

(12) STANDARD PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 2002319629 B2**

(54) Title
Hinge down refrigerator water filter

(51)⁷ International Patent Classification(s)
F25D 023/12

(21) Application No: **2002319629** (22) Date of Filing: **2002.07.15**

(87) WIPO No: **WO03/008883**

(30) Priority Data

(31) Number	(32) Date	(33) Country
60/305,735	2001.07.16	US
10/195,659	2002.07.15	US

(43) Publication Date: **2003.03.03**

(43) Publication Journal Date: **2003.05.22**

(44) Accepted Journal Date: **2005.11.17**

(71) Applicant(s)
Maytag Corporation

(72) Inventor(s)
Eveland, Michael J.; Olberding, David J.; Nugent, Timothy Mark; Kniffen, Todd E.; Wahney, Ravi Kumar; Jenkins, James H.; Zinni, John Frank

(74) Agent / Attorney
Davies Collison Cave, Level 15 1 Nicholson Street, MELBOURNE, VIC, 3000

(56) Related Art
US 4942630
WO 2001/023819
US 5907958
US 5715699
WO 2001/083079

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

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 January 2003 (30.01.2003)

PCT

(10) International Publication Number
WO 03/008883 A1

(51) International Patent Classification⁷: **F25D 23/12**

(21) International Application Number: PCT/US02/23236

(22) International Filing Date: 15 July 2002 (15.07.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/305,735 16 July 2001 (16.07.2001) US
10/195,659 15 July 2002 (15.07.2002) US

(71) Applicant (for all designated States except US): **MAY-TAG CORPORATION** [US/US]; P.O. Box 39, Newton, IA 50208-7000 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **JENKINS, James, H.** [US/US]; P.O. Box 39, Newton, IA 50208-7000 (US). **OLBERDING, David, J.** [US/US]; P.O. Box 39, Newton, IA 50208-7000 (US). **EVELAND, Michael, J.** [US/US];

P.O. Box 39, Newton, IA 50208-7000 (US). **KNIFFEN, Todd, E.** [US/US]; P.O. Box 39, Newton, IA 50208-7000 (US). **ZINNI, John, Frank** [US/US]; P.O. Box 39, Newton, IA 50208-7000 (US). **NUGENT, Timothy, Mark** [US/US]; P.O. Box 39, Newton, IA 50208-7000 (US). **WAHNEY, Ravi, Kumar** [US/US]; P.O. Box 39, Newton, IA 50208-7000 (US).

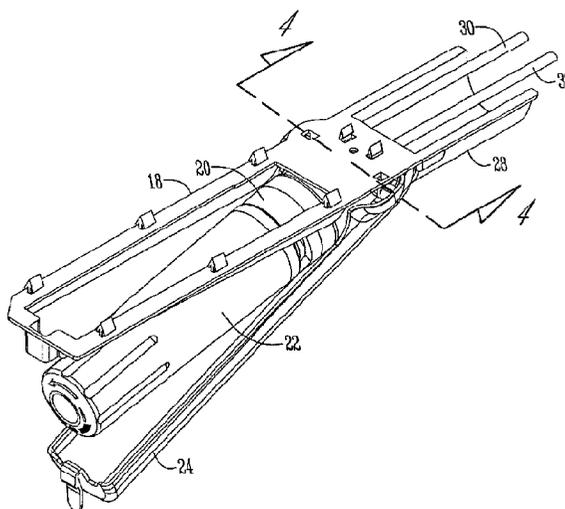
(74) Agent: **HARTUNG, Kirk, M.**; McKee, Voorhees & Sease, P.L.C., Suite 3200, 801 Grand Avenue, Des Moines, IA 50309-2721 (US).

(81) Designated States (national): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(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, BG, CH, CY, CZ, DE, DK, EE,

[Continued on next page]

(54) Title: HINGE DOWN REFRIGERATOR WATER FILTER



(57) Abstract: A refrigerator water filter assembly (10) is provided in the ceiling (12) of a refrigerator (14) and is adapted to hinge downwardly from the ceiling (12) for changing the filter cartridge (22). The cartridge (22) is normally partially recessed within the ceiling (12) so as to minimize the use of space in the food compartment of the refrigerator. The filter assembly (10) includes a base (18) mounted in the refrigerator ceiling (12), a manifold (20) pivotally mounted on the base (18), a filter cartridge (22) attached to the manifold (20), and a cover (24) pivotally mounted on the manifold (20) so as to be movable between open and closed positions. When the cover (24) is opened, the filter cartridge (22) is angled downwardly from the ceiling (12) for easy grasping by a person for replacement of the cartridge (22).



WO 03/008883 A1



ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

Published:

— *with international search report*

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.

2002319629 31 Oct 2005

HINGE DOWN REFRIGERATOR WATER FILTER

Refrigerators often times include water filters to treat water used to make ice cubes or dispensed from a built-in water dispenser. The filter assemblies include a manifold with
5 a removable filter cartridge which can be replaced periodically. Previously proposed water filter assemblies are typically located at the bottom of the refrigerator adjacent the floor or in the rear of the fresh food compartment adjacent the ceiling. In both instances, access to the cartridge for replacement is not convenient and the cartridge may be difficult to reach for some people.

10 According to one aspect of the present invention, there is provided a water filter assembly for a refrigerator having a fresh food compartment with a floor, a ceiling and side walls, the assembly comprising:

a base mounted in the ceiling;

a manifold having opposite pins to pivotally mount the manifold to the base;

15 a water filter cartridge with an end releasably mounted to the manifold, the end having both a water supply line and a water return line; and

a cover pivotally mounted on the manifold pins adjacent the ceiling for enclosing the filter cartridge and being movable between a closed position wherein the manifold and filter cartridge are pivoted upwardly and an open position wherein the manifold and filter
20 cartridge pivot downwardly from the ceiling of the filter cartridge from the manifold.

The water filter cartridge may be in a substantially horizontal position when the cover is closed.

The water filter assembly may further comprise a clip to retain the cover in the closed position.

25 The cover may pivot away from the filter cartridge when opened to provide access to the filter cartridge.

The cover may be pivotal a greater degree than the manifold and the filter cartridge so as to be spaced from the filter cartridge when in the open position to expose the filter for grasping and removal from the manifold.

30 The manifold may be pivotal a first radial distance and the cover may be pivotal a second radial distance, the second radial distance being greater than the first radial

2002319629 31 Oct 2005

- 2 -

distance.

The filter cartridge may be partially recessed into the ceiling when the cover is in the closed position, thereby advantageously minimizing the space occupied by the filter assembly in the food compartment.

5 A preferred form of the present invention seeks to provide an improved water filter assembly for a refrigerator.

Further, a preferred form of the present invention seeks to provide a refrigerator water filter assembly which is pivotally mounted to the ceiling in the fresh food compartment.

10 Further, a preferred form of the present invention seeks to provide a refrigerator water filter assembly wherein the filter cartridge is partially recessed into the ceiling of the fresh food compartment so as to minimize encroachment into the compartment.

Further, a preferred form of the present invention seeks to provide a method of accessing the water filter cartridge in a refrigerator involving the steps of opening a filter cover to expose the filter cartridge, pivoting the filter manifold and cartridge downwardly and manually removing the cartridge from the manifold.

15 Further, a preferred form of the present invention seeks to provide a hinge down refrigerator water filter assembly that provides quick and easy access for replacement of the filter cartridge.

20 Still further, a preferred form of the present invention seeks to provide a refrigerator water filter assembly which is economical to manufacture and durable in use.

The present invention will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

25

Figure 1 is a perspective view of a refrigerator illustrating the location of a water filter assembly.

Figure 2 is a perspective view of the water filter assembly in a closed position.

Figure 3 is a perspective view of the water filter assembly in an open position.

30

Figure 4 is a sectional view of the water filter assembly taken along lines 4-4 of Figure 3.

2002319629 31 Oct 2005

- 2a -

Figure 5 is a perspective view of the base of the water filter assembly.

Figure 6 is a sectional view of the base taken along lines 6-6 of Figure 5.

Figure 7 is a sectional view of the base taken along lines 7-7 of Figure 5.

Figure 8 is a perspective view of the filter manifold of the water filter assembly.

5 Figure 9 is a side elevation view of the filter manifold of the water filter assembly.

Figure 10 is a perspective view of the cover of the water filter assembly.

Figure 11 is a sectional view of the cover taken along lines 11-11 of Figure 10.

A water filter assembly 10 is shown to be mounted in the roof or ceiling 12 of a
10 refrigerator 14. Alternatively, the filter assembly 10 may be

mounted in one of the side wall panels 16 of the refrigerator 14, though the preferred location is in the ceiling 12.

The water filter assembly 10 includes a base 18, a filter manifold 20, a filter cartridge 22, and a cover 24. The manifold 20 and the cover 24 are pivotal. The cover 24 is movable between a closed position, shown in Figure 2, wherein the manifold 20 and the cartridge 22 are held in a substantially horizontal position, with the cartridge 22 being partially recessed into the ceiling 12, and an open position shown in Figure 3 wherein the manifold 20, the cartridge 22, and the cover 24 are pivoted downwardly from the base 18 to provide access to the cartridge 22. As seen in Figure 3, the cover 24 pivots a greater degree than the manifold 20 and the cartridge 22.

The base 18 is adapted to be mounted on the ceiling 12 of the refrigerator 14 through a plurality of clips 26 which are adapted to extend through corresponding holes in the ceiling 12. The base includes a rear housing or tunnel 28 through which water lines 30, 32 extend. The base also includes a collar 34 and a clip 36 opposite one another to pivotally support the manifold 20 as described below. The base 18 also includes an enlarged opening 38 corresponding to the shape of the filter cartridge 22 which allows a portion of the cartridge to extend upwardly through the opening 38 and into a recess in the ceiling 12, when the cover 24 is closed, as best seen in Figure 2.

The manifold 20 is best shown in Figures 8 and 9. The manifold 20 includes an upper plate 40 and opposite downwardly extending side plates or wings 42. A pair of pins 44 extend outwardly from each of the wings 42 and define a pivot axis for the manifold 20. The pins 44 of the manifold 22 are adapted to be received in the collar 34 and the clip 36 of the base 18, as shown in Figure 4, so as to pivotally mount the manifold 22 to the base 18. The upper plate 40 includes a sloped portion 46 angled downwardly and rearwardly from the pivot pins 44.

The manifold 20 also includes a head 48 adapted to threadably receive the cartridge 22. The head 48 includes the female plug 50 which mates with the cartridge 22 in a conventional manner. The plug 50 includes a plurality of O rings 52 to matingly seal with the cartridge 22 and prevent water leakage. Conventional valves 54 are provided in the head 48 so as to provide communication between the water lines 30, 32 when the cartridge 22 is mounted on the head 48 of the manifold 20.

2002319629 31 Oct 2005

- 4 -

The cover 24 is shown in Figures 10 and 11 and is shaped so as to substantially matingly enclose the cartridge 22 when in the closed position. The cover 24 includes opposite flared out portions 56 adjacent the rearward end of the cover 24. Each flared out portion 56 includes an inwardly directed collar 58 which are adapted to receive the pins 44 of the manifold 20 such that the cover 24 is pivotally mounted on the manifold 20. The trailing edge 60 of the flared out portions 56 is tapered or sloped downwardly to permit the cover 24 to pivot relative to the base 18. The angle of the trailing edge 60 relative to a horizontal plane is greater than the angle of the sloped portion 46 of the manifold plate 40, such that the cover 24 pivots a greater amount than the manifold 20 and the cartridge 22, as seen in Figure 3. A clip 62 is provided on the front end of the cover 24 and is adapted to releasably engage a retention surface 64 on the base 18 to thereby releasably lock the cover 24 in the closed position shown in Figure 2.

In use, with the cartridge 22 is mounted on the manifold 20, water is supplied through the water line 30 to the filter for treatment, and then returned through the water line 32 for supply to the refrigerator ice maker or water dispenser. When it is time to change the filter, as indicated in any known manner, the clip 62 of the cover 24 is depressed for release from the clip retention surface 64 on the base 18. Upon release of the clip 62, the cover 24, the manifold 20 and the cartridge 22 pivot downwardly by gravity away from the ceiling 12. The cover 24 can be further pivoted to a spaced relation from the cartridge 22, as shown in Figure 3, so that a person can easily grasp the cartridge 22 and twist the cartridge 22 for disengagement from the manifold head 48. A new cartridge can be installed on the manifold head 48. The cover 24 can then be pushed upwardly until the clip 62 locks on the retention surface 64 of the base 18.

The invention has been shown and described above with the preferred embodiments, and it is understood that many modifications, substitutions, and additions may be made which are within the intended spirit and scope of the invention.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that that prior art forms part of the common general knowledge in Australia.

2002319629 31 Oct 2005

- 5 -

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A water filter assembly for a refrigerator having a fresh food compartment with a floor, a ceiling and side walls, the assembly comprising:
 - 5 a base mounted in the ceiling;
 - a manifold having opposite pins to pivotally mount the manifold to the base;
 - a water filter cartridge with an end releasably mounted to the manifold, the end having both a water supply line and a water return line; and
 - a cover pivotally mounted on the manifold pins adjacent the ceiling for enclosing
 - 10 the filter cartridge and being movable between a closed position wherein the manifold and filter cartridge are pivoted upwardly and an open position wherein the manifold and filter cartridge pivot downwardly from the ceiling of the filter cartridge from the manifold.
2. The water filter assembly of claim 1 wherein the water filter cartridge is in a
- 15 substantially horizontal position when the cover is closed.
3. The water filter assembly of claim 1 further comprising a clip to retain the cover in the closed position.
- 20 4. The water filter assembly of claim 1 wherein the cover pivots away from the filter cartridge when opened to provide access to the filter cartridge.
5. The water filter assembly of claim 1 wherein the cover is pivotal a greater degree than the manifold and the filter cartridge so as to be spaced from the filter cartridge when
- 25 in the open position.
6. The water filter assembly of claim 1 wherein the manifold is pivotal a first radial distance and the cover is pivotal a second radial distance, the second radial distance being greater than the first radial distance.
- 30 7. The water filter assembly of claim 1 wherein the filter cartridge is partially recessed

into the ceiling when the cover is in the closed position.

8. A water filter assembly substantially as hereinbefore described with reference to the accompanying drawings.

5

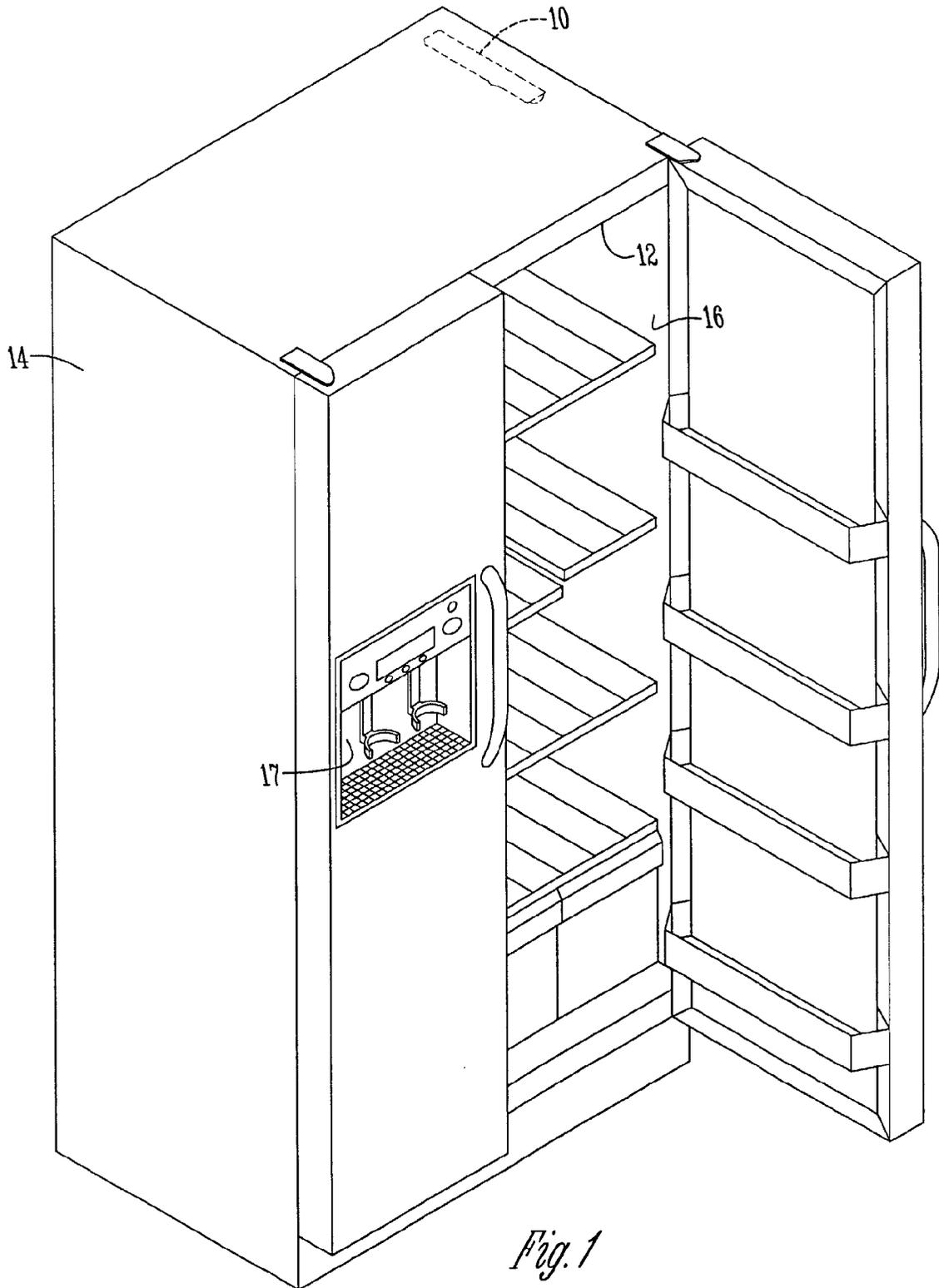
Dated this 18th day of October, 2005

Maytag Corporation

10

by DAVIES COLLISON CAVE
Patent Attorneys for the Applicant

2002319629 31 Oct 2005



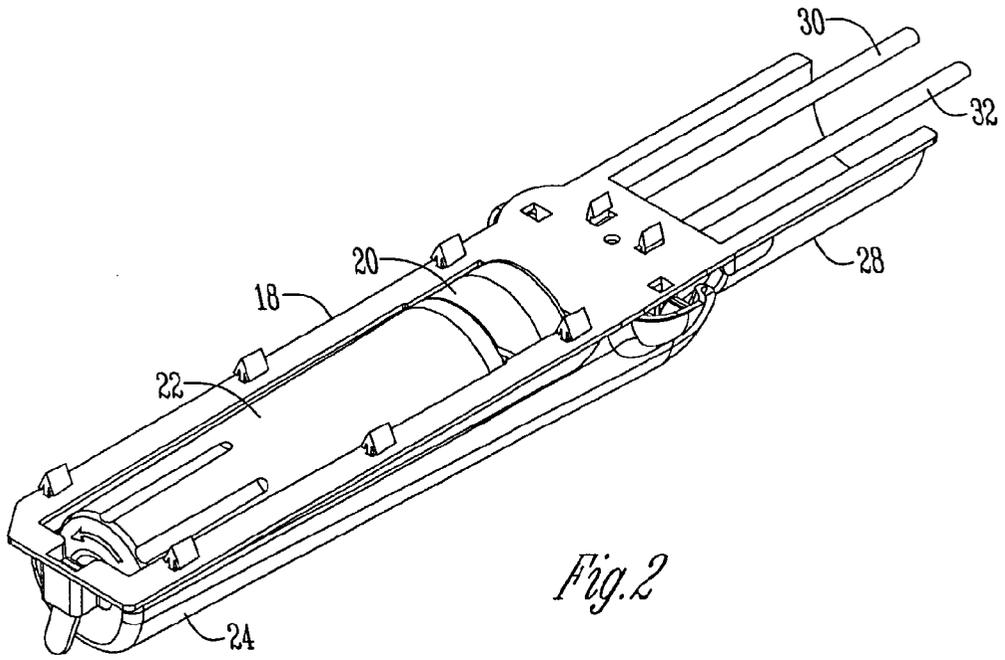


Fig. 2

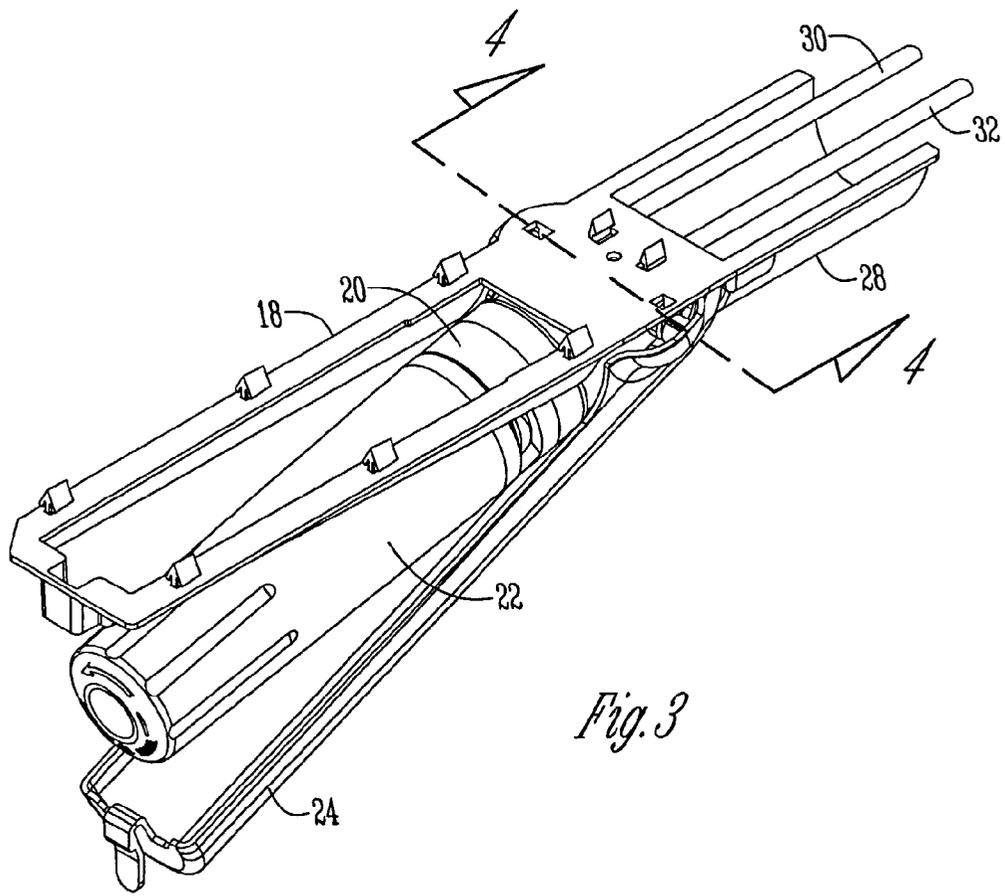


Fig. 3

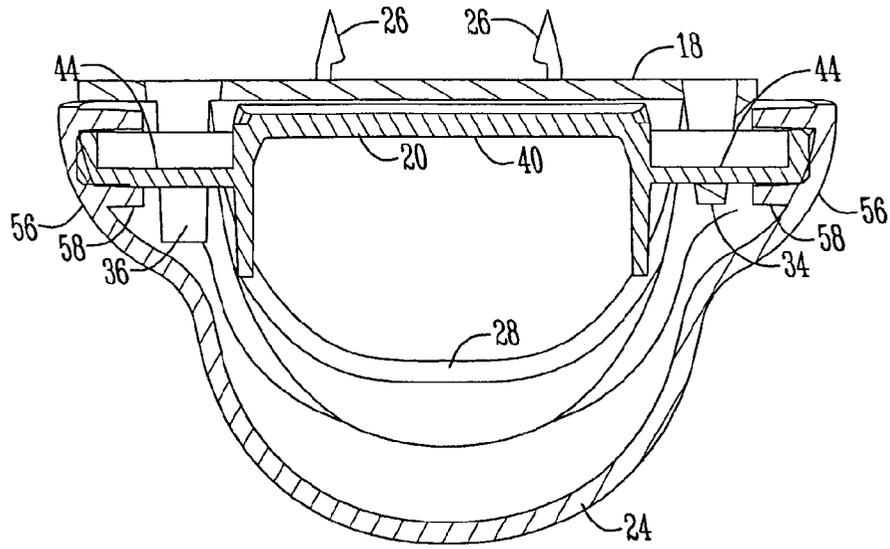


Fig. 4

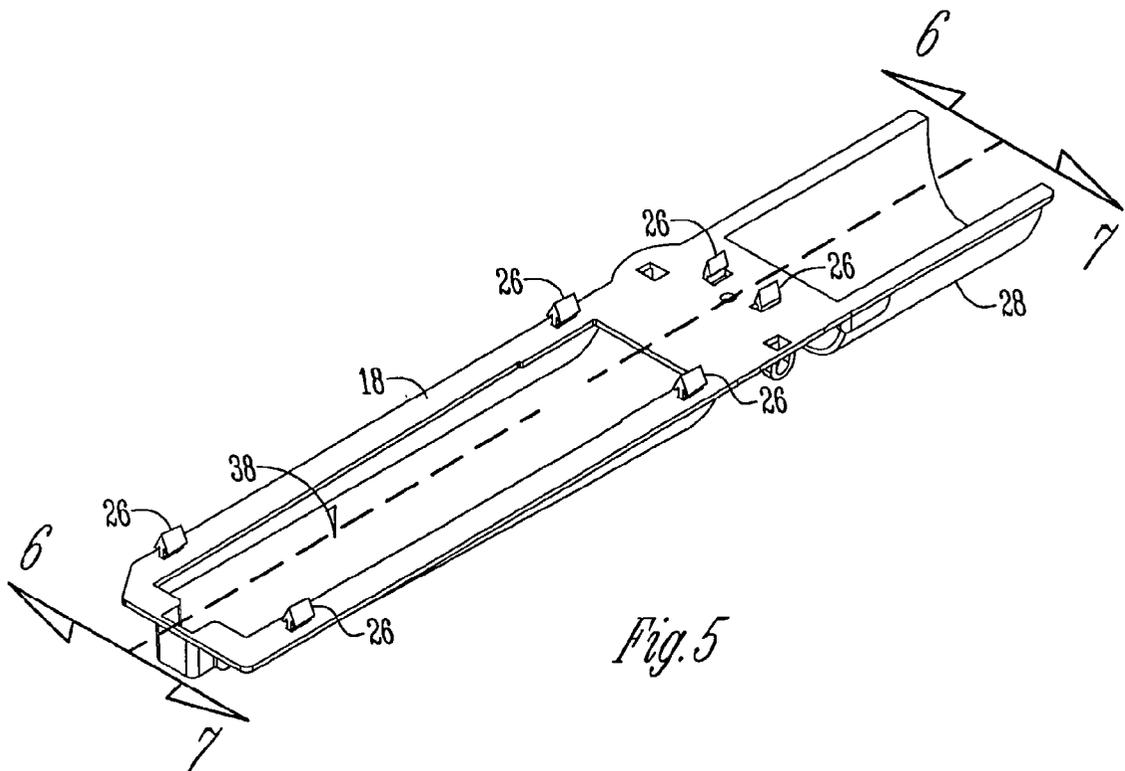


Fig. 5

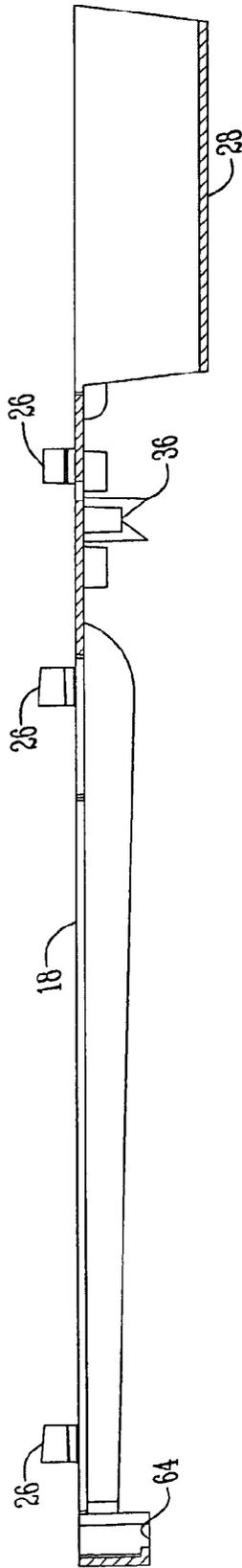


Fig. 6

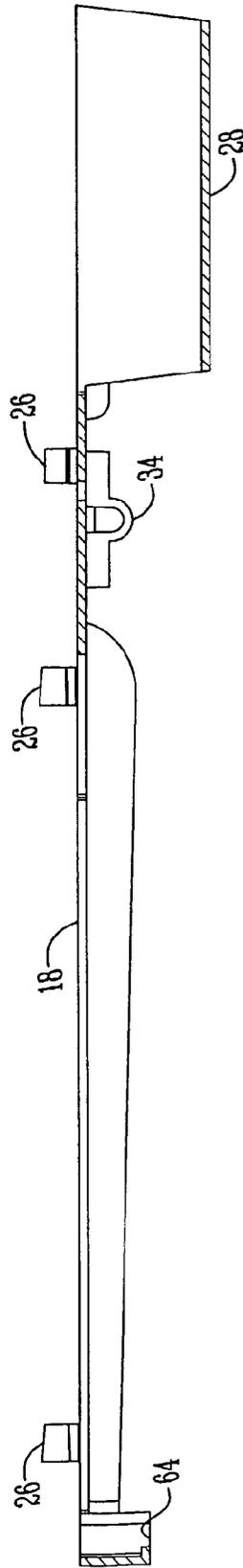


Fig. 7

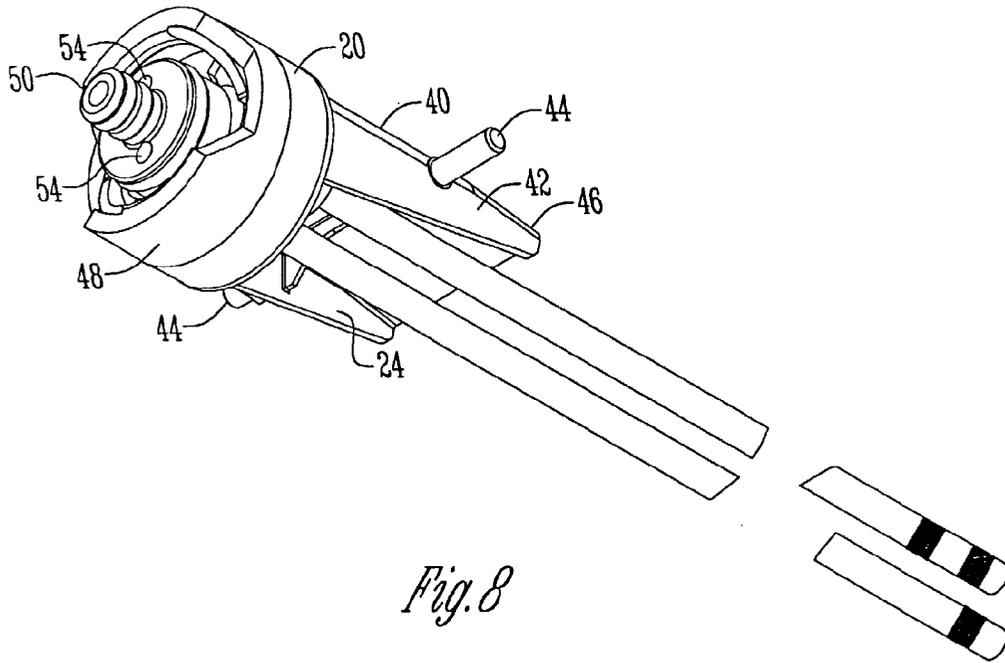


Fig. 8

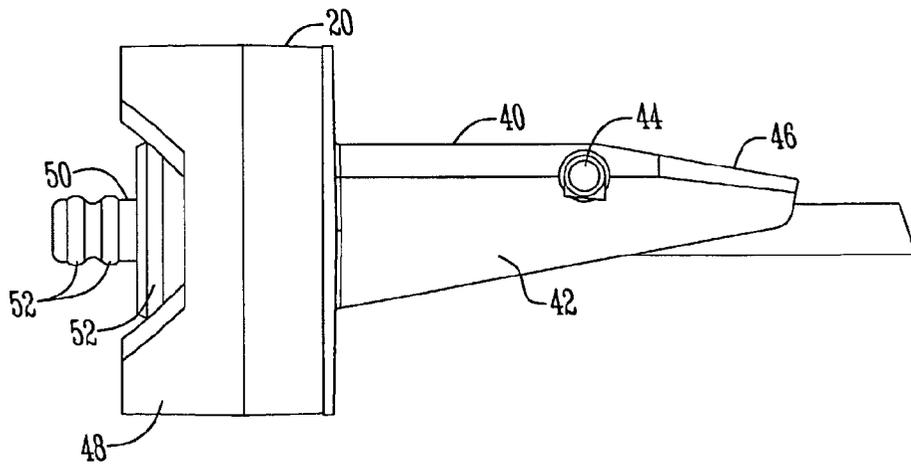


Fig. 9

