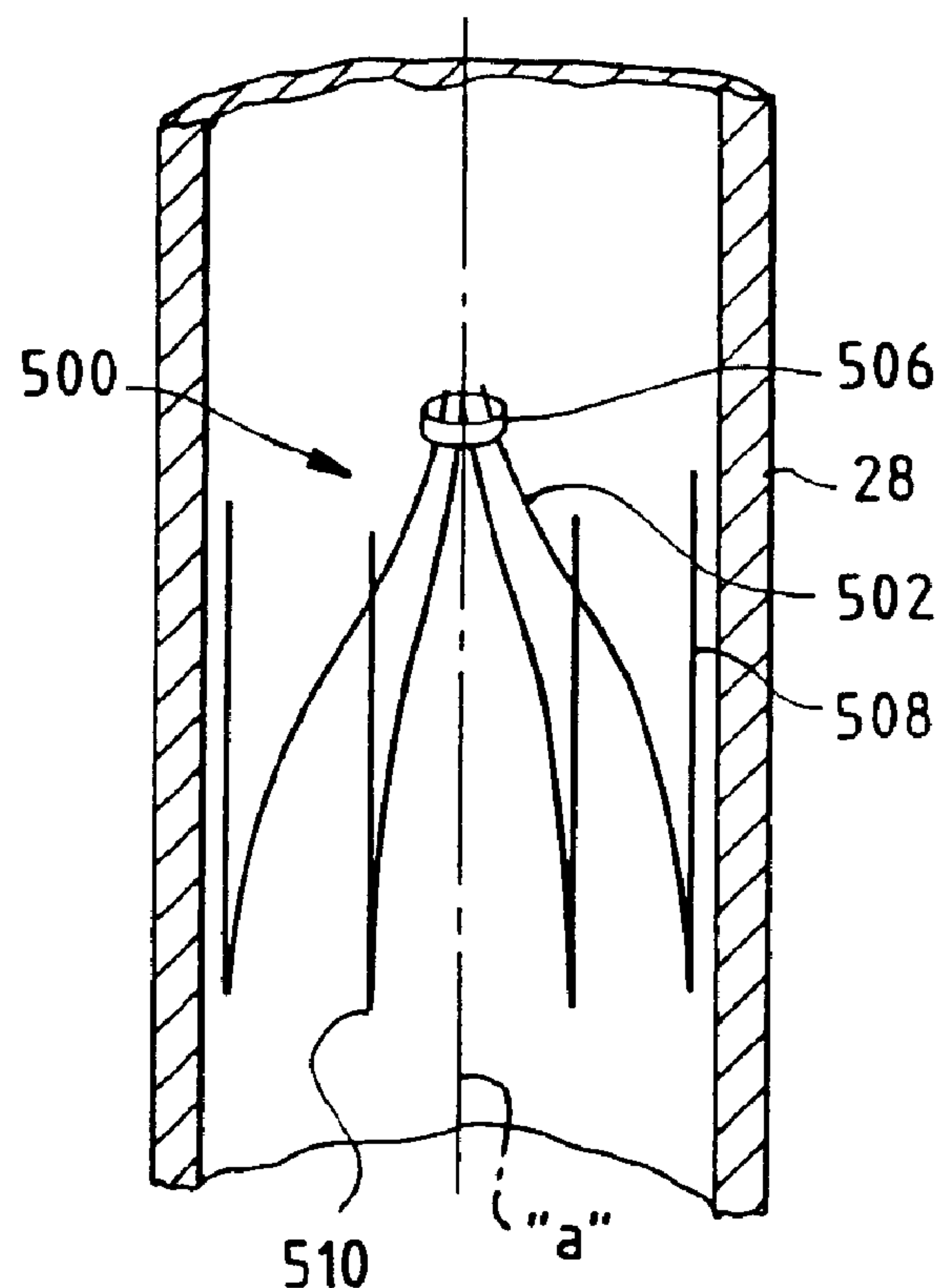




(86) Date de dépôt PCT/PCT Filing Date: 2000/05/03
(87) Date publication PCT/PCT Publication Date: 2000/11/09
(45) Date de délivrance/Issue Date: 2008/01/15
(85) Entrée phase nationale/National Entry: 2001/10/31
(86) N° demande PCT/PCT Application No.: US 2000/012004
(87) N° publication PCT/PCT Publication No.: 2000/066031
(30) Priorité/Priority: 1999/05/03 (US09/304,311)

(51) Cl.Int./Int.Cl. *A61F 2/01* (2006.01)
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(54) Titre : FILTRE CAVE ET PROCEDE DE TRAITEMENT DES MALADIES VASCULAIRES
(54) Title: BLOOD FILTER AND METHOD FOR TREATING VASCULAR DISEASE



(57) Abrégé/Abstract:

A filter is provided that is convertible from a filter configuration to an open, stent-like configuration. The filter includes a plurality of intraluminal filter elements (filter legs) that may be formed into a single cone or dual cone filter structure. A retainer secures the filter legs in the filter configuration upon initial deployment within a vessel. The retainer is then either self-releasing or removable to permit the filter legs to expand from the filter configuration into what may generally be described as an open or stent-like configuration. A filter web extends, at least in part, between the filter legs.



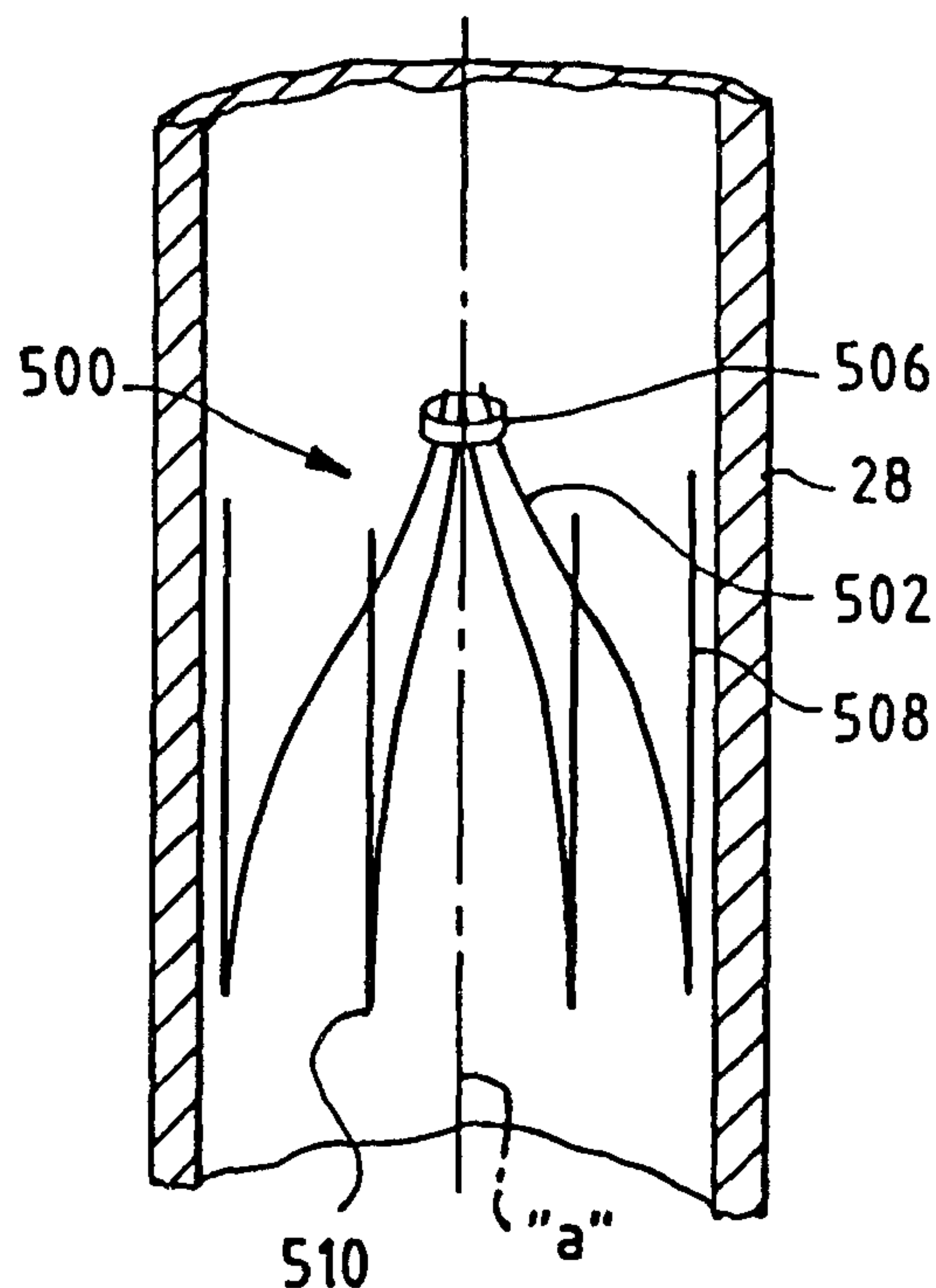


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : A61F 2/01	A1	(11) International Publication Number: WO 00/66031 (43) International Publication Date: 9 November 2000 (09.11.00)
(21) International Application Number: PCT/US00/12004 (22) International Filing Date: 3 May 2000 (03.05.00) (30) Priority Data: 09/304,311 3 May 1999 (03.05.99) US (71)(72) Applicant and Inventor: O'CONNELL, Paul, T. [US/US]; 2414 Harrison Street, Evanston, IL 60201 (US). (74) Agent: SITKO, Anthony, G.; Marshall, O'Toole, Gerstein, Murray & Borun, 6300 Sears Tower, 233 South Wacker Drive, Chicago, IL 60606 (US).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, 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, 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, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: BLOOD FILTER AND METHOD FOR TREATING VASCULAR DISEASE**(57) Abstract**

A filter is provided that is convertible from a filter configuration to an open, stent-like configuration. The filter includes a plurality of intraluminal filter elements (filter legs) that may be formed into a single cone or dual cone filter structure. A retainer secures the filter legs in the filter configuration upon initial deployment within a vessel. The retainer is then either self-releasing or removable to permit the filter legs to expand from the filter configuration into what may generally be described as an open or stent-like configuration. A filter web extends, at least in part, between the filter legs.



CLAIMS

I claim:

1. A filter adapted for use in treating vascular disease, the filter having a plurality of interconnected intraluminal filter elements, the intraluminal filter elements arranged to be disposed in a filter configuration within the lumen of a blood vessel, the filter characterized in that:

a non-tethered, releasable retainer joins the intraluminal filter elements in the filter configuration, and

wherein upon release of the releasable retainer the intraluminal filter elements convert to an open configuration.

2. The filter of claim 1, wherein each of the plurality of intraluminal filter elements has a superior end and an inferior end,

a plurality of orienting members are secured to and extend from respective ones of the intraluminal filter elements, and

the releasable retainer joins the superior ends in a filter configuration.

3. The filter of claim 1, wherein each of the plurality of intraluminal filter elements has a superior end and an inferior end, and the releasable retainer is disposed at a location along the intraluminal filter elements between the superior and inferior ends.

4. The filter of claim 1, wherein each intraluminal filter element has a first end and a second end and wherein the filter is arranged to be disposed in a basket-type configuration within the lumen of a blood vessel, the releasable retainer joins each first end of the intraluminal filter elements and each second end of the intraluminal filter elements.

5. The filter of any of claims 1-4, further comprising a spring formed integrally with the plurality of intraluminal filter elements.

6. The filter of any of claims 1-4, further comprising a filter web interconnecting the filter elements

7. The filter of claim 6, wherein the filter web extends between each adjacent intraluminal filter element.

8. The filter of any of claim 6, wherein the filter web is formed integrally with the intraluminal filter elements.

9. The filter of any of claims 1-4, further comprising means for passively releasing the releasable retainer.

10. The filter of any of claims 1-4, further comprising means for releasing the releasable retainer after a predetermined time period.

11. The filter of any of claims 1-4, wherein the releasable retainer comprises a biodegradable material.

12. The filter of any of claims 1-4, further comprising means for actively releasing the releasable retainer.

13. The filter of any of claims 1-4, wherein the releasable retainer comprises a coupling formed with a plurality of catches, each of the catches respectively engaged with one of the plurality of intraluminal filter elements.

14. The filter of any of claims 1-4, wherein the releasable retainer comprises a breakable band engaging each of the plurality of intraluminal filter elements.

15. The filter of any of claims 1-4, further comprising means for releasing the releasable retainer responsive to an energy stimulus.

16. The filter of any of claims 1-4, further comprising means for releasing the releasable retainer responsive to a chemical stimulus.

17. The filter of any of claims 1-16 usable for the treatment of pulmonary embolism.
18. The filter of any of claims 1-16 usable for the treatment of atherosclerosis.
19. The use of the filter according to any one of claims 1-18 for treating vascular disease.

CLAIMS

I claim:

1. A filter adapted for use in treating vascular disease, the filter having a plurality of interconnected intraluminal filter elements, the intraluminal filter elements arranged to be disposed in a filter configuration within the lumen of a blood vessel, the filter characterized in that:

a non-tethered, releasable retainer joins the intraluminal filter elements in the filter configuration, and

wherein upon release of the releasable retainer the intraluminal filter elements convert to an open configuration.

2. The filter of claim 1, wherein each of the plurality of intraluminal filter elements has a superior end and an inferior end,

a plurality of orienting members are secured to and extend from respective ones of the intraluminal filter elements, and

the releasable retainer joins the superior ends in a filter configuration.

3. The filter of claim 1, wherein each of the plurality of intraluminal filter elements has a superior end and an inferior end, and the releasable retainer is disposed at a location along the intraluminal filter elements between the superior and inferior ends.

4. The filter of claim 1, wherein each intraluminal filter element has a first end and a second end and wherein the filter is arranged to be disposed in a basket-type configuration within the lumen of a blood vessel, the releasable retainer joins each first end of the intraluminal filter elements and each second end of the intraluminal filter elements.

5. The filter of any of claims 1-4, further comprising a spring formed integrally with the plurality of intraluminal filter elements.

6. The filter of any of claims 1-4, further comprising a filter web interconnecting the filter elements

7. The filter of claim 6, wherein the filter web extends between each adjacent intraluminal filter element.

8. The filter of any of claim 6, wherein the filter web is formed integrally with the intraluminal filter elements.

9. The filter of any of claims 1-4, further comprising means for passively releasing the releasable retainer.

10. The filter of any of claims 1-4, further comprising means for releasing the releasable retainer after a predetermined time period.

11. The filter of any of claims 1-4, wherein the releasable retainer comprises a biodegradable material.

12. The filter of any of claims 1-4, further comprising means for actively releasing the releasable retainer.

13. The filter of any of claims 1-4, wherein the releasable retainer comprises a coupling formed with a plurality of catches, each of the catches respectively engaged with one of the plurality of intraluminal filter elements.

14. The filter of any of claims 1-4, wherein the releasable retainer comprises a breakable band engaging each of the plurality of intraluminal filter elements.

15. The filter of any of claims 1-4, further comprising means for releasing the releasable retainer responsive to an energy stimulus.

16. The filter of any of claims 1-4, further comprising means for releasing the releasable retainer responsive to a chemical stimulus.

17. The use of the filter of any of claims 1-16 for the treatment of pulmonary embolism.

18. The use of the filter of any of claims 1-16 for the treatment of atherosclerosis.

19. The use of the filter according to any on of claims 1-16 for treating vascular disease.

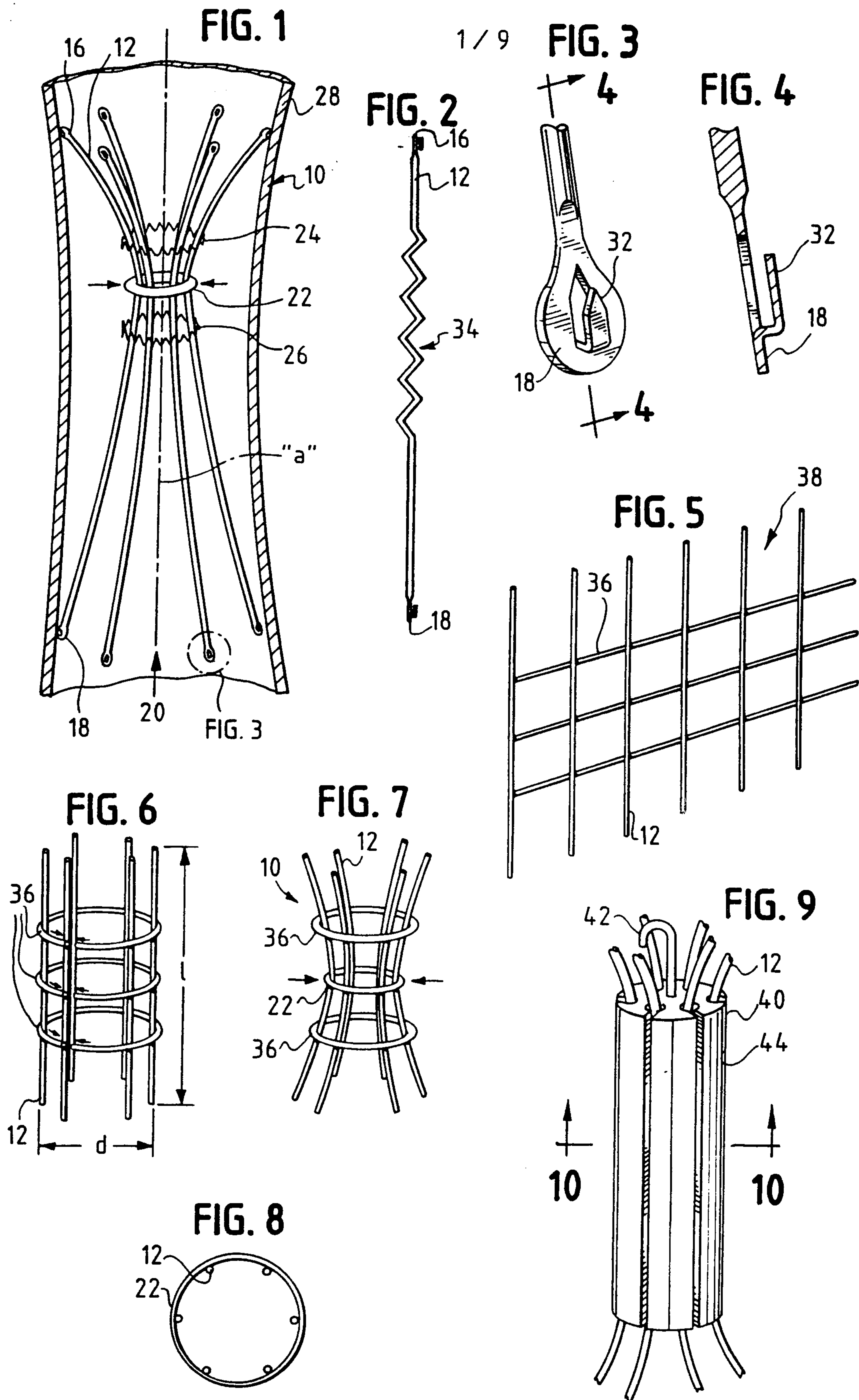


FIG. 12

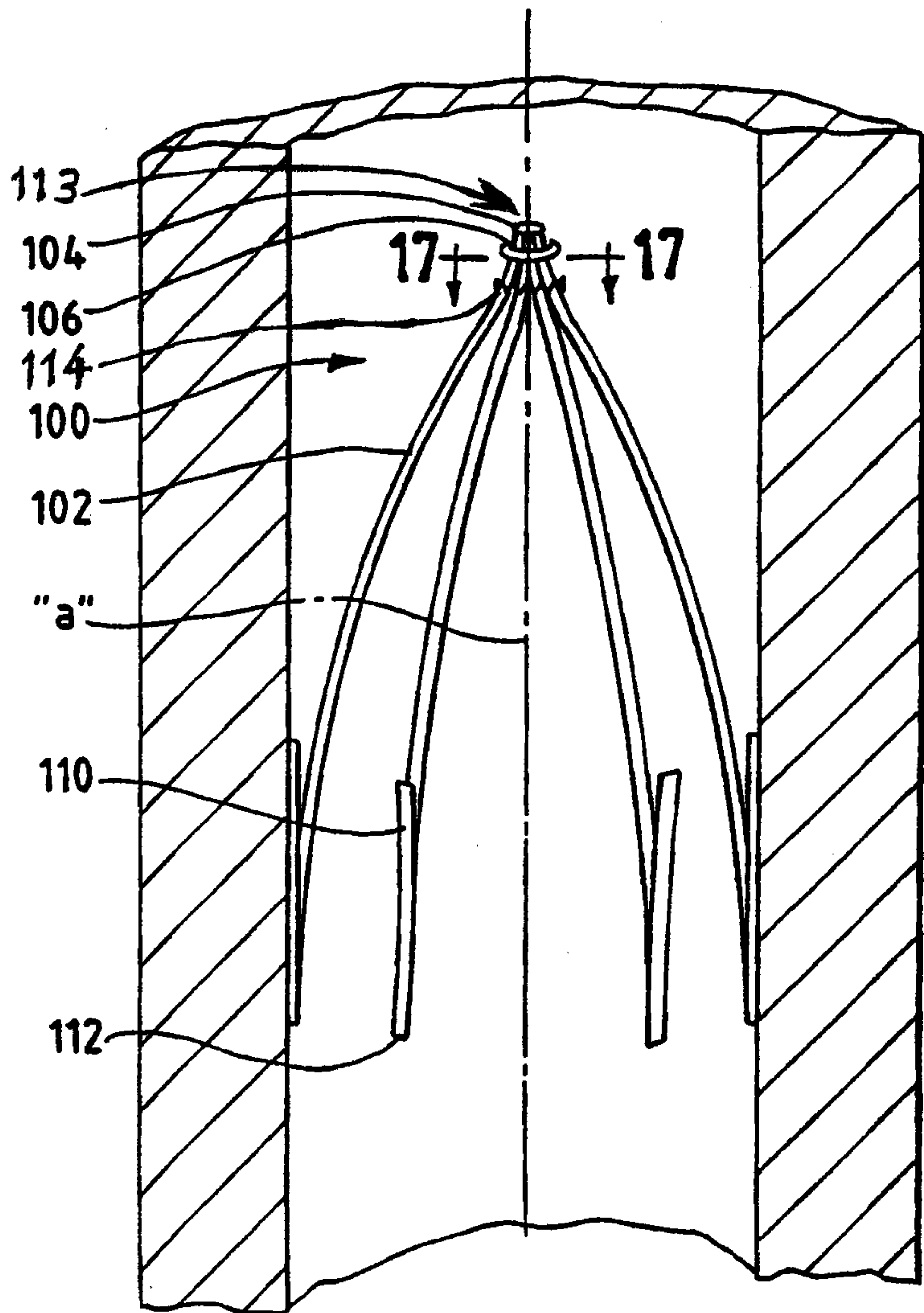


FIG. 10

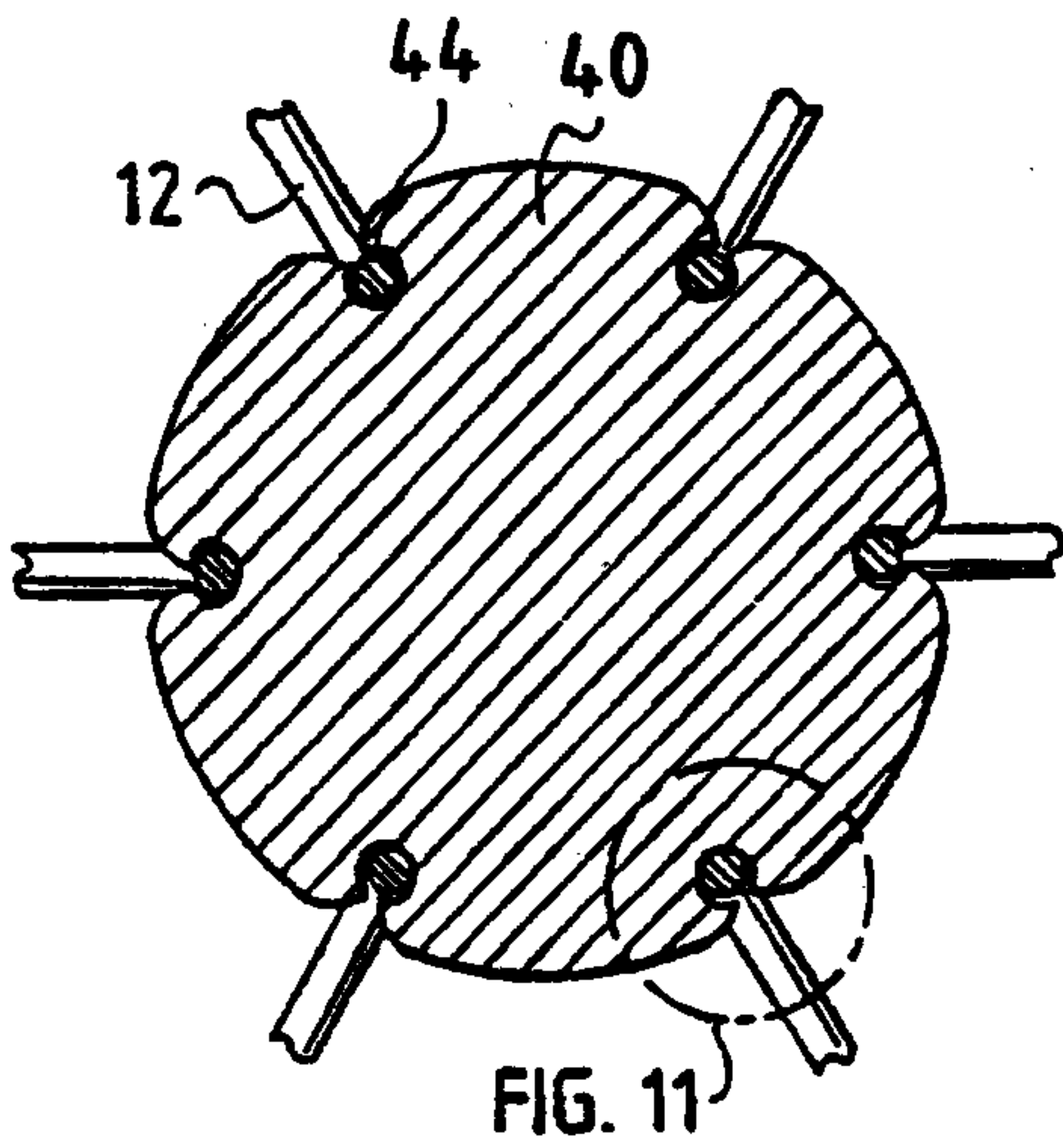


FIG. 11

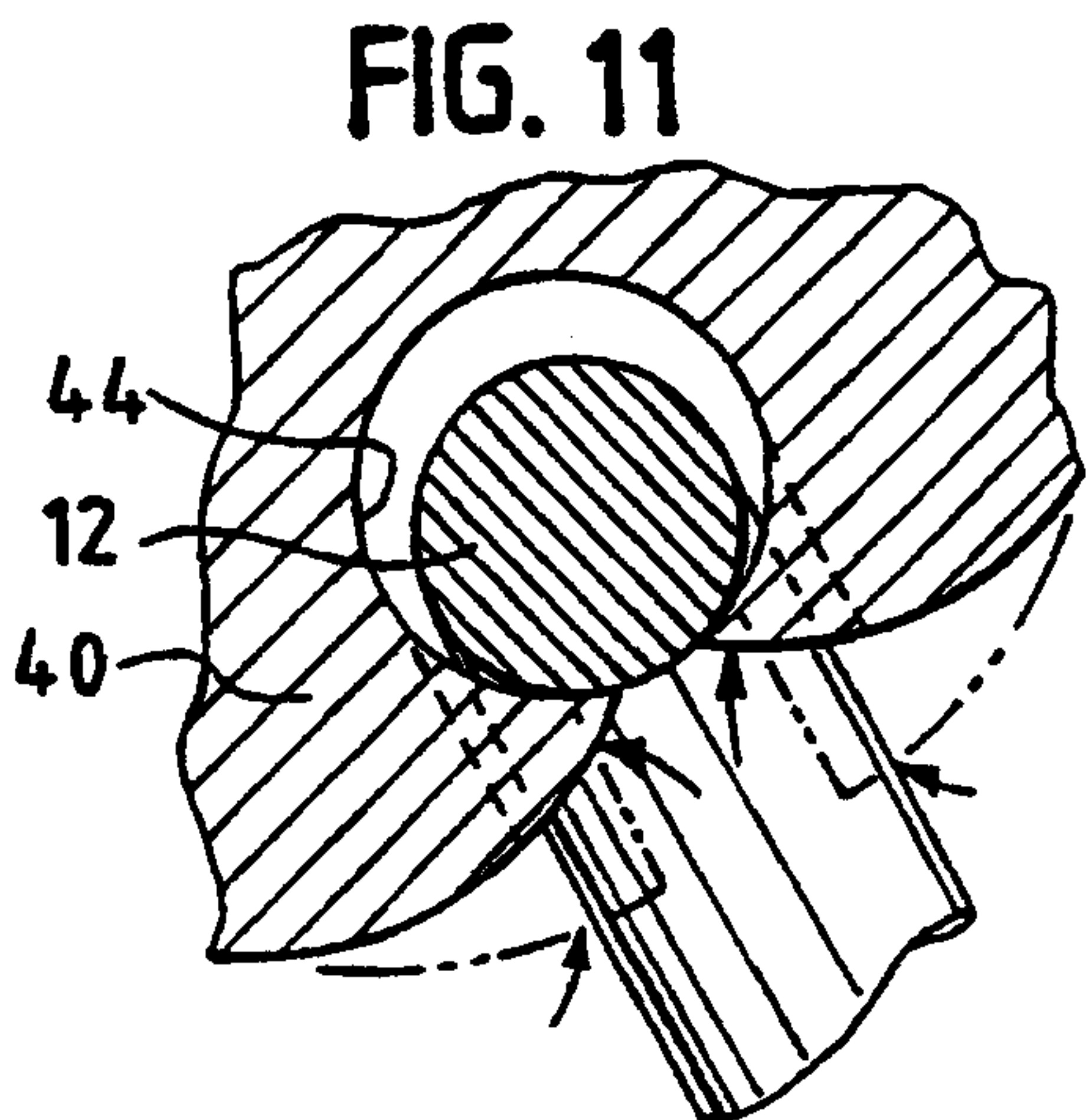


FIG. 11

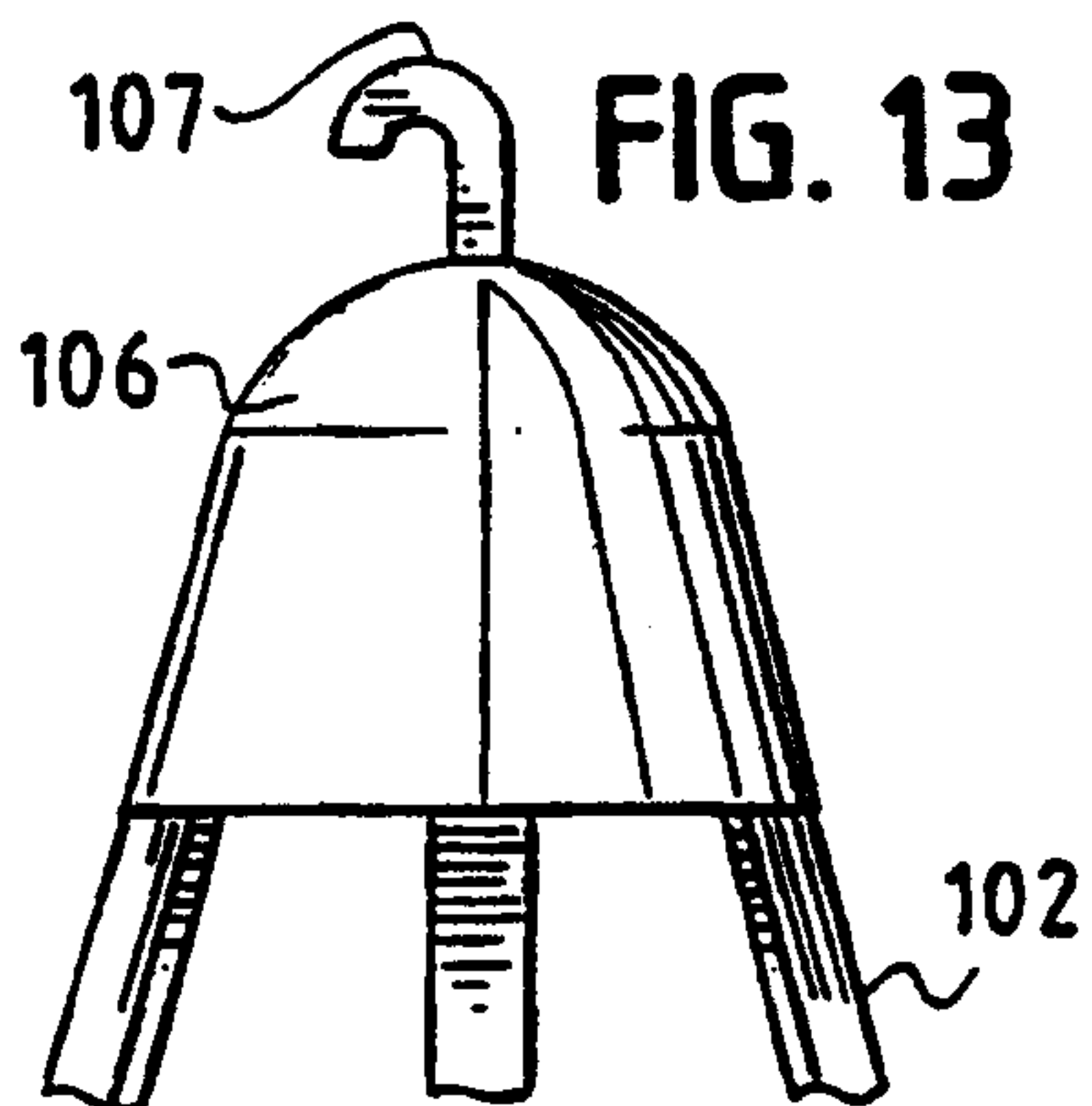


FIG. 13

FIG. 14

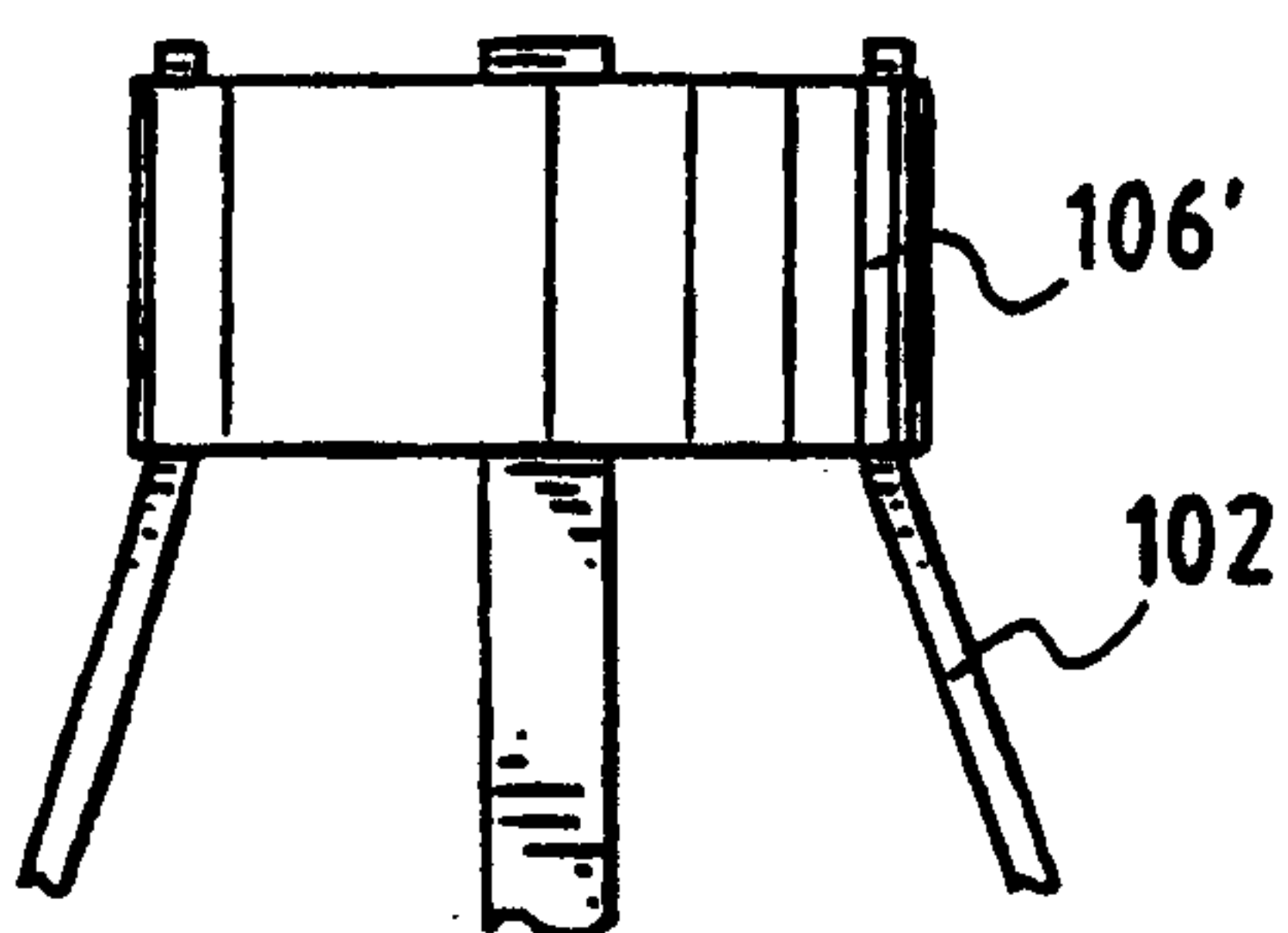


FIG. 15

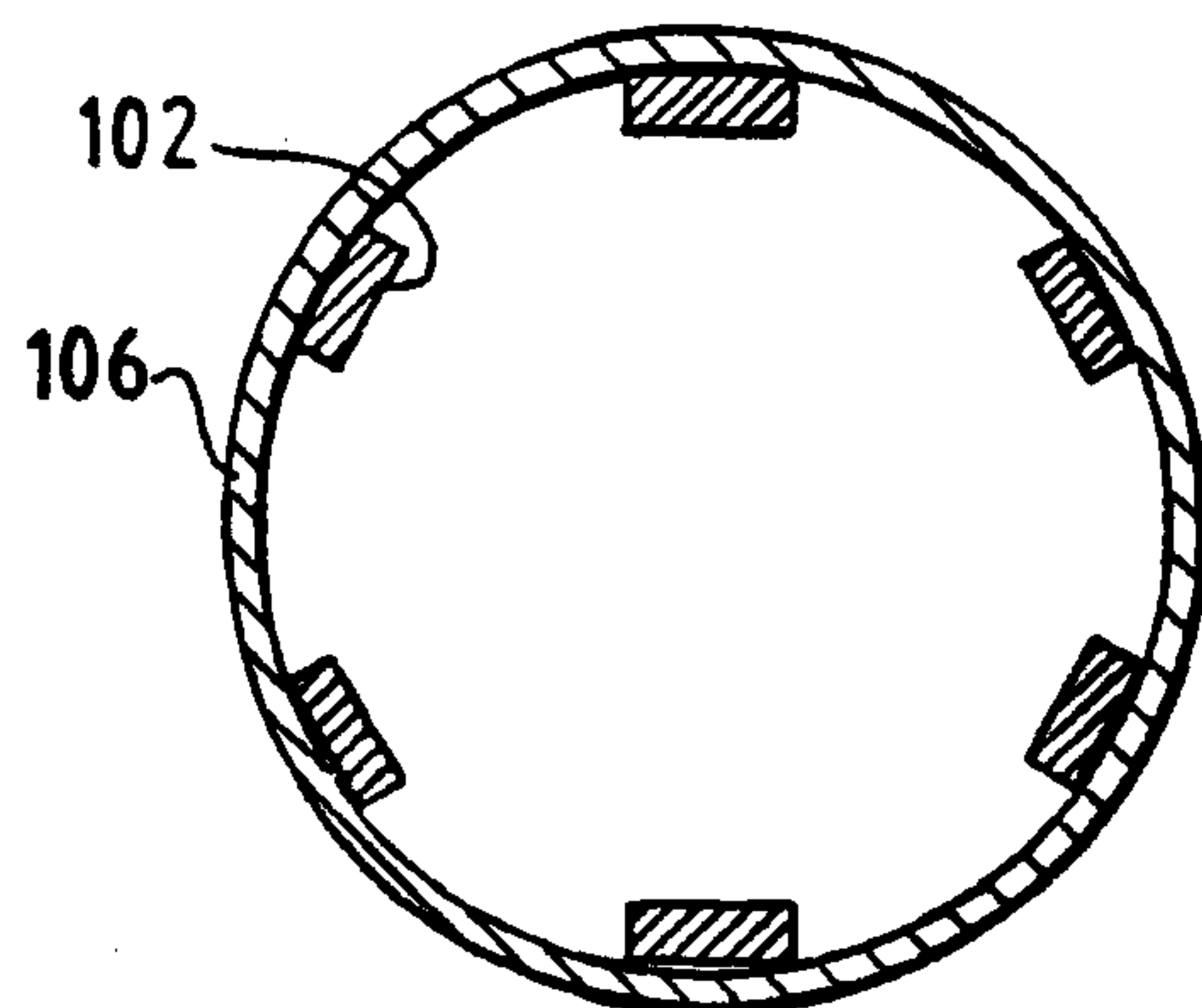
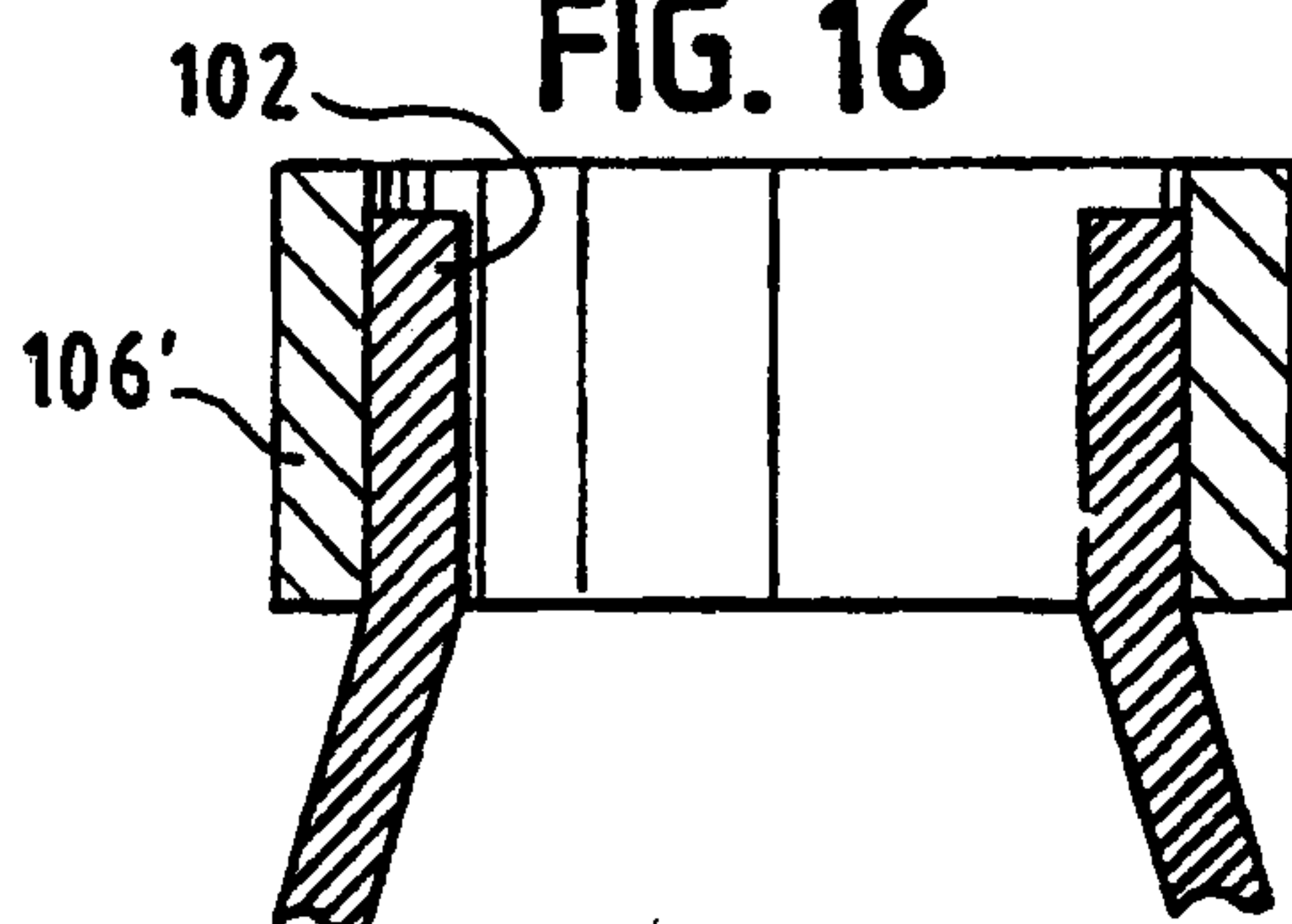


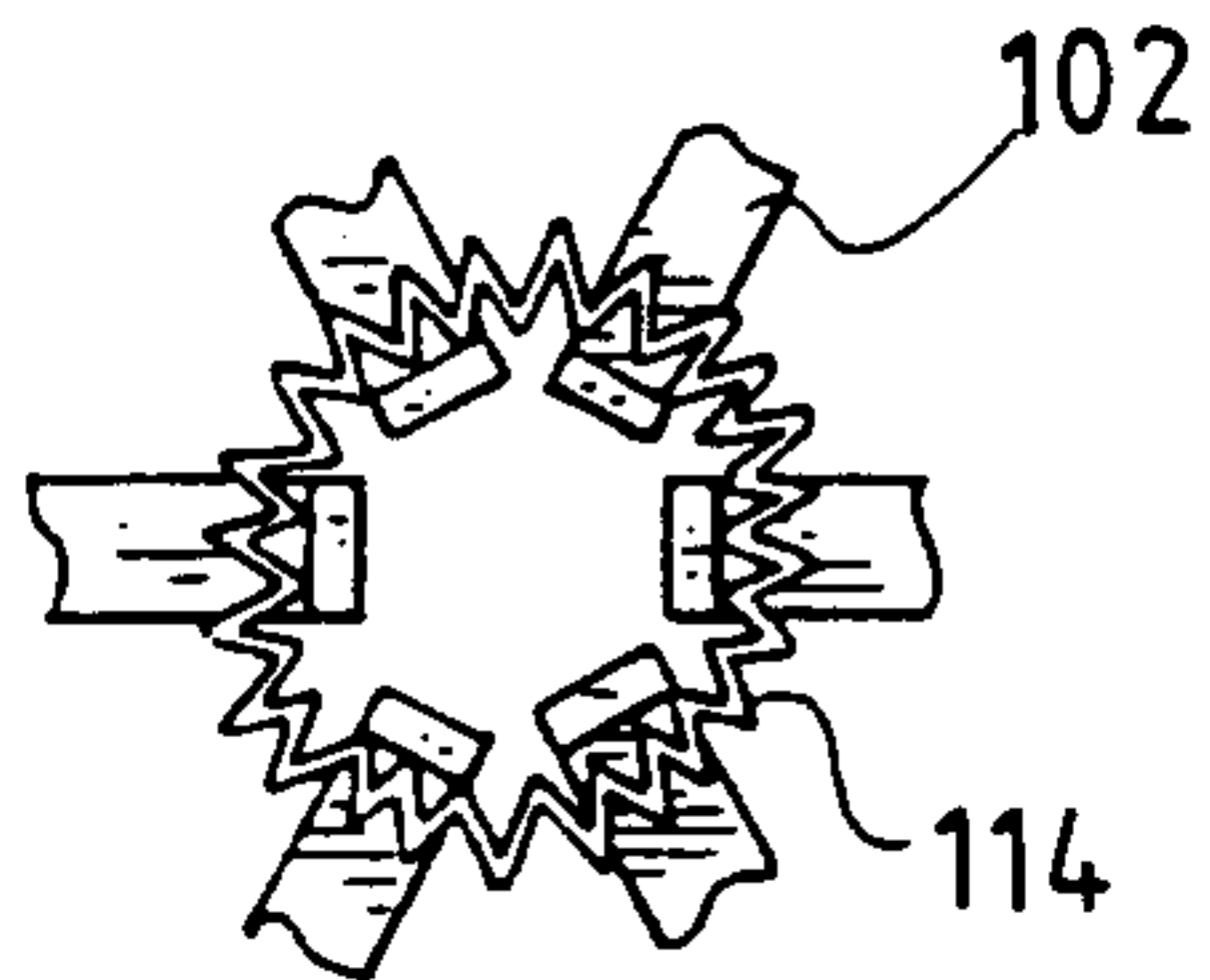
FIG. 16



Quilayson & Singler

PATENT AGENTS

FIG. 17



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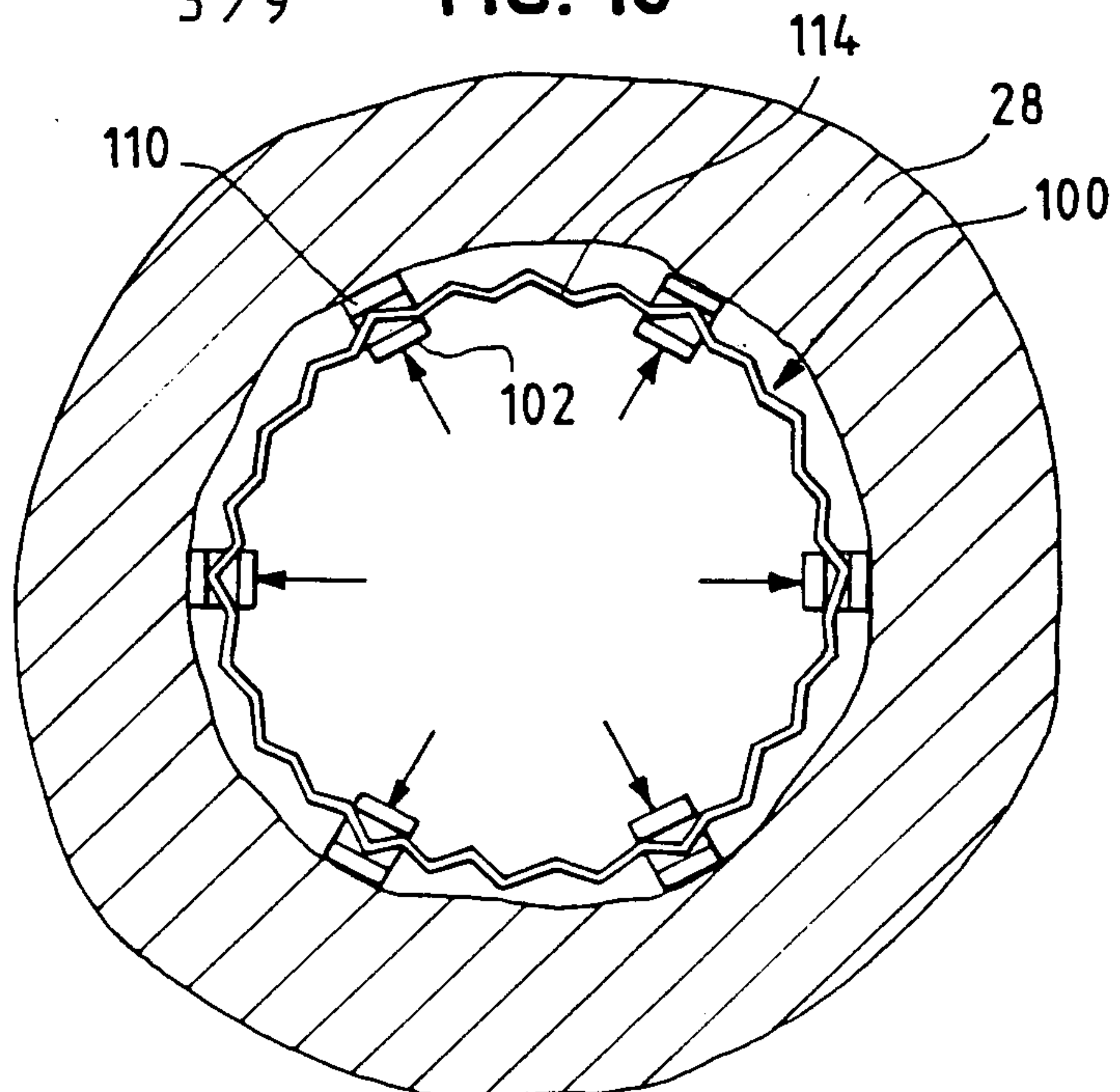


FIG. 19

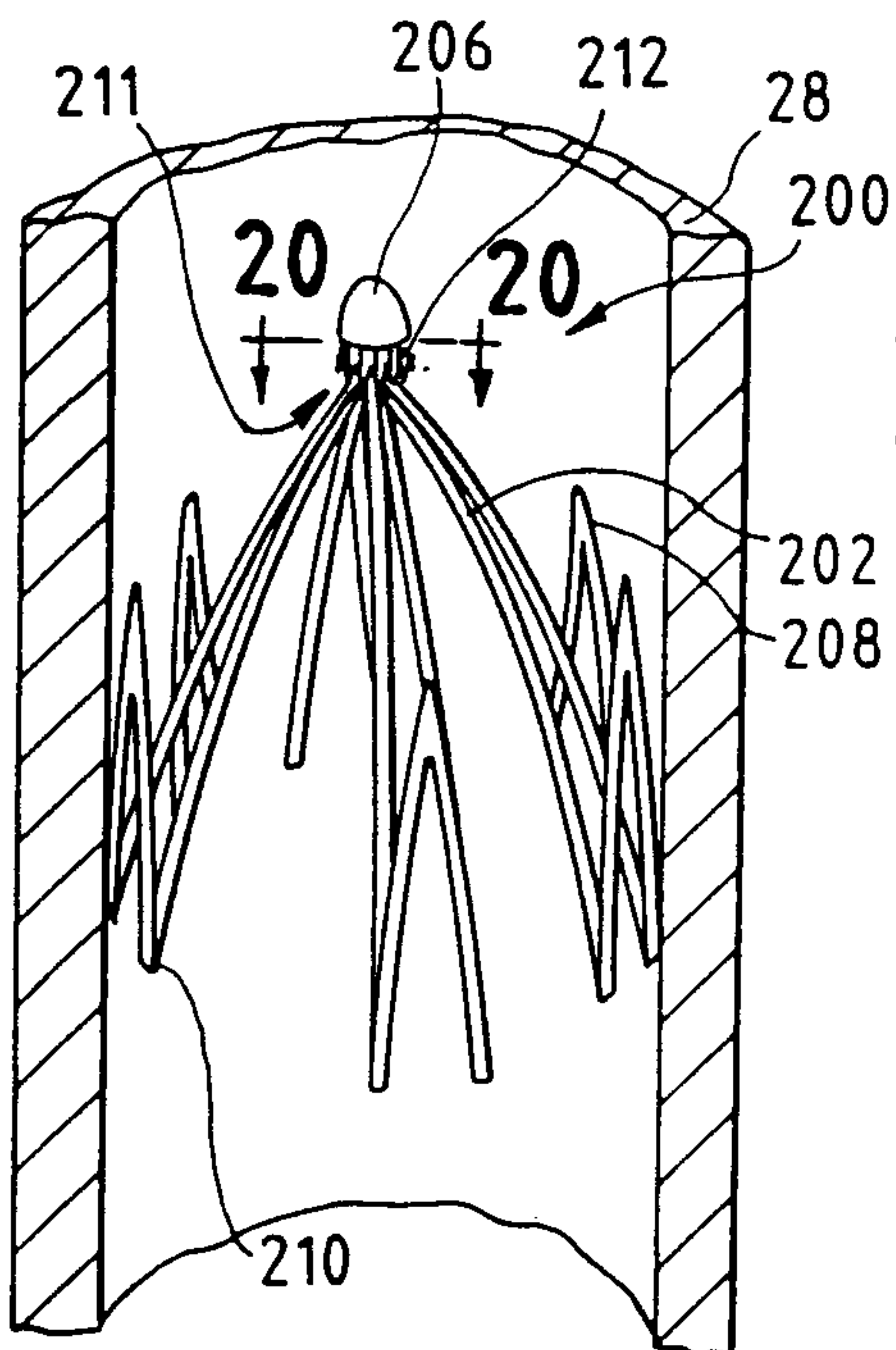


FIG. 20

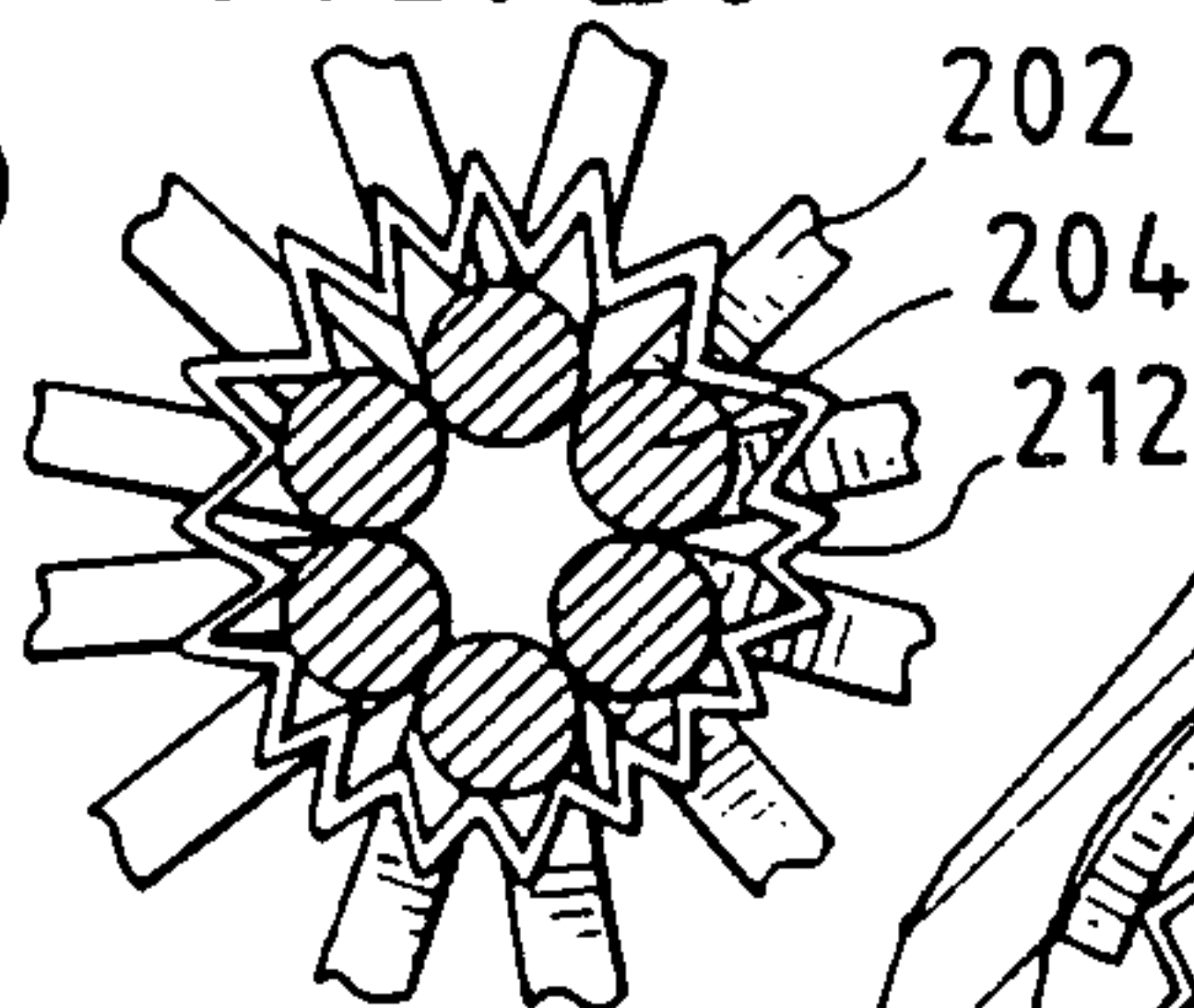


FIG. 21

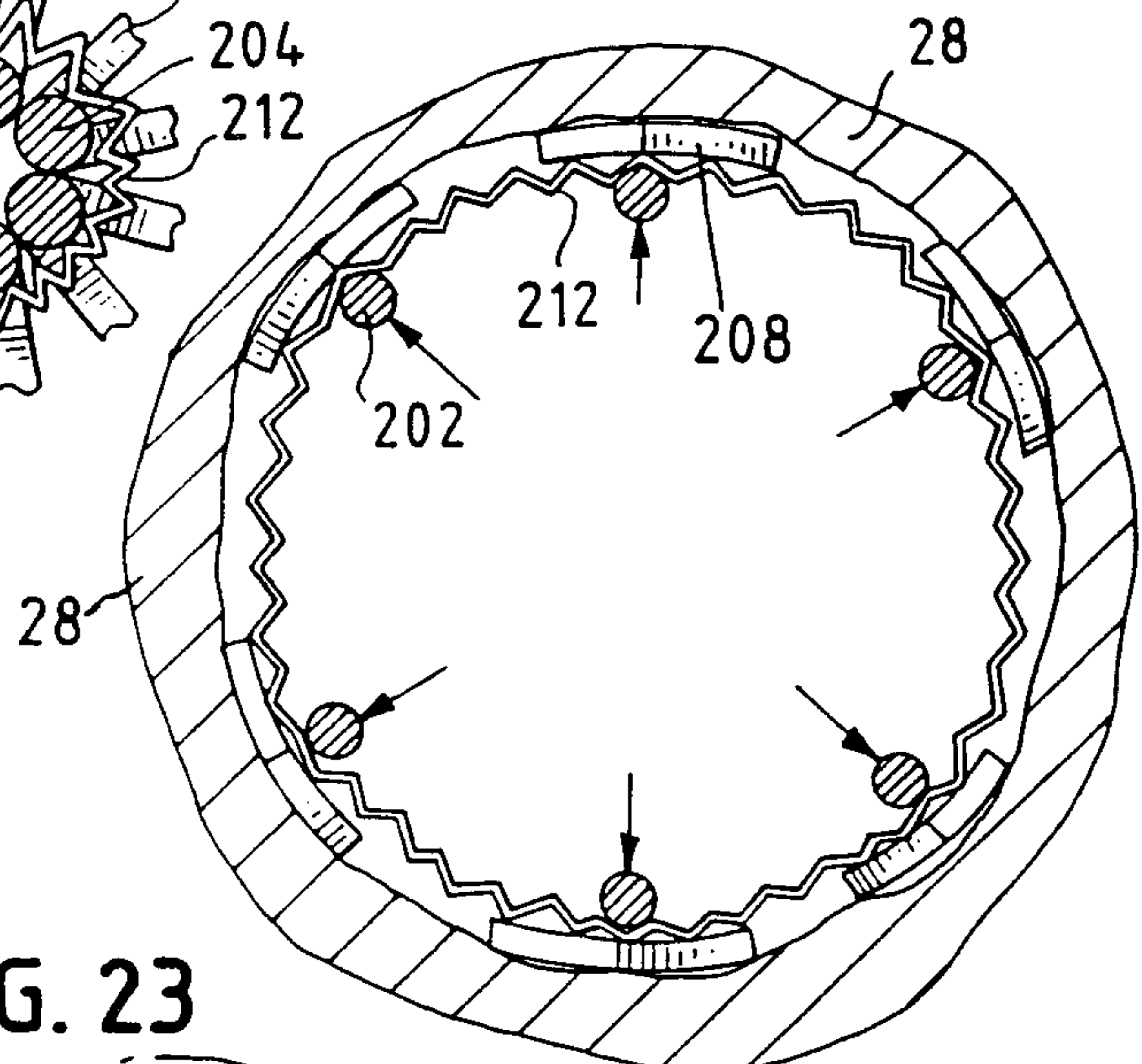


FIG. 23

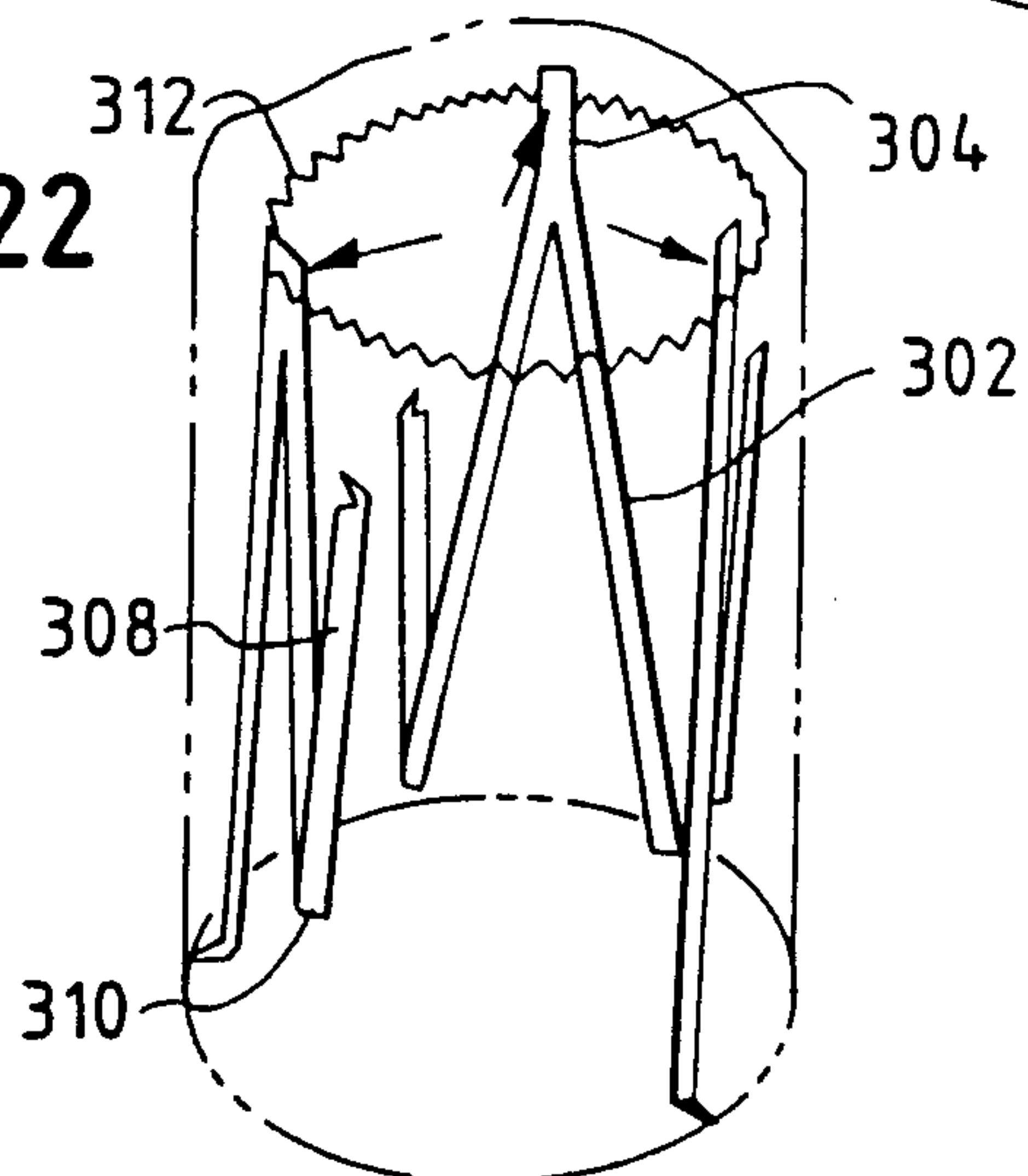


FIG. 22

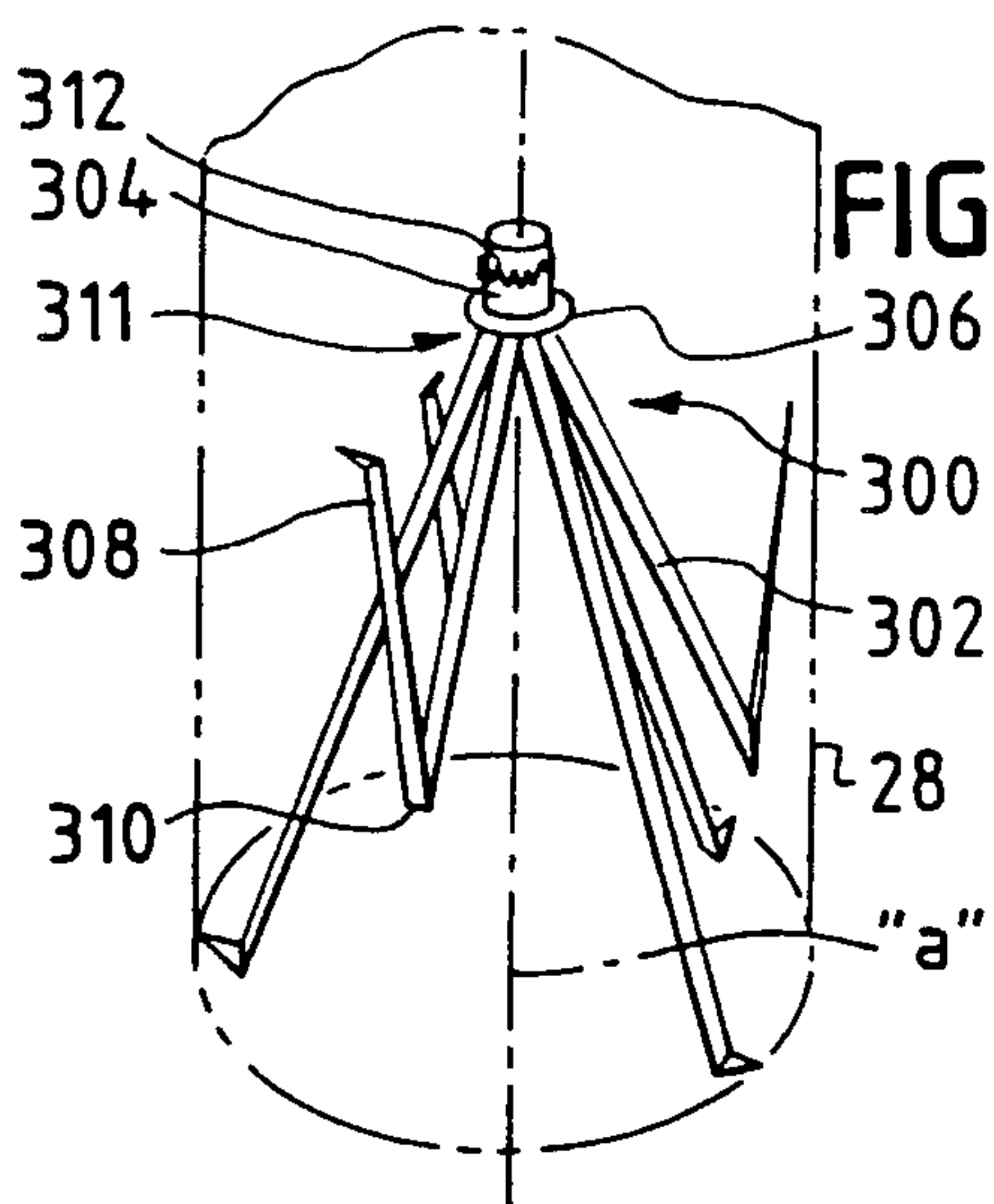


FIG. 24

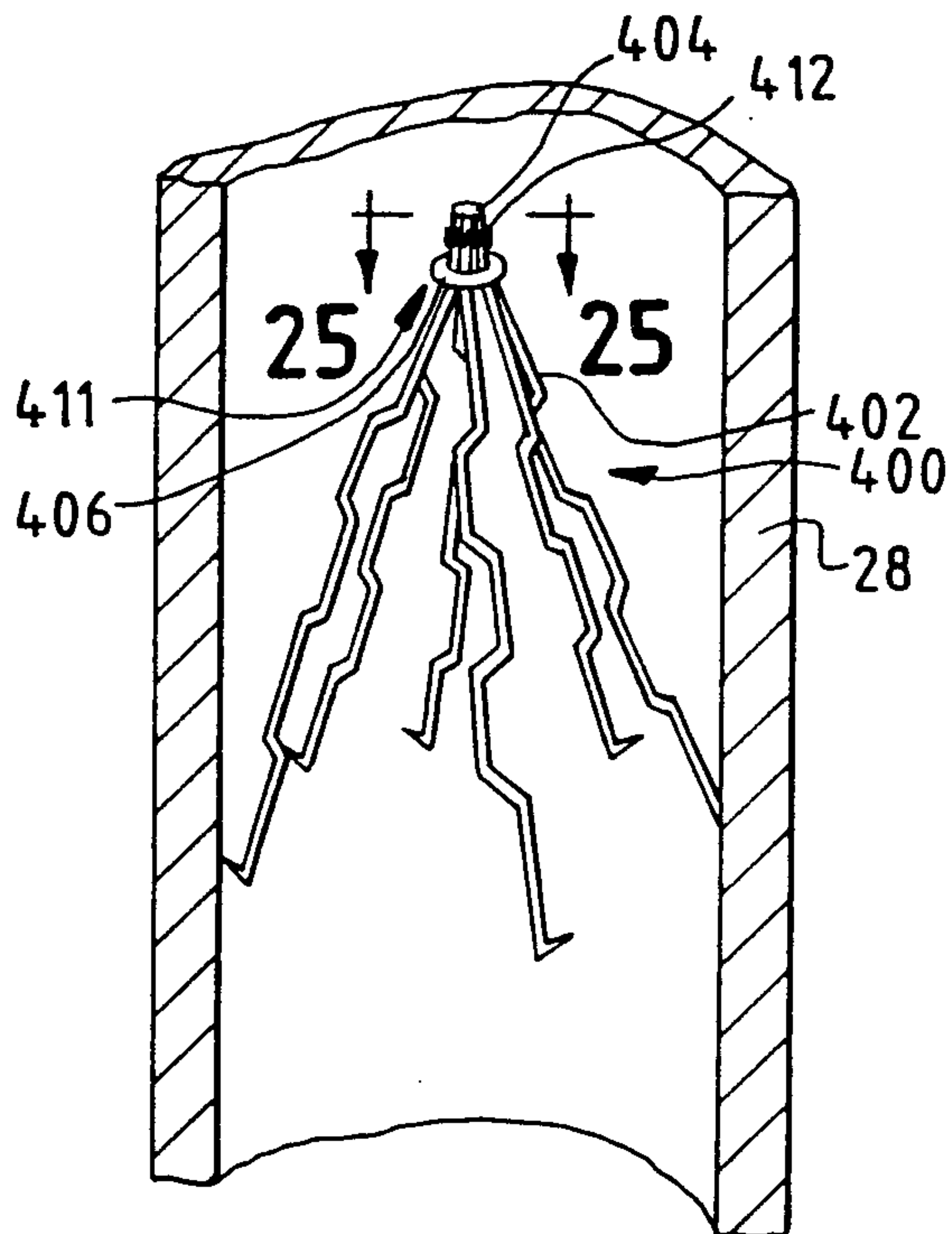


FIG. 25

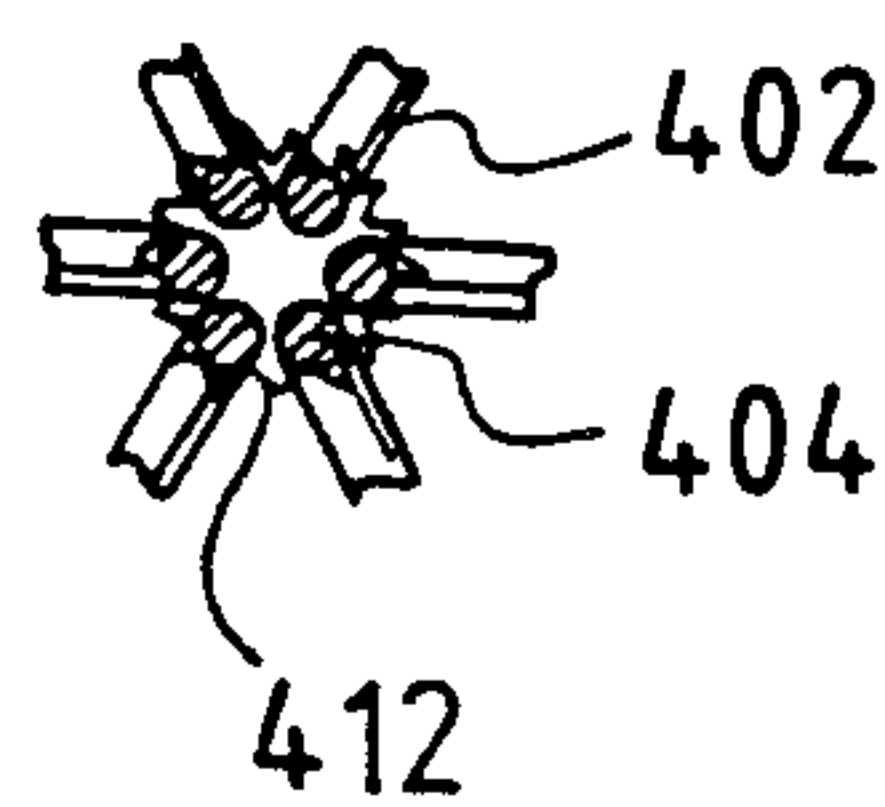


FIG. 26

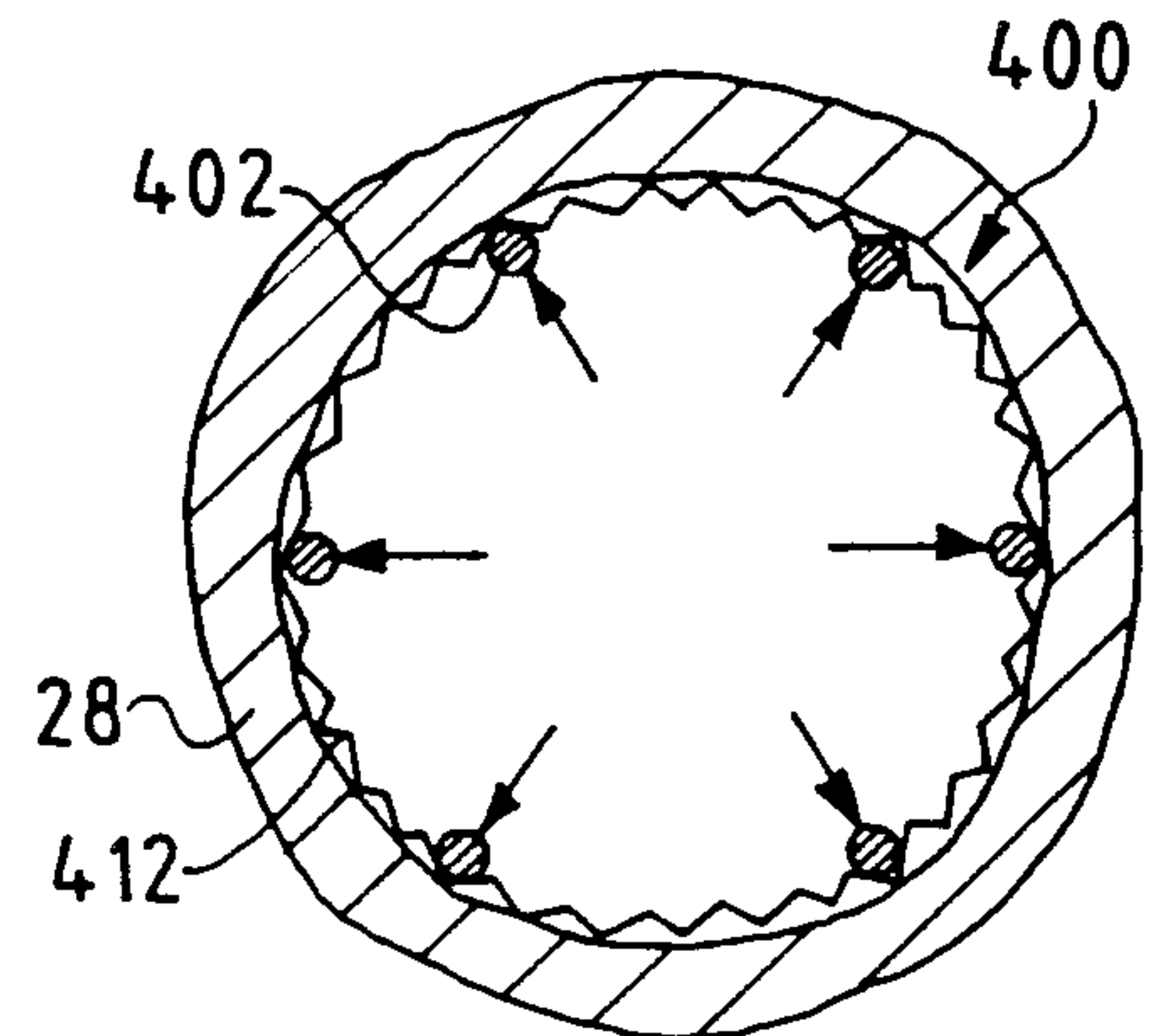


FIG. 27

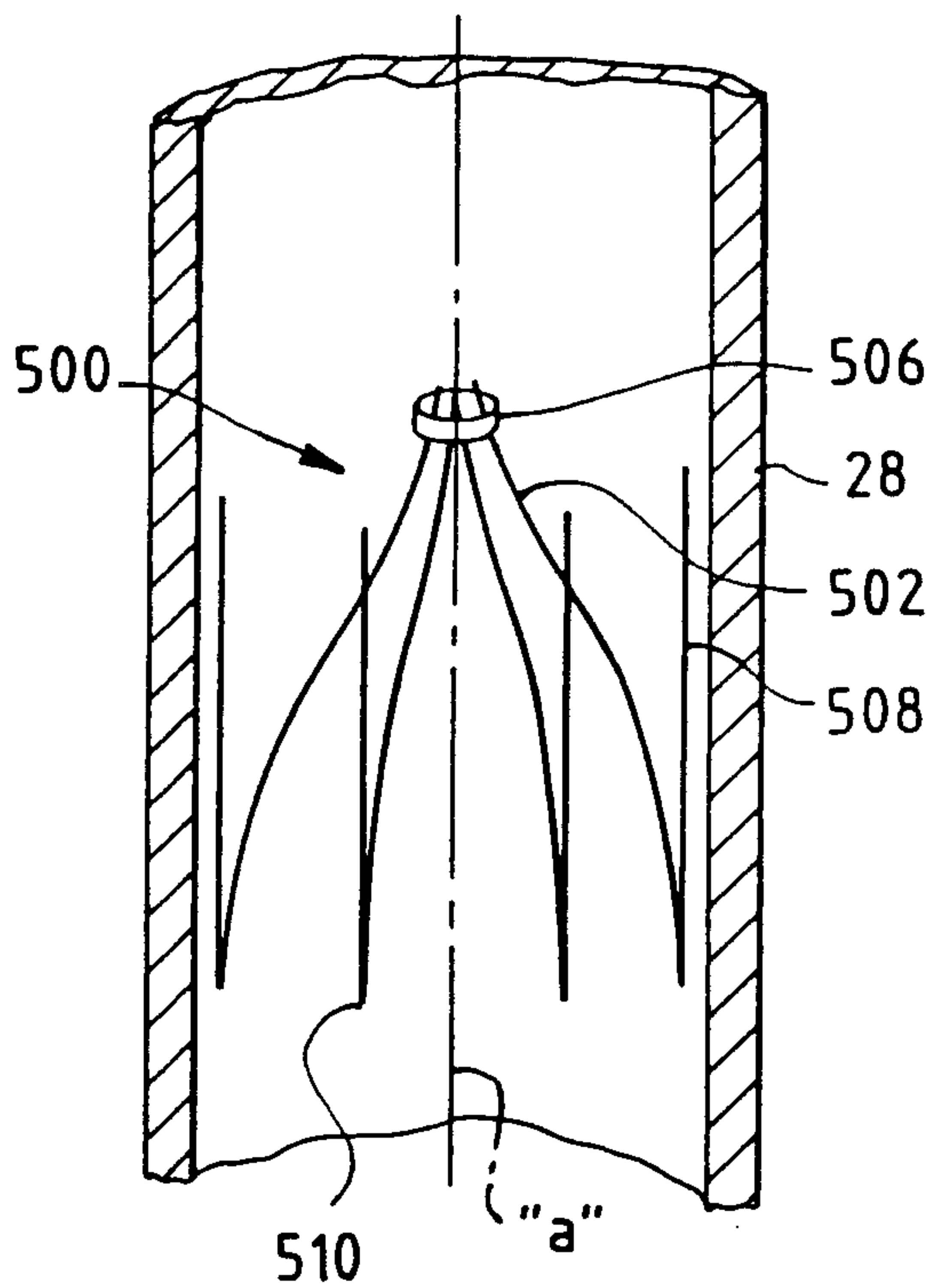


FIG. 28

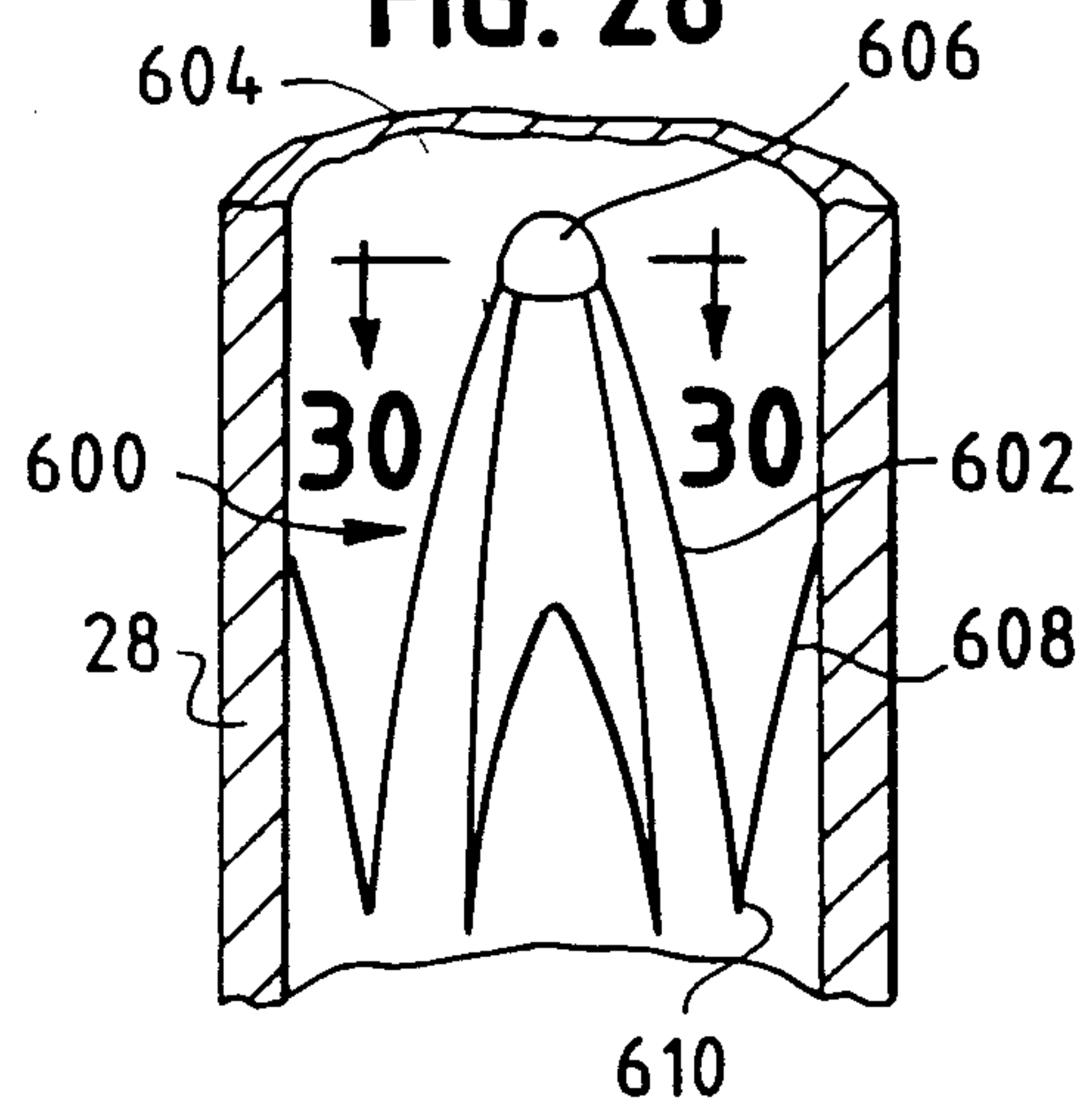


FIG. 29

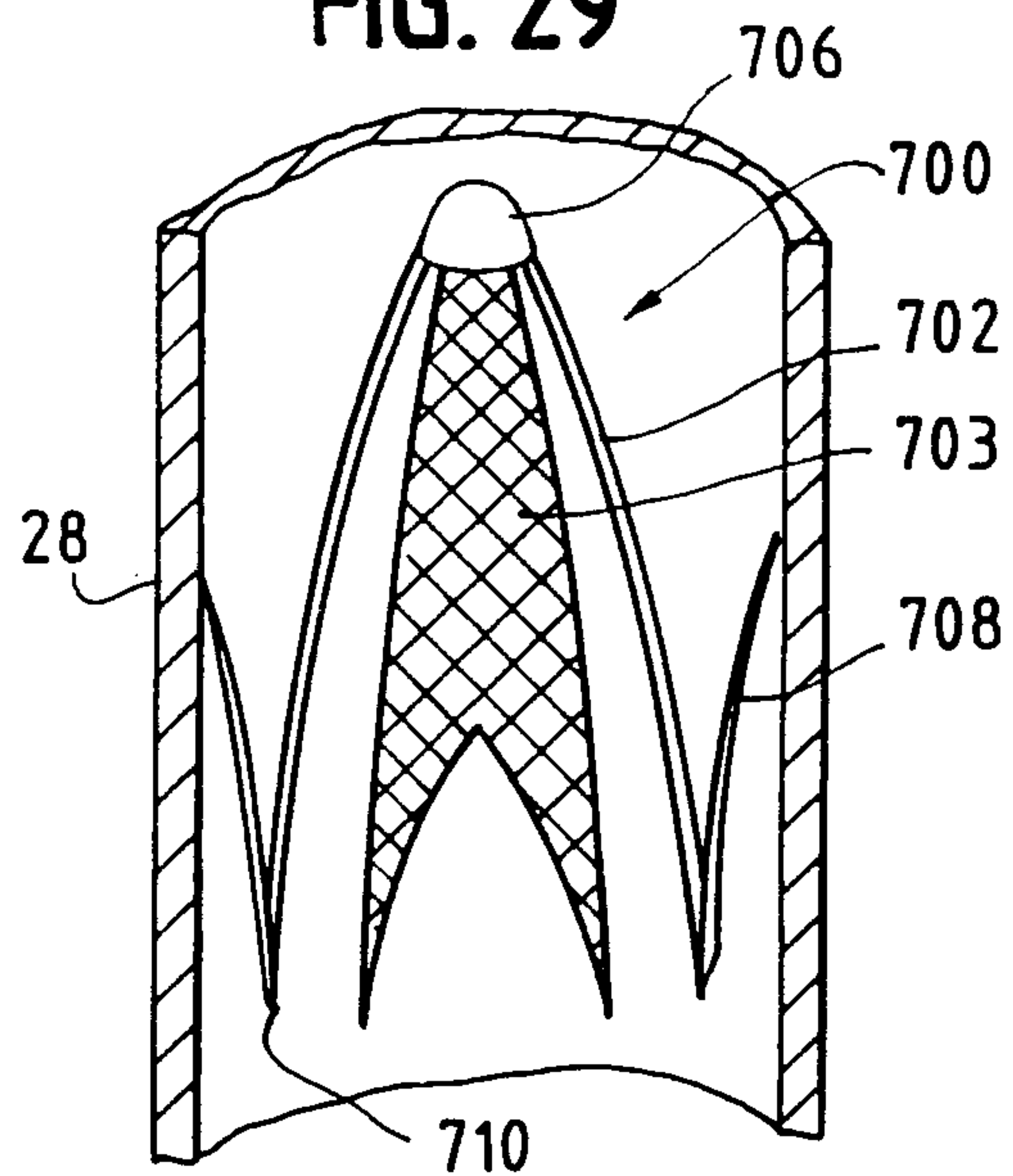


FIG. 30

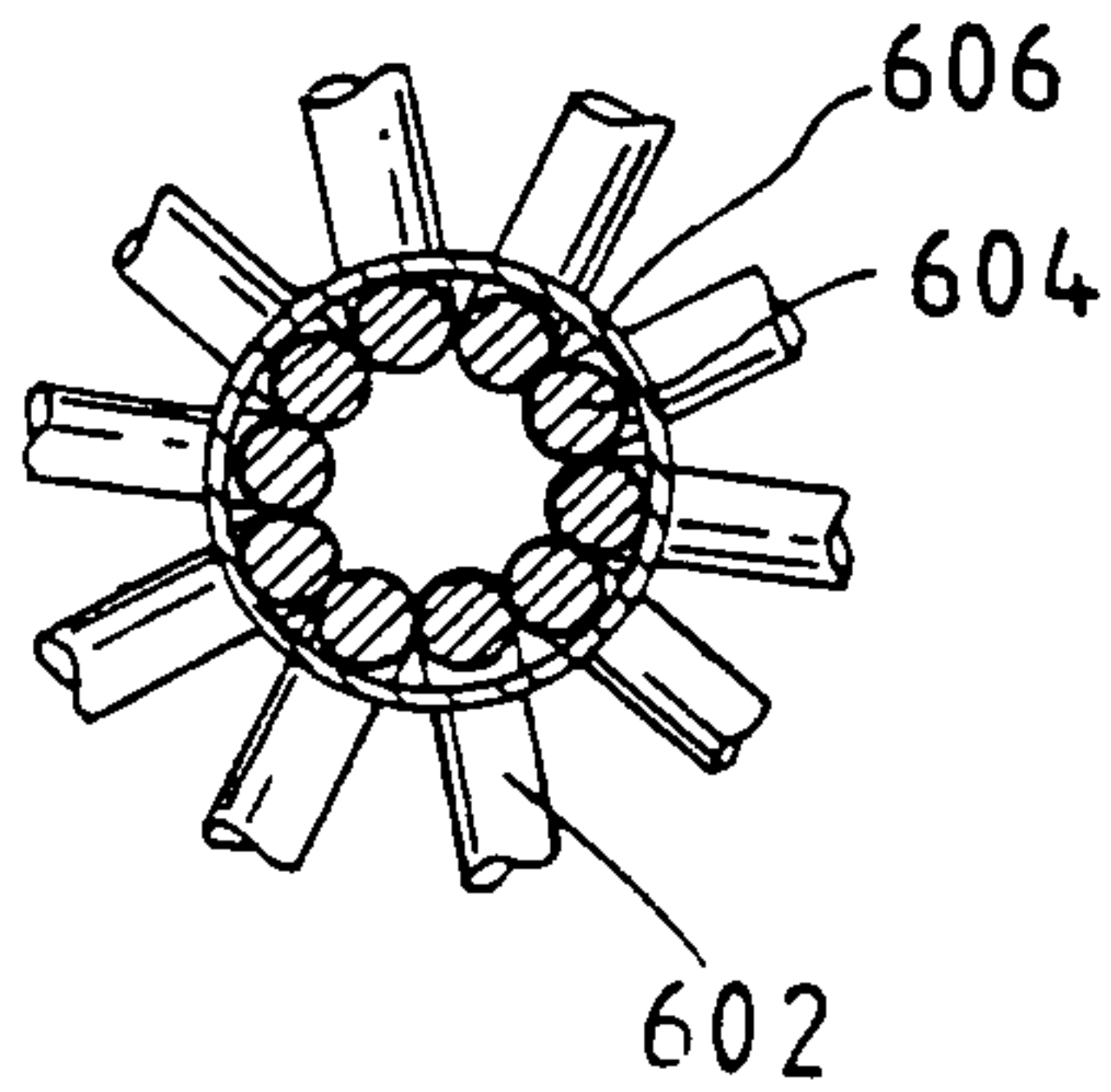


FIG. 31

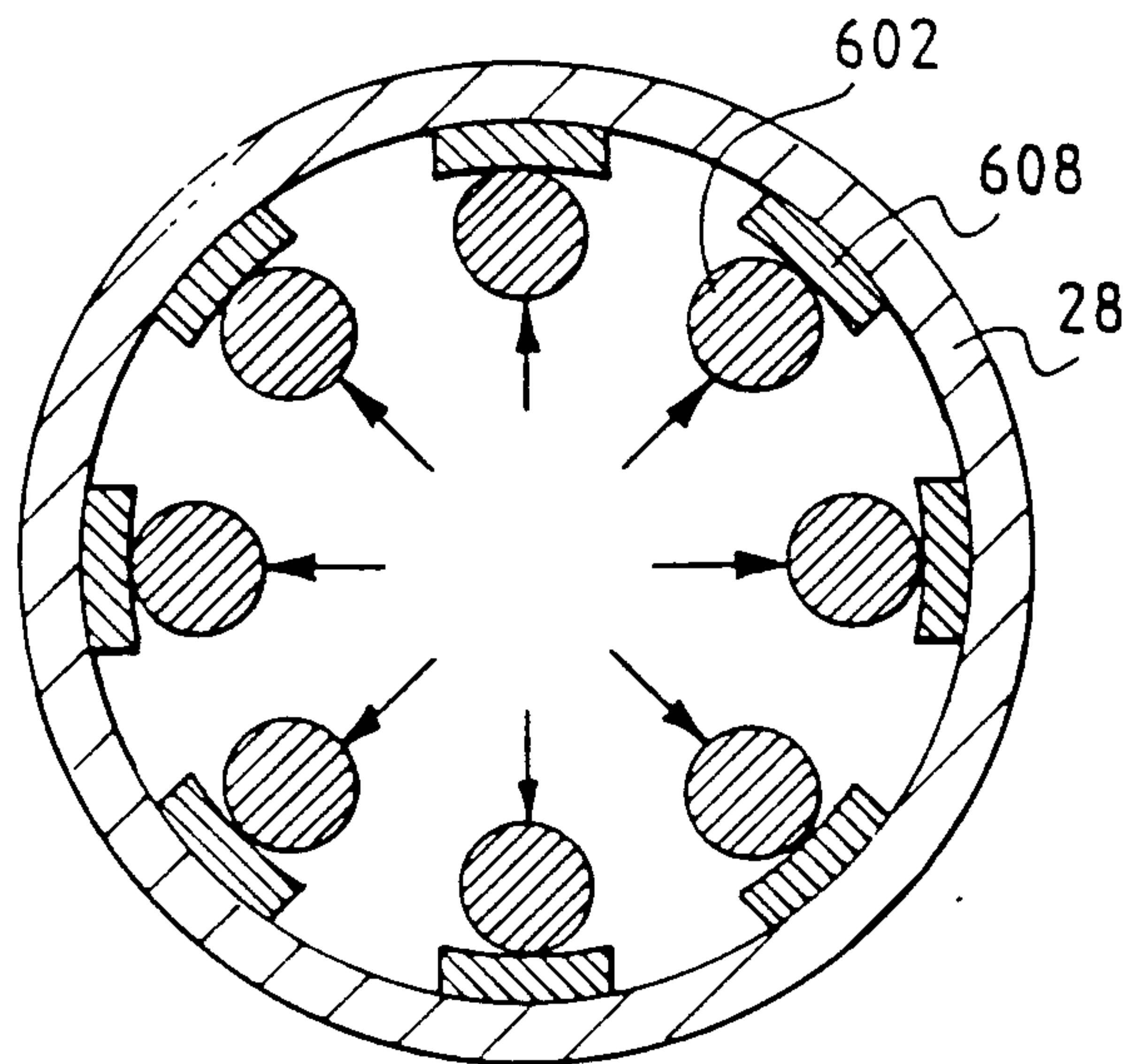


FIG. 32

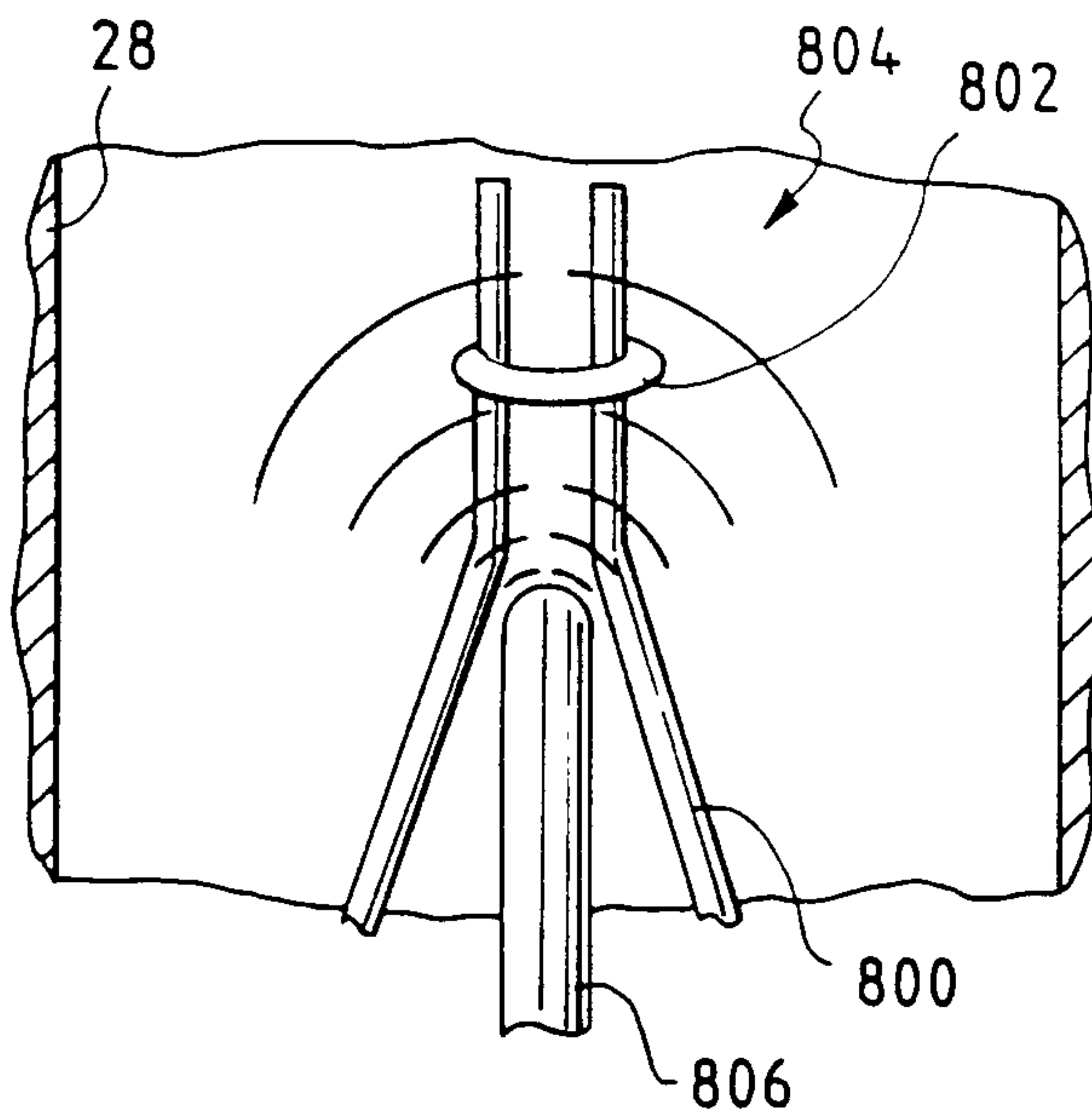
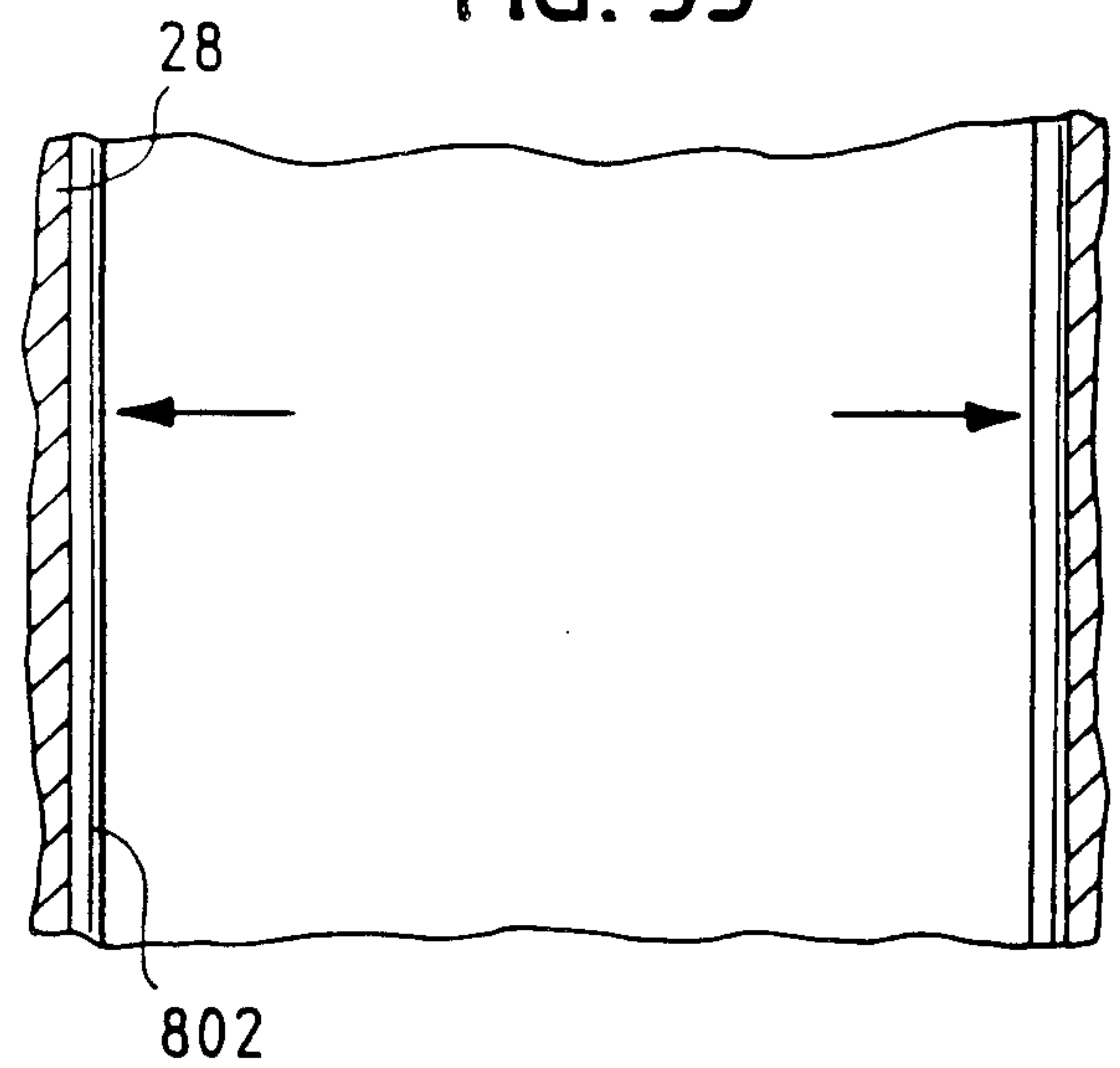
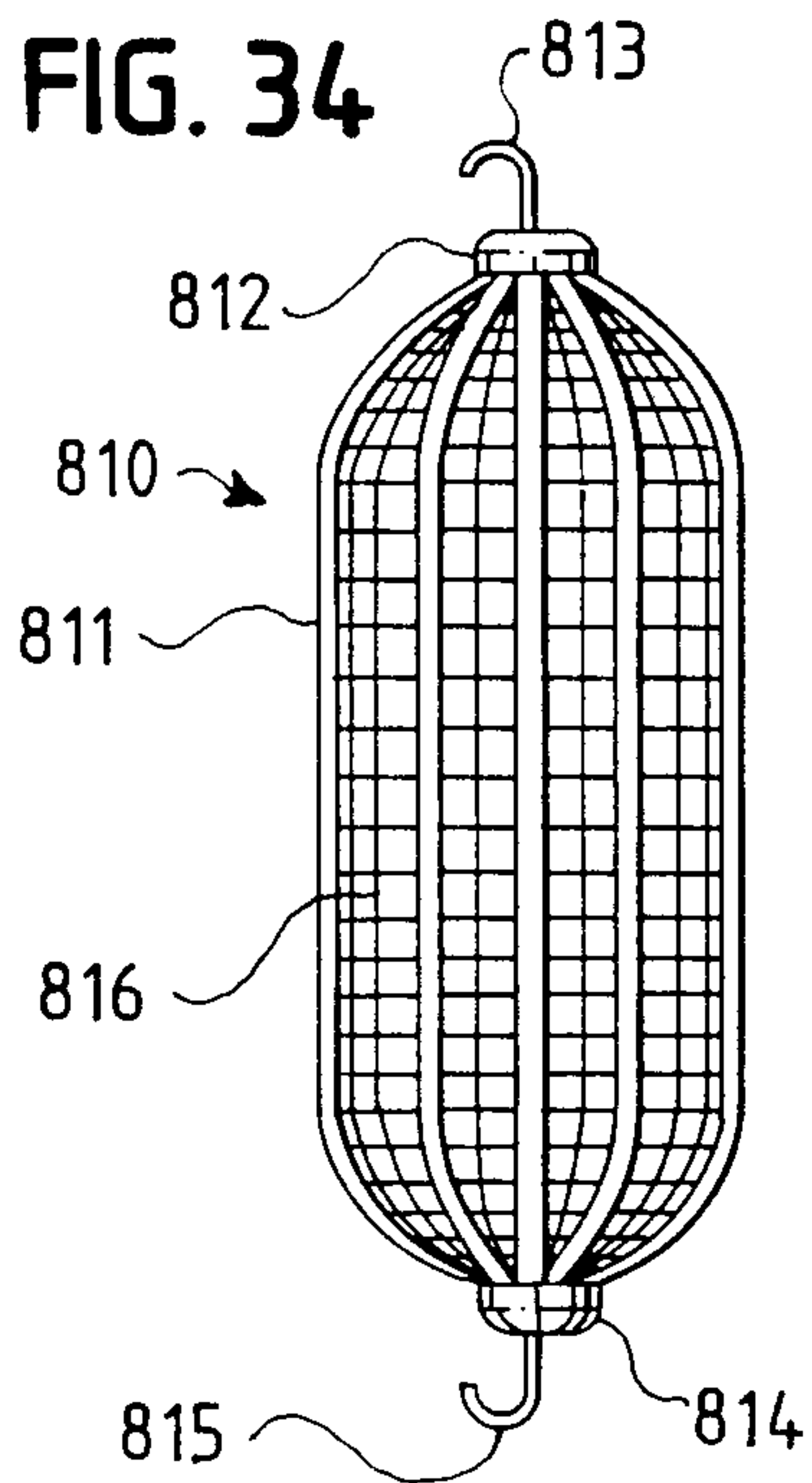
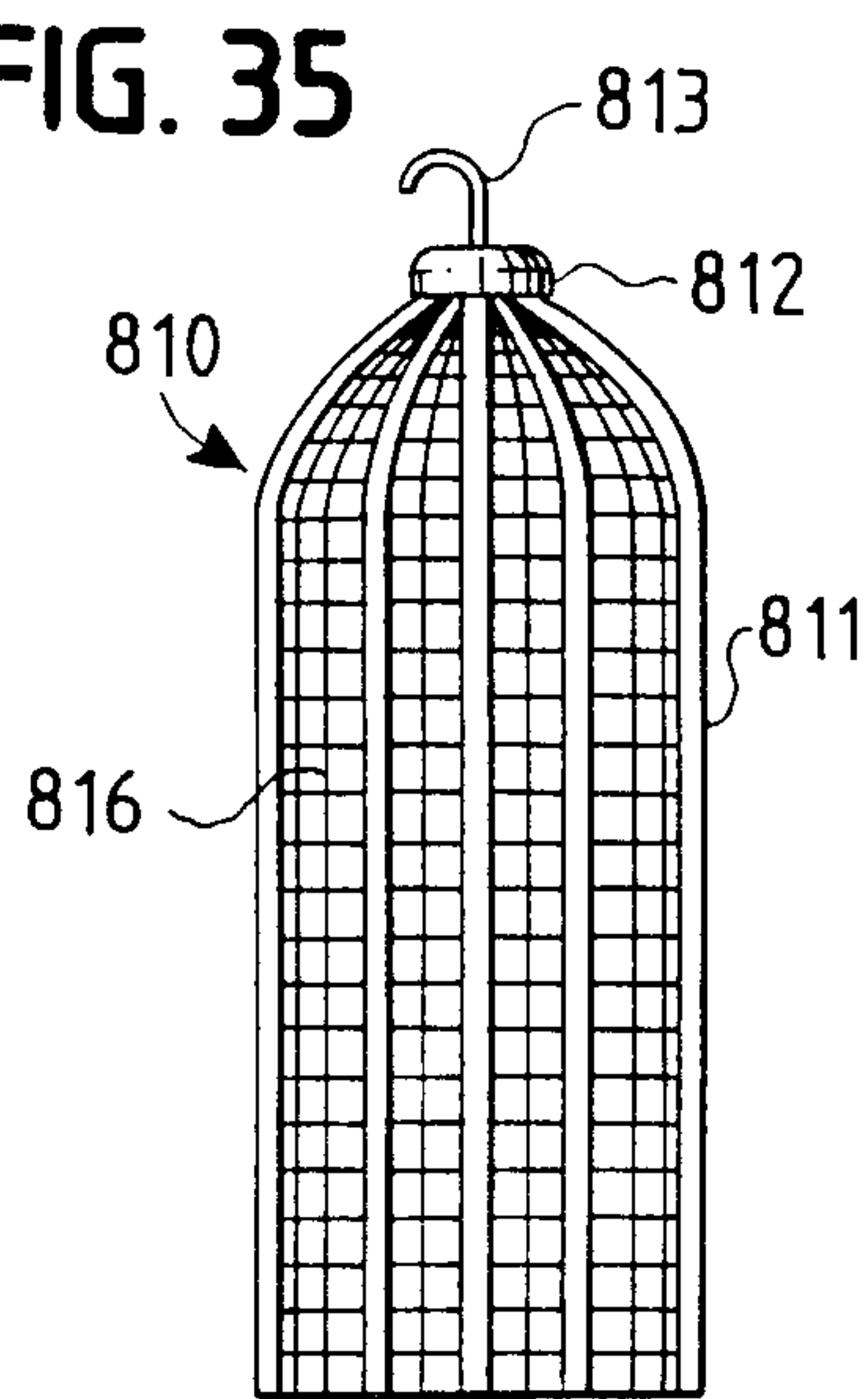
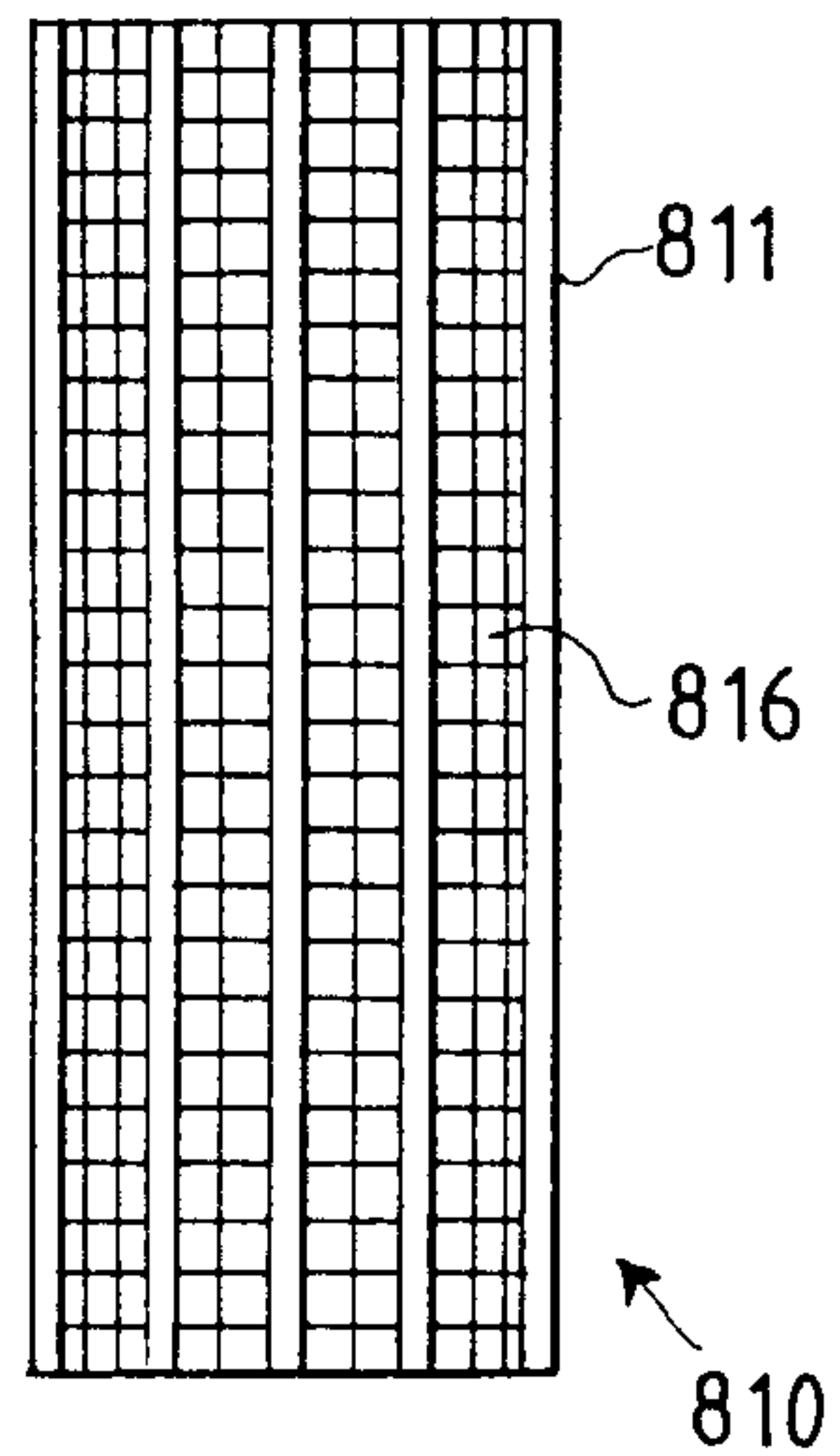
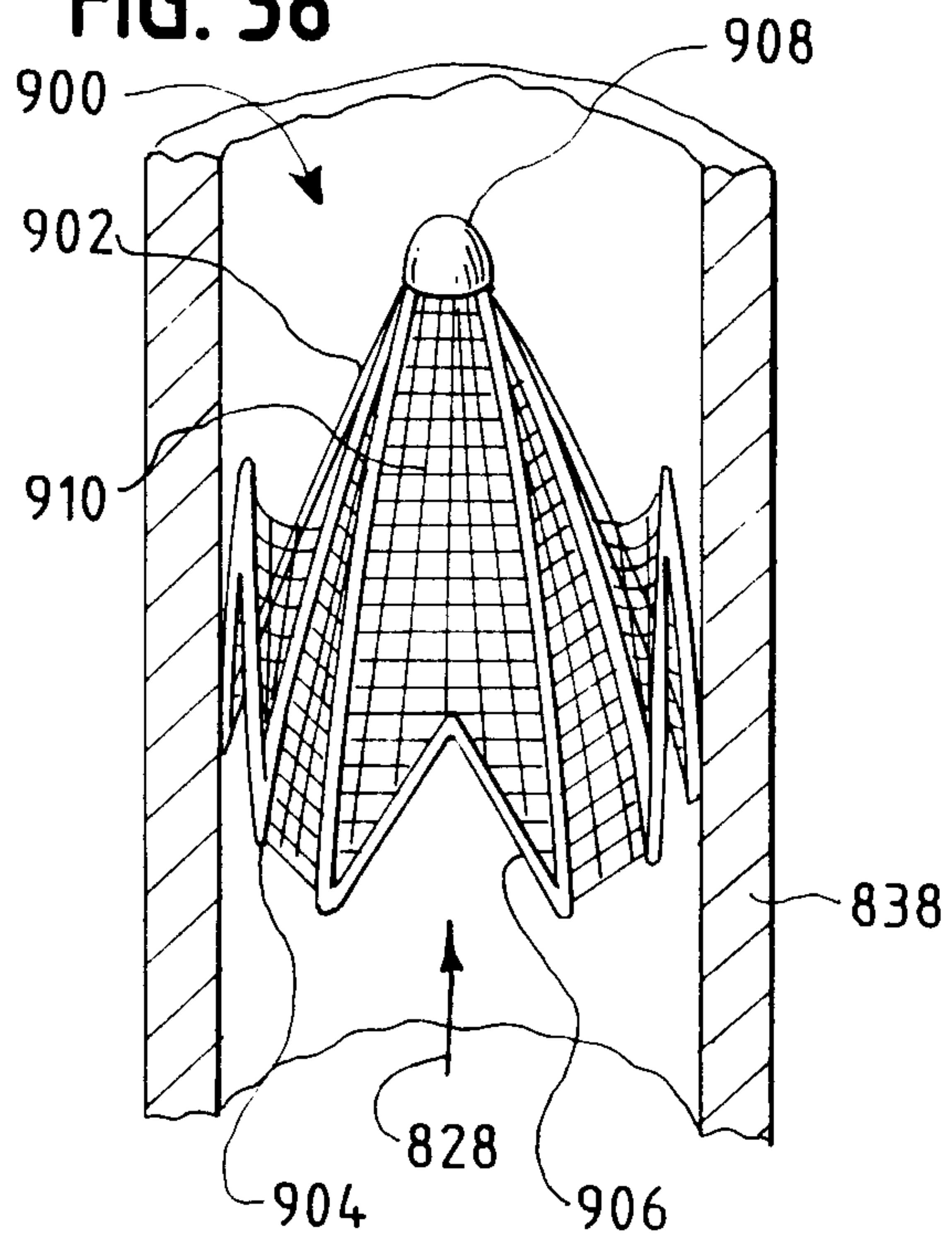
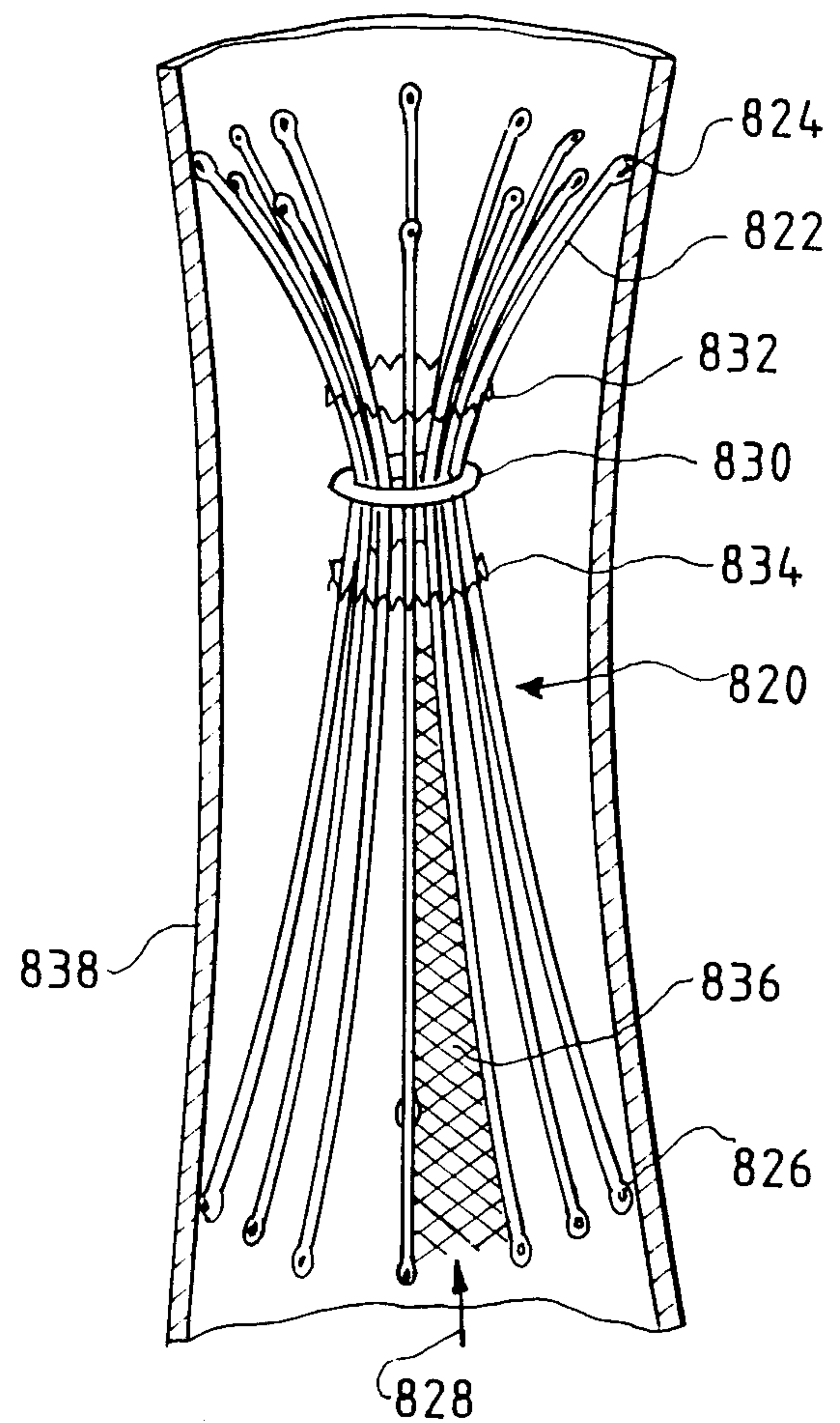
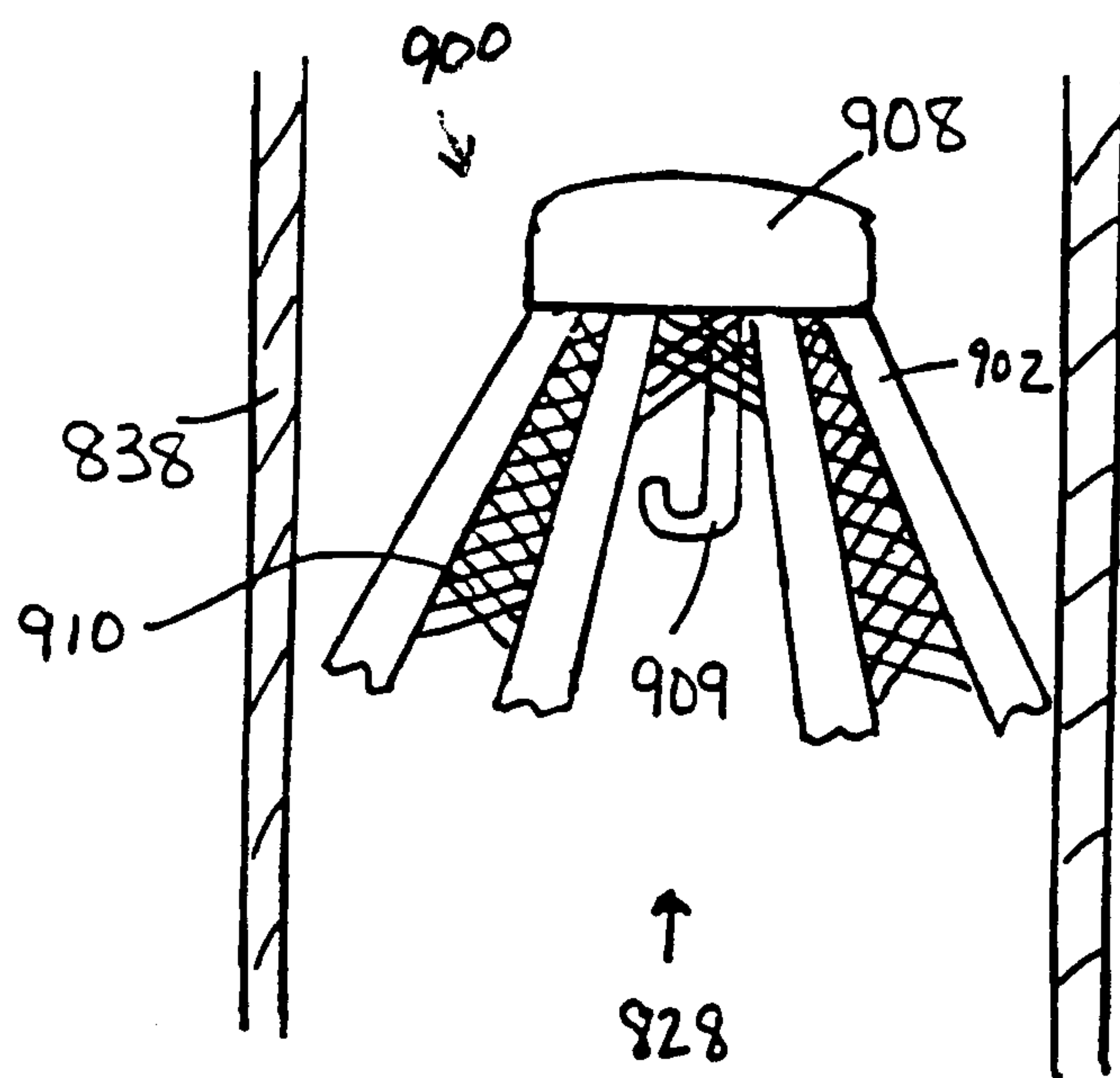
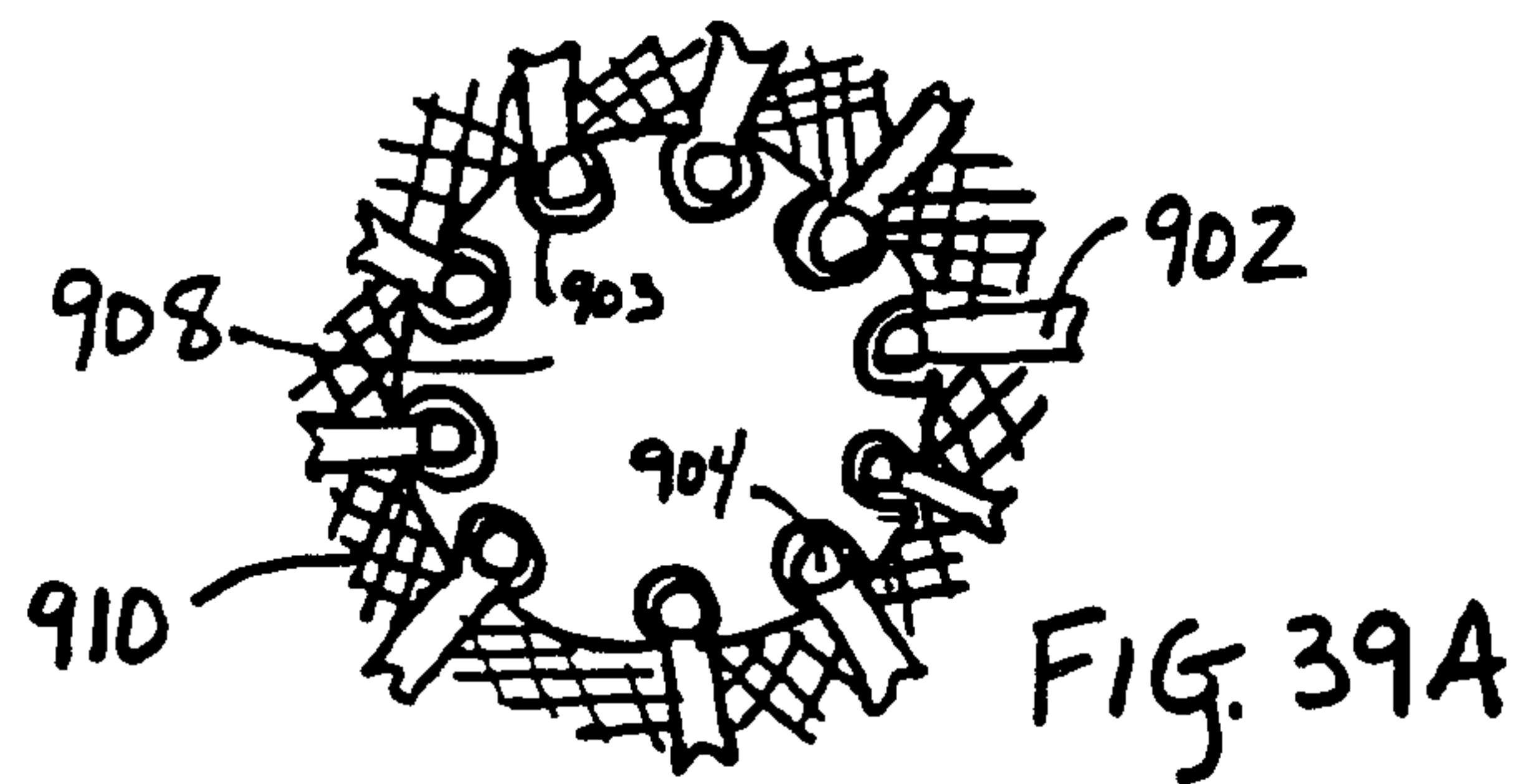
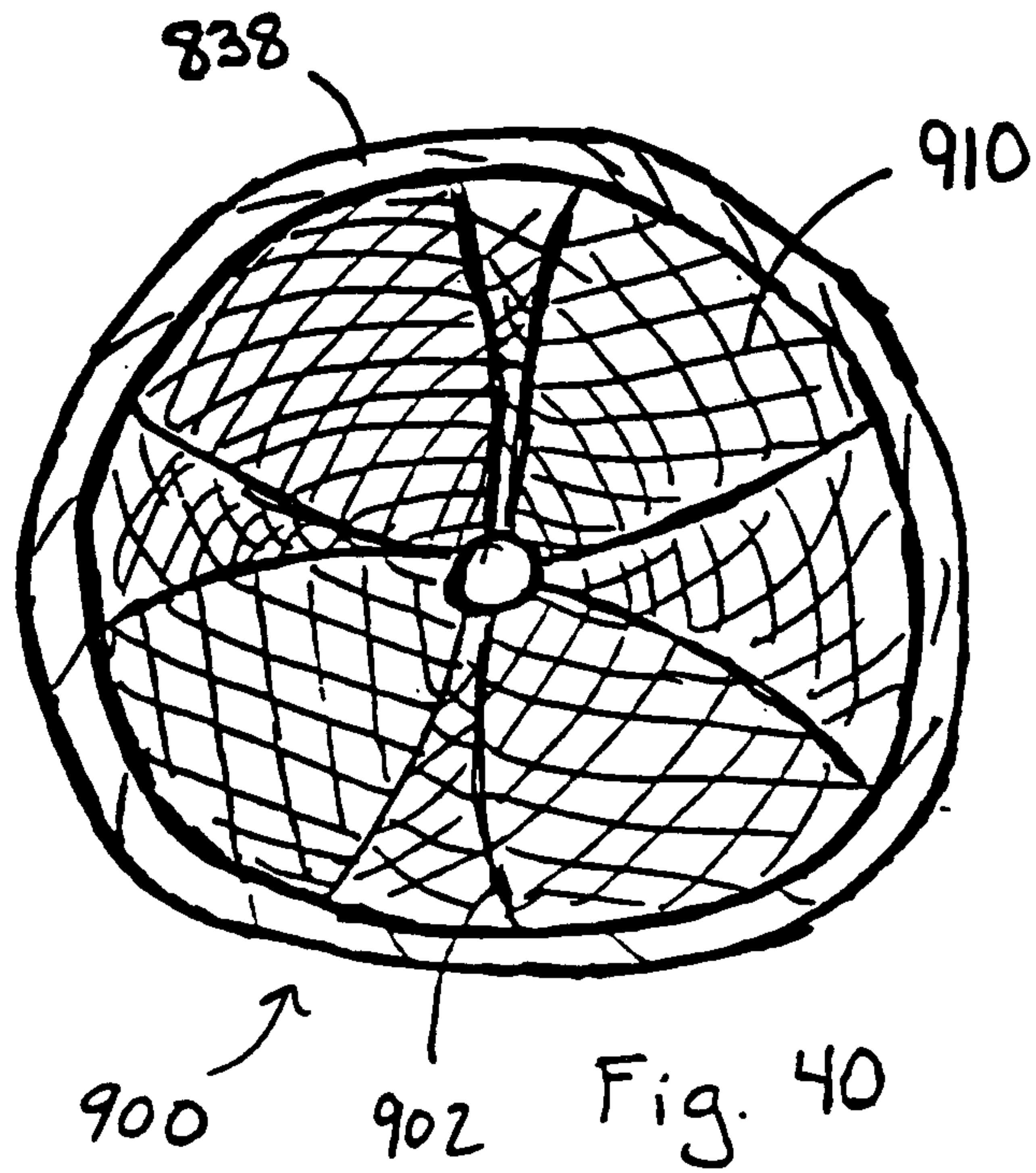


FIG. 33



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FIG. 34**FIG. 35****FIG. 36****FIG. 38****FIG. 37**



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FIG. 41

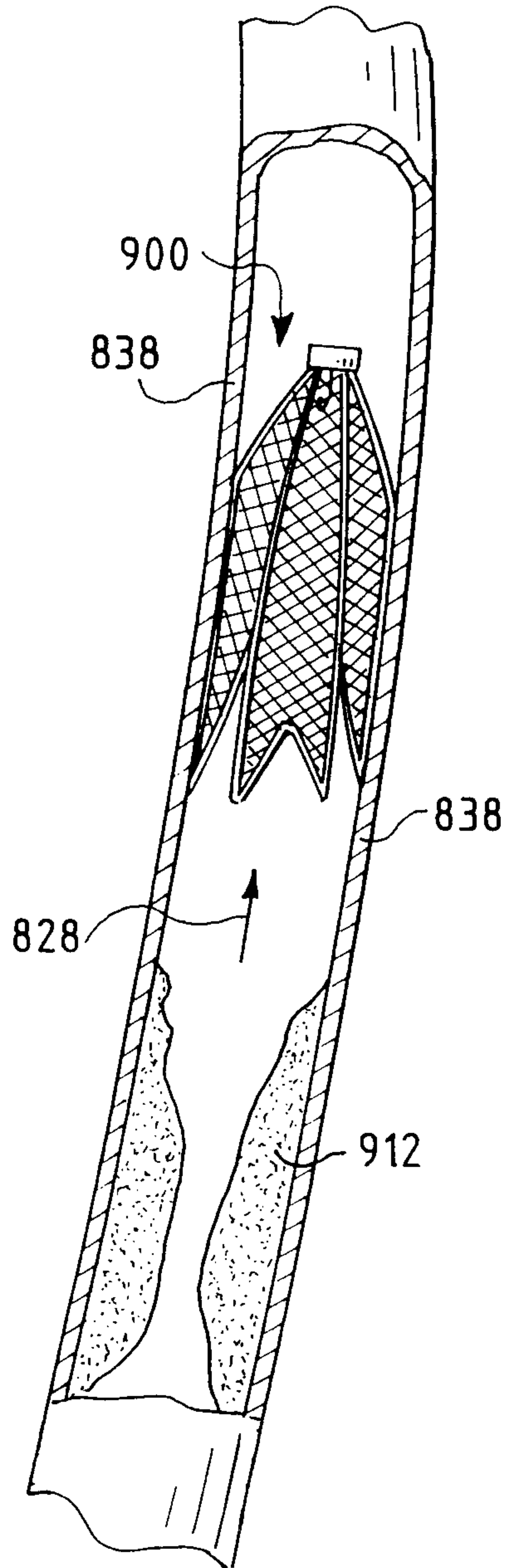
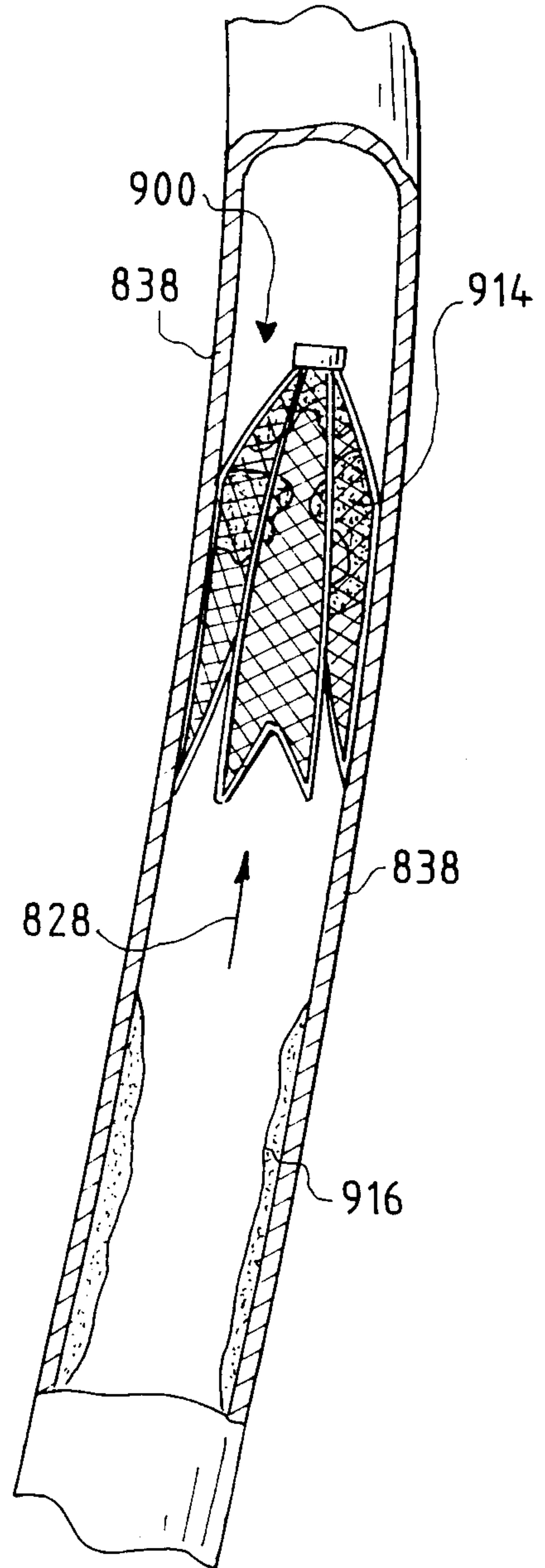


FIG. 42



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FIG. 43

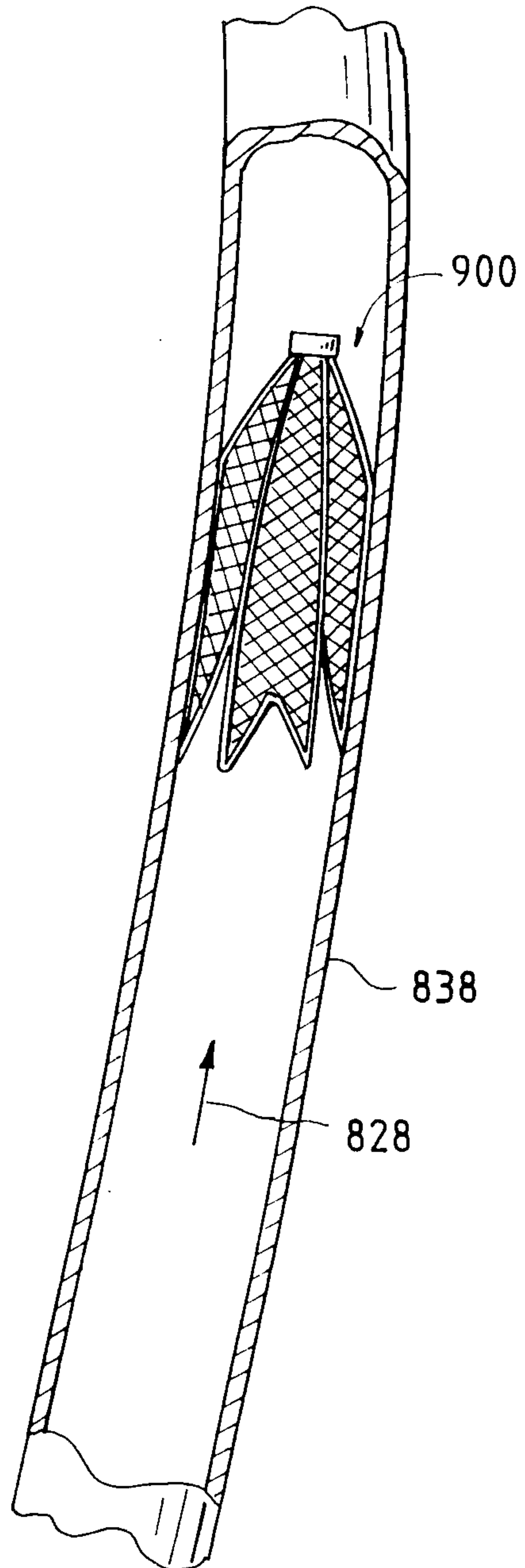


FIG. 44

