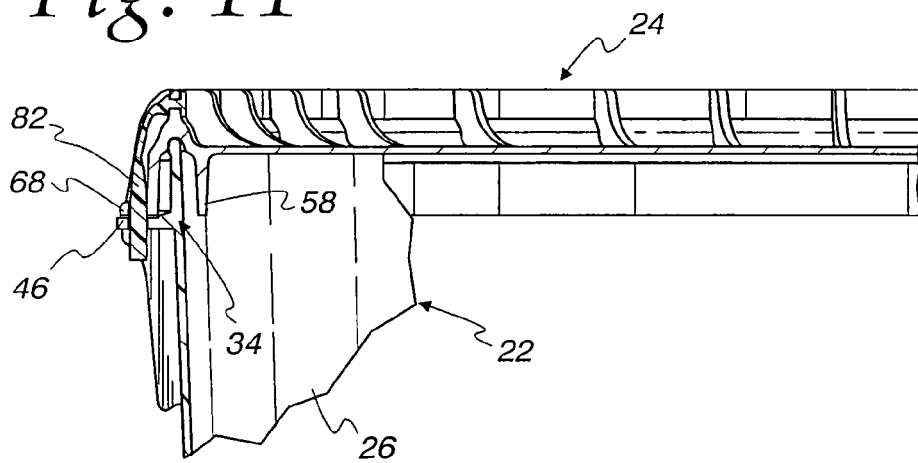
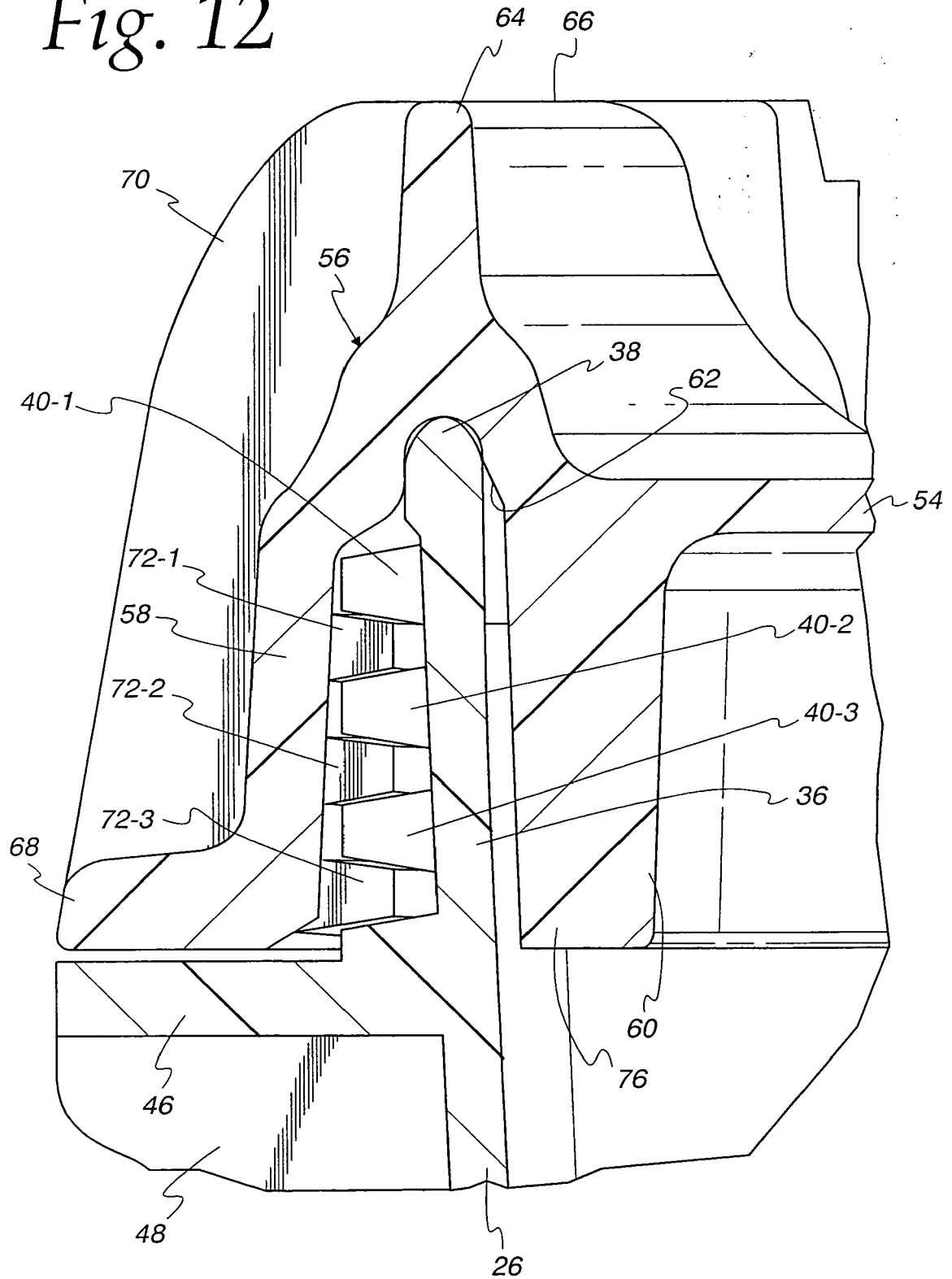


Fig. 12





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 07 25 3348

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Place of search <b>Munich</b>		Date of completion of the search <b>4 September 2008</b>	Examiner <b>Piolat, Olivier</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 07 25 3348

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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