

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION**

HENGST SE,

Plaintiff,

v.

CHAMPION LABORATORIES, INC.,

Defendant.

Case No. 23-cv-00794

Judge Sara L. Ellis

Magistrate Judge Heather K. McShain

**CHAMPION LABORATORIES, INC.'s LPR 3.1(b) FINAL UNENFORCEABILITY
AND INVALIDITY CONTENTIONS**

Defendant Champion Laboratories, Inc. (“Champion”) submits the following Final Unenforceability and Invalidity Contentions (“Contentions”) pursuant to Local Patent Rule 3.1(b) and the agreed upon schedule in this case concerning Claims 15-17, 19, 23-25, and 28-30 of the U.S. Patent No. 9,023,203 (“’203 Patent” or “Patent-in-Suit”) (collectively, “Asserted Claims”), which Plaintiff Hengst SE’s (“Hengst”) assert in the above-captioned action.

Champion’s investigations in connection with this lawsuit are continuing. Champion’s Contentions are based on information currently known to it. In this action, fact discovery is ongoing, expert discovery has not yet begun, and no claim construction order has issued. Champion reserves the right to supplement these contentions as provided by the Northern District of Illinois Local Patent Rules, orders of this Court, or as is otherwise appropriate in the course of discovery. Further, Champion’s Contentions should not be interpreted as any admission or waiver of any particular claim construction. Champion will disclose any proposed claim constructions at the time required by the Court’s schedule.

Moreover, discovery is ongoing and Champion reserves the right to pursue all other defenses that may be available to it, including but not limited to defenses that the Patents-in-Suit are unenforceable based on laches, estoppel, waiver, acquiescence, patent exhaustion, unfair competition, unclean hands, express or implied license, or any other grounds.

Champion further reserves the right to supplement this contentions to the extent relevant information is learned via any third party discovery.

I. LOCAL PATENT RULE 3.1(b), 2.3(b) & (c)

Local Patent Rule 3.1(b) requires Champion to provide the information called for in Local Patent Rule 2.3 (b) and (c). This information is provided below and in the attached exhibits.

Local Patent Rule 2.3(b)(1)

Pursuant to Local Patent Rule 2.3(b)(1), Exhibit B includes a table that identifies prior art references that anticipate each asserted claim or render it obvious. Champion has limited the number of references in the contentions, but reserves the right to rely on additional references for the purpose of explaining the state of the art and scope and content of the prior art at the time of the invention.

Local Patent Rule 2.3(b)(2) and (3)

Pursuant to Local Patent Rule 2.3(b)(2) and (3), Exhibit C-1-C-4 includes charts that identify where specifically in each prior art reference each element of each asserted claim is found, and stating whether each prior art reference anticipates the asserted claim or renders it obvious, along with reasons to combine the references. In addition to the motivation stated within the charts, it would have been obvious to one of ordinary skill in the art to combine the references listed in the charts for one or more of the following reasons:

(A) Combining prior art elements according to known methods to yield predictable results;

(B) Simple substitution of one known element for another to obtain predictable results;

(C) Use of known technique to improve similar devices (methods, or products) in the same way;

(D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(E) “Obvious to try” – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

(F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;

(G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

Local Patent Rule 2.3(b)(4)

Pursuant to Local Patent Rule 2.3(b)(4), the following asserted claims of the Patent-in-Suit that are invalid pursuant to indefiniteness under 35 U.S.C. § 112(2)/112(b) or enablement or written description under 35 U.S.C. § 112(1)/112(a) for the reasons stated thereof.

Claim 15	Under Hengst’s apparent construction, claim 15 lacks essential matter including missing elements, steps, and necessary structural cooperative relationships of elements described by the applicant as necessary to practice the invention, including at least the “second positioning means.” For example, applicant considered both positioning means as well as the interaction/engagement between the two positioning means as essential to the invention. Yet, claim 15 only claims “a ring filter insert” and states that the second positioning means is “on the filter housing”—an element that Hengst appears to contend is not required by claim 15. Without the second positioning means, the claimed ring filter insert cannot be rotated and the blocking element cannot be moved into engagement with the eccentric opening. Thus, claim 15, under pre-AIA 35 U.S.C. 112, first paragraph, is not enabling. <i>See, e.g., In re Mayhew</i>, 527 F.2d 1229, (CCPA 1976).
Claim 15	Under Hengst’s apparent construction, claim 15 lacks essential matter including missing elements, steps, and necessary structural cooperative relationships of elements described by the applicant as necessary to practice the invention, including at least the “second positioning means.”

	For example, applicant considered both positioning means as well as the interaction/engagement between the two positioning means as essential to the invention. Yet, claim 15 only claims “a ring filter insert” and states that the second positioning means is “on the filter housing”—an element that Hengst appears to contend is not required by claim 15. Without the second positioning means, the claimed ring filter insert cannot be rotated and the blocking element cannot be moved into engagement with the eccentric opening. Thus, claim 15, under pre-AIA 35 U.S.C. 112, first paragraph, lacks an adequate written description and is invalid. <i>See, e.g., Gentry Gallery, Inc. v. Berkline Corp.</i>, 134 F.3d 1473 (Fed. Cir. 1998).
Claim 15	Under Hengst’s apparent construction, claim 15 lacks essential matter including missing elements, steps, and necessary structural cooperative relationships of elements described by the applicant as necessary to practice the invention, including at least the “second positioning means.” For example, applicant considered both positioning means as well as the interaction/engagement between the two positioning means as essential to the invention. Yet, claim 15 only claims “a ring filter insert” and states that the second positioning means is “on the filter housing”—an element that Hengst appears to contend is not required by claim 15. Without the second positioning means, the claimed ring filter insert cannot be rotated and the blocking element cannot be moved into engagement with the eccentric opening. Thus, claim 15, under pre-AIA 35 U.S.C. 112, second paragraph, is indefinite. <i>See, e.g., In re Venezia</i>, 530 F.2d 956 (CCPA 1976).
Claim 15	Under Hengst’s apparent construction, claim 15 lacks essential matter including missing elements, steps, and necessary structural cooperative relationships of elements described by the applicant as necessary to practice the invention, including at least the “second positioning means.” For example, applicant considered both positioning means as well as the interaction/engagement between the two positioning means as essential to the invention. Yet, claim 15 only claims “a ring filter insert” and states that the second positioning means is “on the filter housing”—an element that Hengst appears to contend is not required by claim 15. Without the second positioning means, the claimed ring filter insert cannot be rotated and the blocking element cannot be moved into engagement with the eccentric opening. Thus, claim 15, under pre-AIA 35 U.S.C. 112, second paragraph, fails to claim the subject matter that the applicant regards as the invention and is invalid. <i>See, e.g., In re Collier</i>, 397 F.2d 1003 (CCPA 1968).
Claim 24	The claim limitation “the lower front panel” is indefinite.

Local Patent Rule 2.3(c)

Pursuant to Local Patent Rule 2.3(c), Champion reserves the right to identify grounds for unenforceability of the asserted patents after receiving discovery from Hengst.

Date: January 16, 2024

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on the 16th day of January, 2024, I electronically served the foregoing document on all counsel of record for the parties in this matter via email at the below email addresses:

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EXHIBIT B - List of Invalidating Prior Art

Prior Art Publications for U.S. Patent No. 9,023,203				
Prior Art	Country	Date of Filing	Date of Issue/Publication	Inventors/Owner
Audi Engine Oil Filter System	United States		No later than 2006	MAHLE & Audi
Kenmore Coldspot Refrigerator Water Filter System	United States		No later than 2000	Kenmore & HDX
US20120261326	United States	August 31, 2010	October 18, 2012	Deschamps, et al.
DE102009049868	Germany	October 20, 2009	April 21, 2011	Deschamps, et al.
DE102007062102	Germany	December 21, 2007	June 25, 2009	Grass, et al.
DE9215351	Germany	November 11, 1992	December 24, 1992	
EP1555058	European Patent	January 5, 2005	July 20, 2005	Fremont
EP1714688	European Patent	April 11, 2006	January 2, 2008	Brisson
JP2004136203	Japan	October 17, 2002	May 13, 2004	Yokoyama, et al.
US20040232063	United States	May 21, 2003	November 25, 2004	Cline, et al.
US20060054547	United States	September 13, 2004	March 16, 2006	Richmond, et al.
US20060219621	United States	February 15, 2006	October 5, 2006	Dworatzek
US20070000830	United States	June 30, 2005	January 4, 2007	Snider, et al.
US20080053886	United States	September 6, 2006	March 6, 2008	Marshall, et al.
US20080245719	United States	June 16, 2008	October 9, 2008	Bread, et al.
US20080277327	United States	May 9, 2007	November 13, 2008	Hersey, et al.
US6554139	United States	June 1, 2000	April 29, 2003	Maxwell, et al.
US7022228	United States	August 2, 2002	April 4, 2006	Hennes, et al.
WO2008134494	WIPO (PCT)	April 25, 2008	November 6, 2008	Honermann, et al.

The Audi Engine Oil Filter System (“Audi System”) is implemented in vehicles including at least 2007-2011 4.2L V8 A/T Quattro Audi A6, 2006-2012 4.2L V8 A/T Quattro Audi A8 and A8L, and 2007-2009 4.2L V8 A/T Premium Audi Q7, and was in public use, on sale, sold, known in this country, or otherwise available to the public since at least 2006 – before the priority date of the asserted claims of the U.S. Patent No. 9,023,203 (the “’203 patent”). On information and belief, at least the following documents, or the documents referenced therein, describe the functionality of Audi System:

- Audi Engine Oil Filter Element Part Number: 079198405E
- Audi Engine Oil Filter Housing Part Number: 079115401AA
- MAHLE OX 350/4D ECO Oil Filter

The Kenmore Coldspot Refrigerator Water Filter System (“Kenmore System”) is implemented in at least the 1999 model of Kenmore Coldspot Refrigerator with model number 59502990. On information and belief, at least the following documents, or the documents referenced therein, describe the functionality of Kenmore System:

- 1999 Kenmore Coldspot Refrigerator model 59502990
- HDX water filter model FMW-2

**Exhibit C-1 – Invalidity of U.S. Patent No. 9,023,203 Based on
U.S. Patent Application Publication No. 20120261326 to Deschamps et al. (“Deschamps”)**

U.S. Patent Application Publication No. 20120261326 to Deschamps et al. (“Deschamps”) was filed on August 31, 2010 and published on October 18, 2012 and claims priority to German Patent Applications 102009049868.0 filed on October 20, 2009 and PCT/EP2010/062684 filed on August 31, 2010. Accordingly, Deschamps invalidates the asserted claims of the ’203 patent under at least pre-AIA 35 U.S.C. § 102.

To the extent Plaintiff alleges that Deschamps does not disclose any particular limitation, either expressly or inherently, it would have been obvious to a person of ordinary skill in the art as of the priority date of the ’203 Patent to modify Deschamps and/or to combine the teachings of Deschamps with other prior art references, including but not limited to the present prior art references found in Exhibits C-1-C-4 and the corresponding section(s) of charts for other prior art references for the ’203 Patent in a manner that would have rendered the Asserted Claims invalid as obvious.

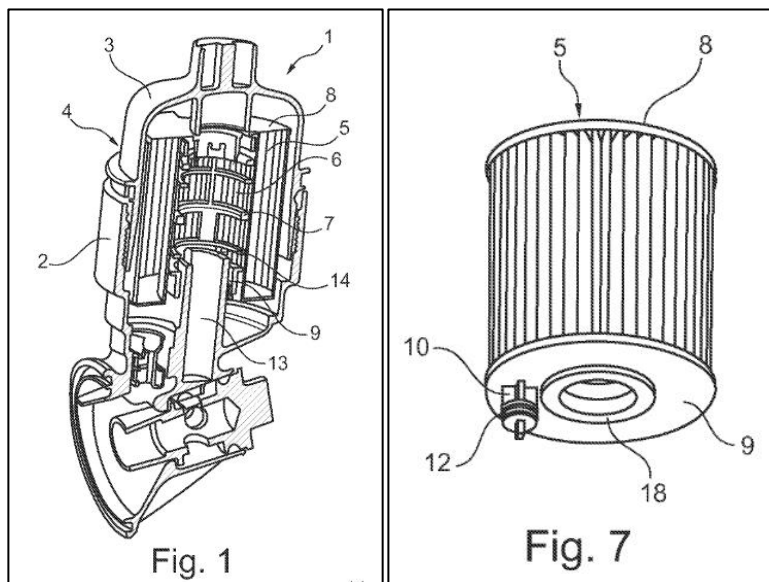
The use of claim terms in the below chart is based on Hengst’s construction of claim terms in its infringement contentions as understood by Champion, as well as the plain and ordinary meaning of the claim terms. This chart should not be construed as consenting to or agreeing with Hengst’s construction of claim terms. Because discovery is ongoing and the claims have not yet been construed, Champion reserves all rights to amend its invalidity contentions based on discovery or on the Court’s constructions.

The citations to portions of any reference in this chart are exemplary only. For example, a citation that refers to or discusses a figure or figure item should be understood to also incorporate by reference that figure and any additional descriptions of that figure as if set forth fully therein. Champion reserves the right to rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid. Citations presented for one claim limitation are expressly incorporated by reference into all other limitations for that claim as well as all limitations of all claims on which that claim depends. Champion also reserves the right to rely on additional citations or sources of evidence that also may be applicable, or that may become applicable in light of claim construction, changes in Plaintiff’s infringement contentions, and/or information obtained during discovery as the case progresses.

Claim Element	Exemplary Disclosures
Claim 15	
[15.pre] A hollow-cylindrical filter material body surrounded on front sides by top and bottom front panels and which can be replaceably arranged in a filter housing,	To the extent it is a limitation, Deschamps discloses a hollow-cylindrical filter material body surrounded on front sides by top and bottom front panels and which can be replaceably arranged in a filter housing. <i>See, e.g.,</i> Deschamps at [0033]:

According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel.

Deschamps at Figs. 1, 7:



For example, Deschamps discloses a hollow-cylindrical filter material body (5) surrounded on front sides by top (8) and bottom (9) front panels and which can be replaceably arranged in a filter housing (4) (see figure 1 showing filter housing).

[15.a] an eccentric blocking element arranged on the bottom front panel for engaging an eccentric opening in the filter housing,

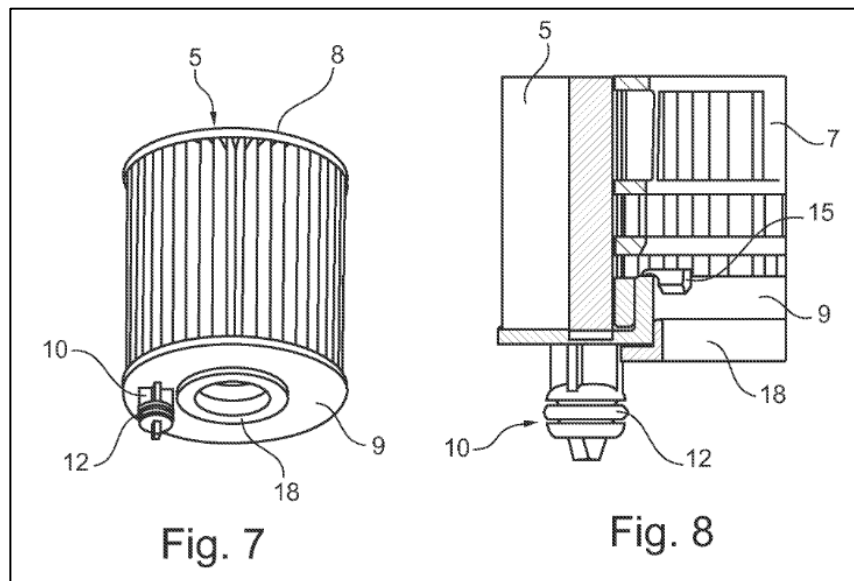
Deschamps discloses an eccentric blocking element arranged on the bottom front panel for engaging an eccentric opening in the filter housing.

See, e.g.,

Deschamps at [0033]:

According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel.

Deschamps at Figs. 7-8, 19:



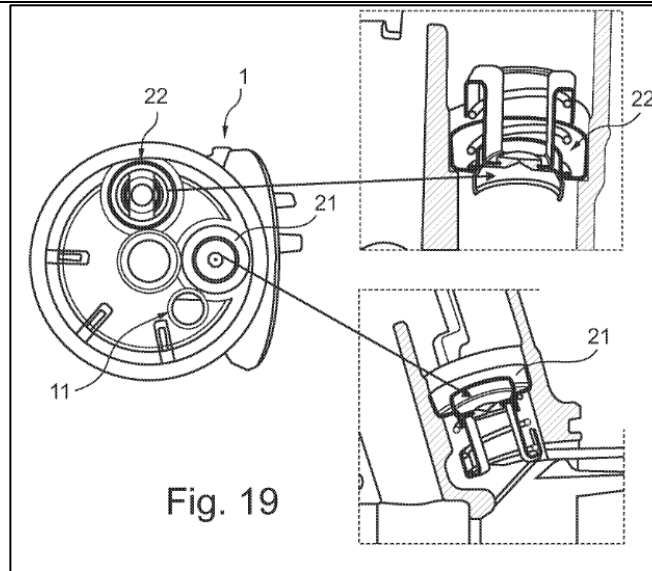


Fig. 19

As one example, Deschamps discloses an eccentric blocking element (10) arranged on the bottom front panel (9) for engaging an eccentric opening (11) in the filter housing (4).

[15.b] first positioning means on the ring filter insert, which interact with second positioning means on the filter housing when the ring filter insert is inserted into the filter housing and which are arranged to bring the blocking element into engagement with the eccentric opening,

Deschamps discloses first positioning means on the ring filter insert, which interact with second positioning means on the filter housing when the ring filter insert is inserted into the filter housing and which are arranged to bring the blocking element into engagement with the eccentric opening.

See, e.g.,

Deschamps at [0033] – [0036]:

According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely

assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel.

Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 2-3, 4-5, 17:

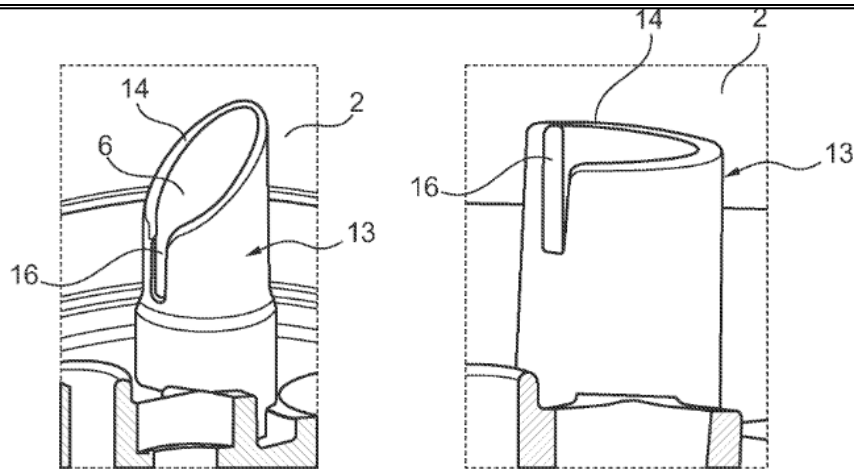


Fig. 2

Fig. 3

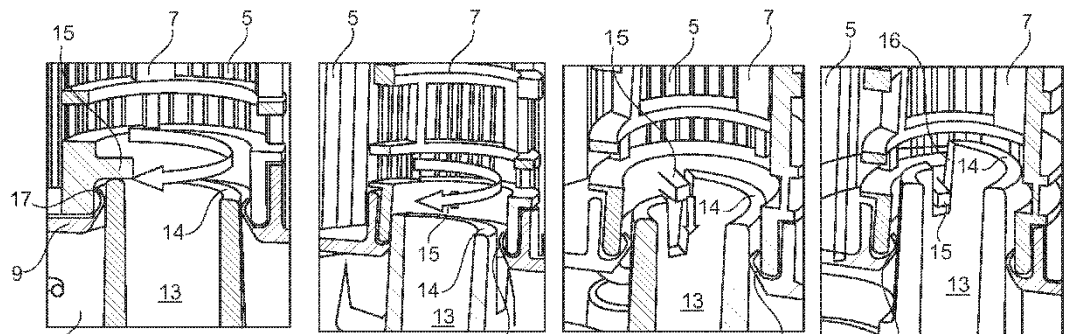


Fig. 4

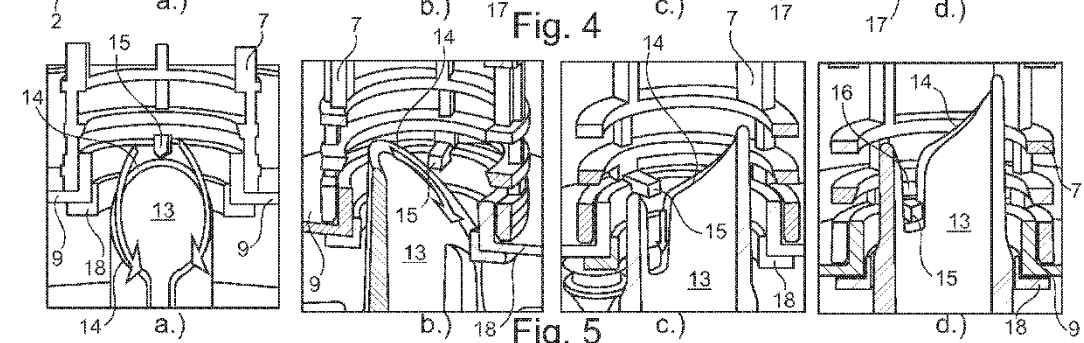
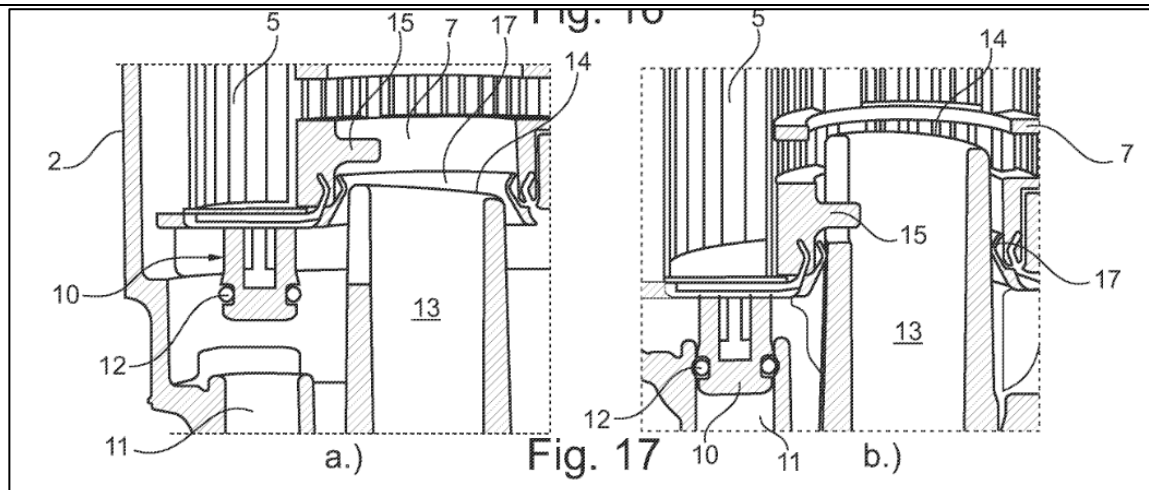


Fig. 5



As one example, Deschamps discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: first positioning means (15) on the ring filter insert (5), which interact with second positioning means (13, 14, 16) on the filter housing (13, 2) when the ring filter insert (5) is inserted into the filter housing (2) and which are arranged to bring the blocking element (10) into engagement with the eccentric opening (11).

[15.c] the first positioning means being one of an inclined plane and a protruding nose, with the second positioning means being the other of the inclined plane and the protruding nose,

Deschamps discloses the first positioning means being one of an inclined plane and a protruding nose, with the second positioning means being the other of the inclined plane and the protruding nose.

Based on Hengst's construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

See, e.g.,

Deschamps at [0033] – [0036]:

According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2

and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel.

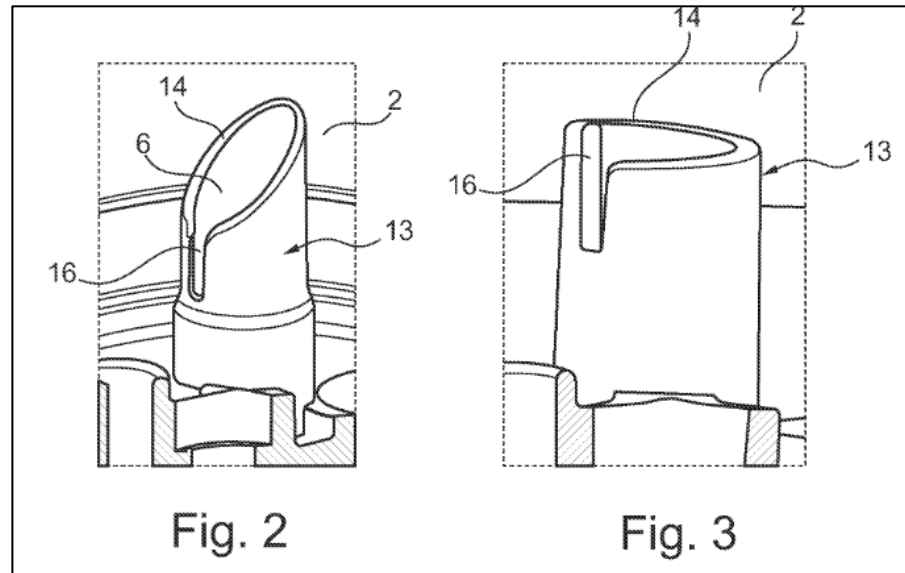
Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for

example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 2-3, 4-5, 17:



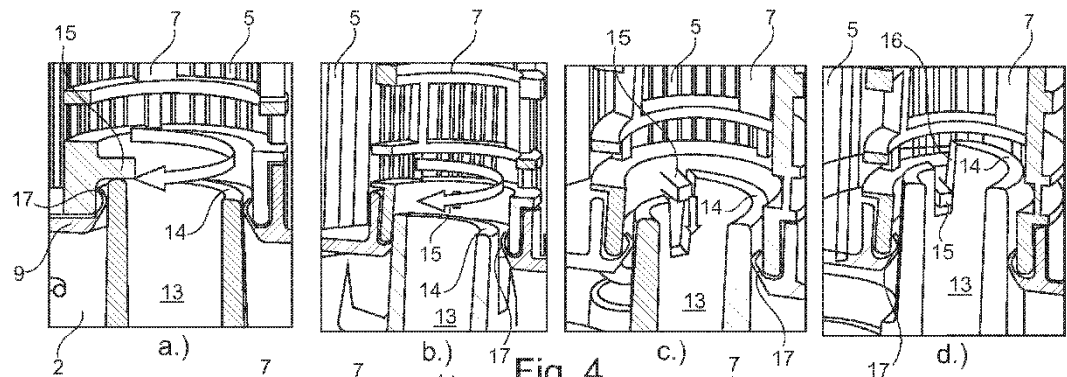


Fig. 4

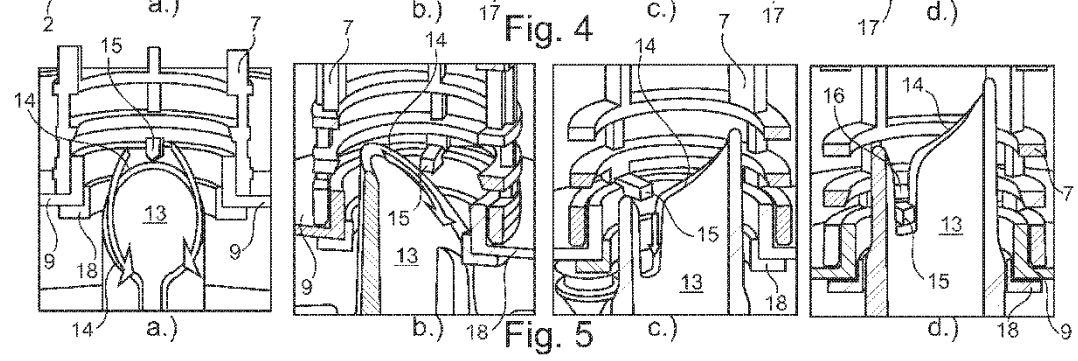


Fig. 5

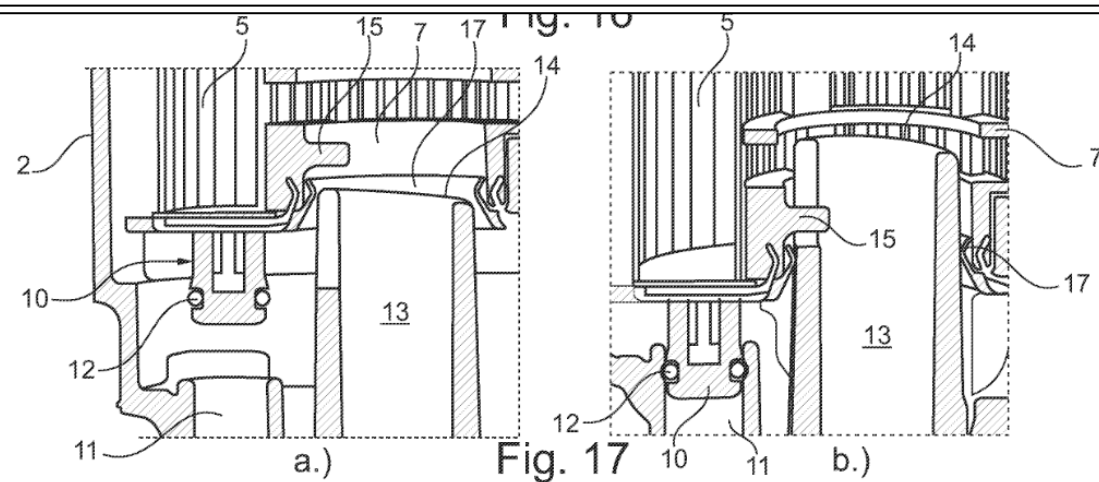


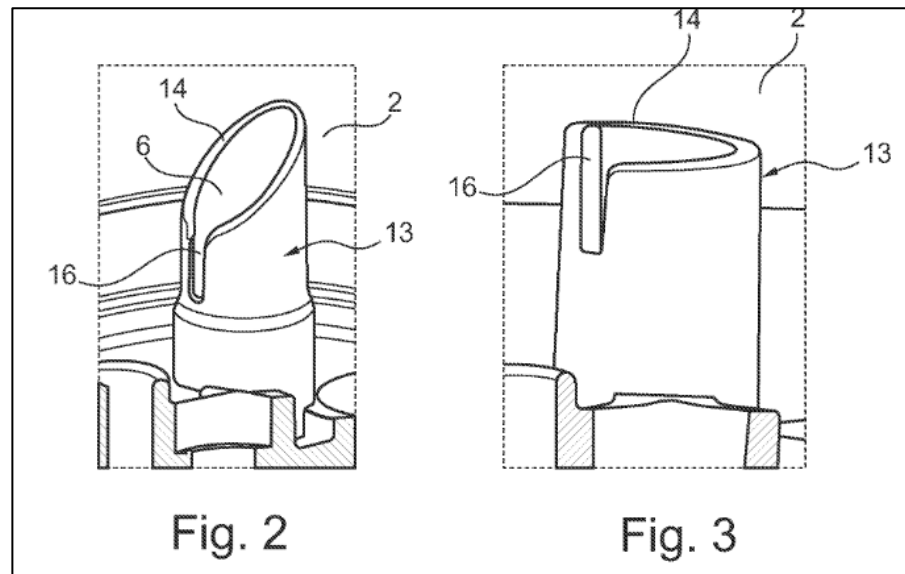
Fig. 17

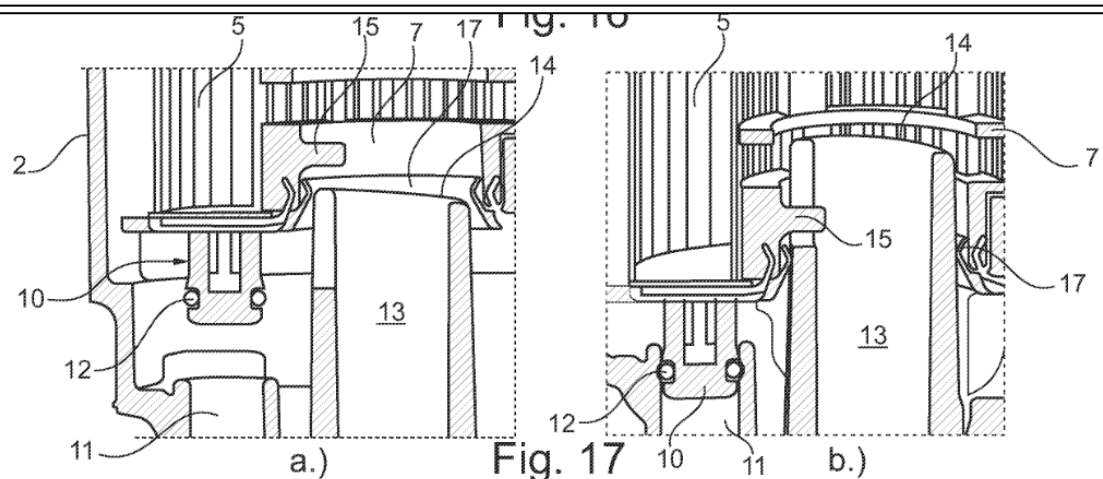
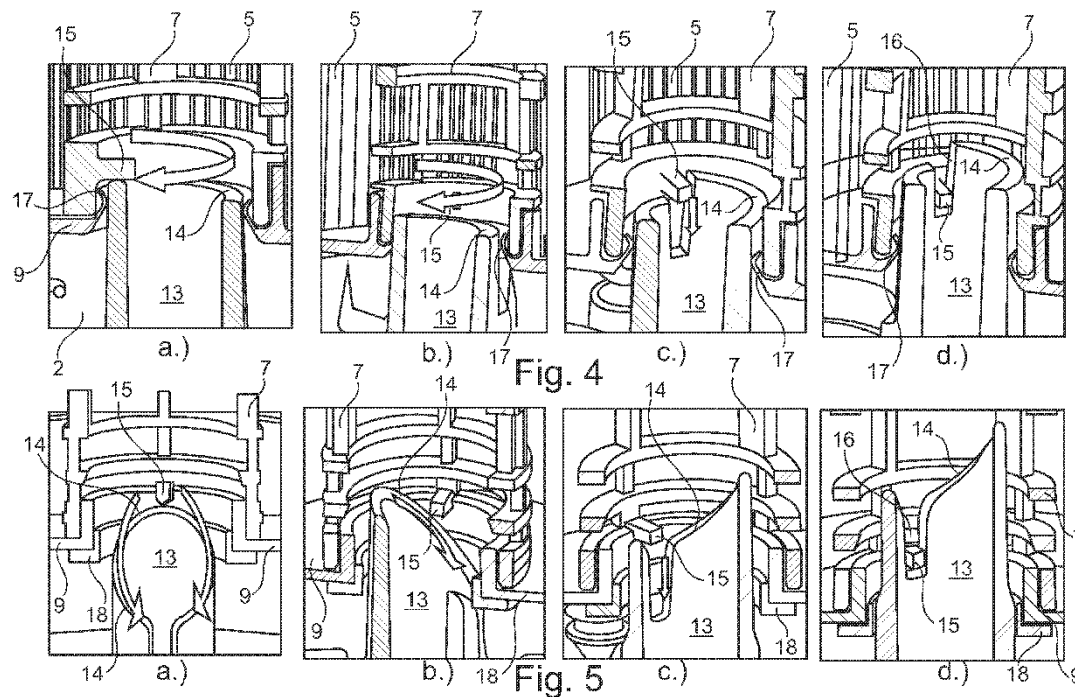
	As one example, Deschamps discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: the first positioning means being a protruding nose (15), with the second positioning means being an inclined plane (14).
[15.d] the inclined plane and the nose arranged to be moved in relation to each other in such a way that they slide along each other and bring the blocking element into engagement with the eccentric opening, by rotating the ring filter insert relative to the filter housing,	Deschamps discloses the inclined plane and the nose arranged to be moved in relation to each other in such a way that they slide along each other and bring the blocking element into engagement with the eccentric opening, by rotating the ring filter insert relative to the filter housing. <i>See, e.g.,</i> Deschamps at [0033] – [0036]: According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel. Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 2-3, 4-5, 17:





For example, Deschamps discloses the inclined plane (14) and the nose (15) arranged to be moved in relation to each other in such a way that they slide along each other (see Deschamps

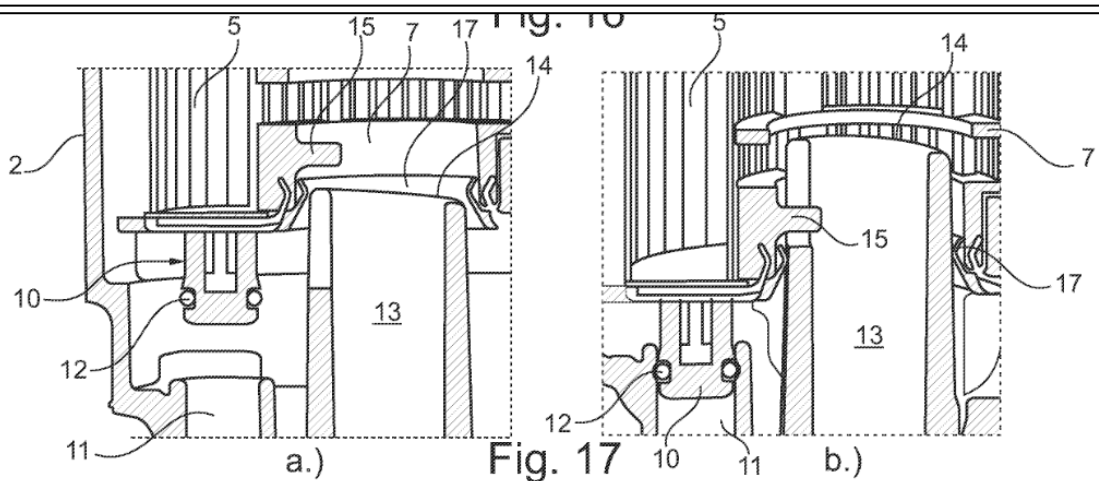
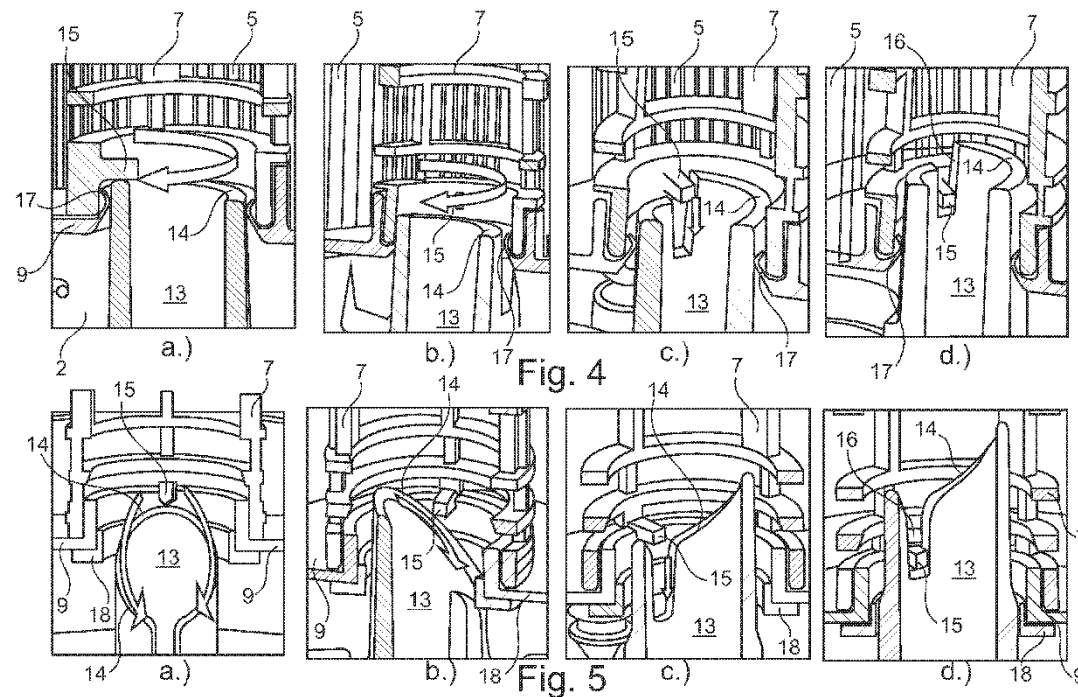
	figs. 4-5, showing the inclined plane and the nose sliding along each other) and bring the blocking element (10) into engagement with the eccentric opening (11), by rotating the ring filter insert relative to the filter housing.
[15.e] the first positioning means being one of embodied and arranged on an inner circumference of the ring filter insert.	Deschamps discloses the first positioning means being one of embodied and arranged on an inner circumference of the ring filter insert. Based on Hengst's construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below. <i>See, e.g.,</i> Deschamps at [0033] – [0036]: According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel. Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in

such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 4-5, 17:



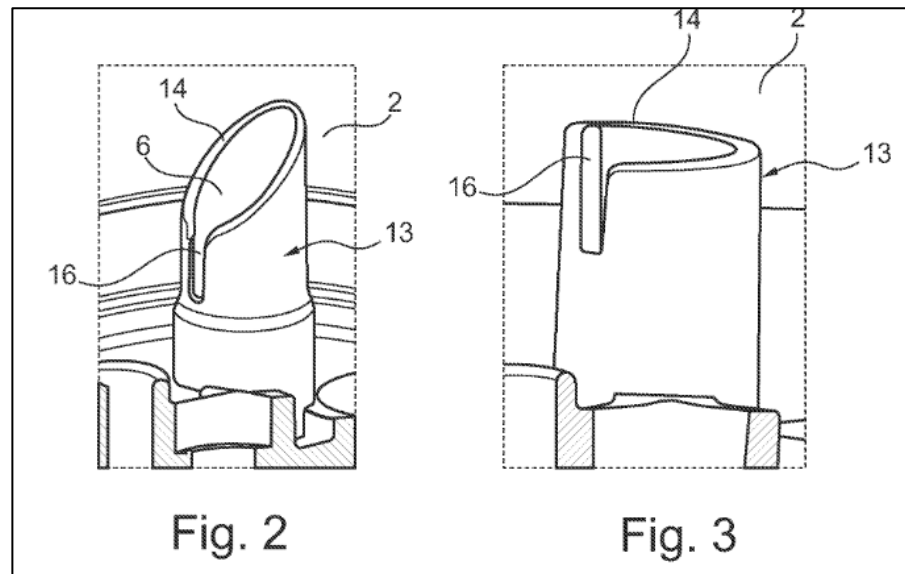
As one example, Deschamps discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to:

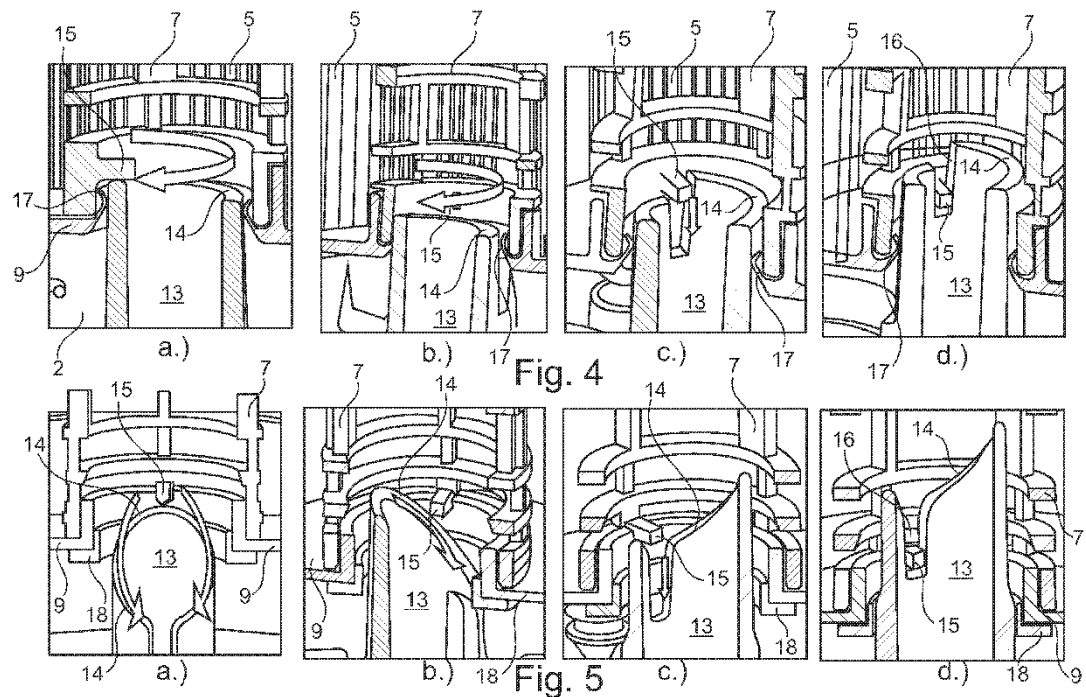
	the first positioning means being a protruding nose (15) and arranged on an inner circumference (7) of the ring filter insert (5).
Claim 16	
[16] The ring filter insert according to claim 15, wherein the inclined plane is formed by two partial planes which run towards each other in opposite directions and which in each case extend across half of an inner circumference of the ring filter insert.	Deschamps discloses the inclined plane is formed by two partial planes which run towards each other in opposite directions and which in each case extend across half of an inner circumference of the ring filter insert. <i>See, e.g.,</i> Deschamps at [0033] – [0036]: According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel. Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 2-3, 4-5:





As one example, Deschamps discloses that inclined plane (14) is formed by two partial planes which run towards each other in opposite directions (see figs. 2, 5) and which in each case extend across half of an inner circumference of the ring filter insert (5).

Claim 17

[17] The ring filter insert according to claim 15, including a guide for the nose which runs in an axial direction and is connected to a lower end of the inclined plane.

Deschamps discloses a guide for the nose which runs in an axial direction and is connected to a lower end of the inclined plane.

See, e.g.,

Deschamps at [0033] – [0036]:

According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing

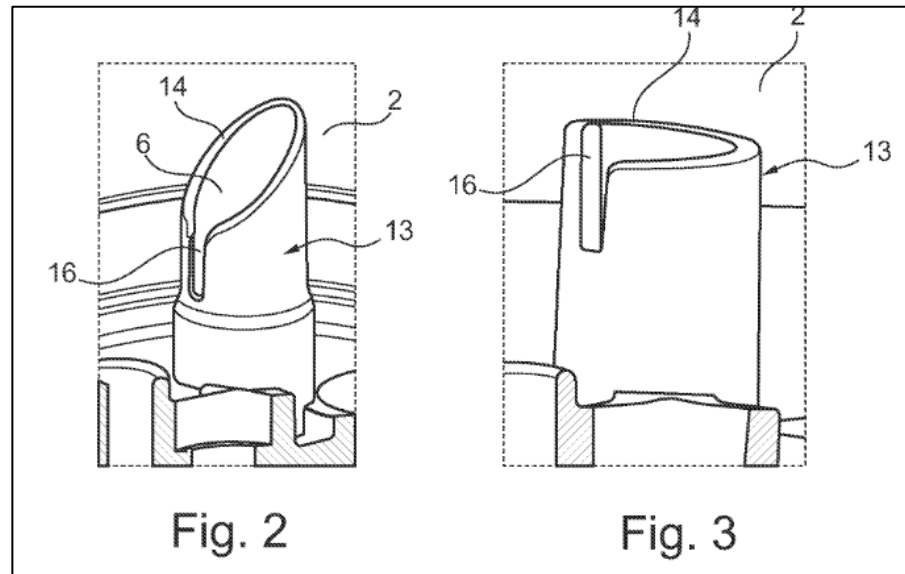
4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel.

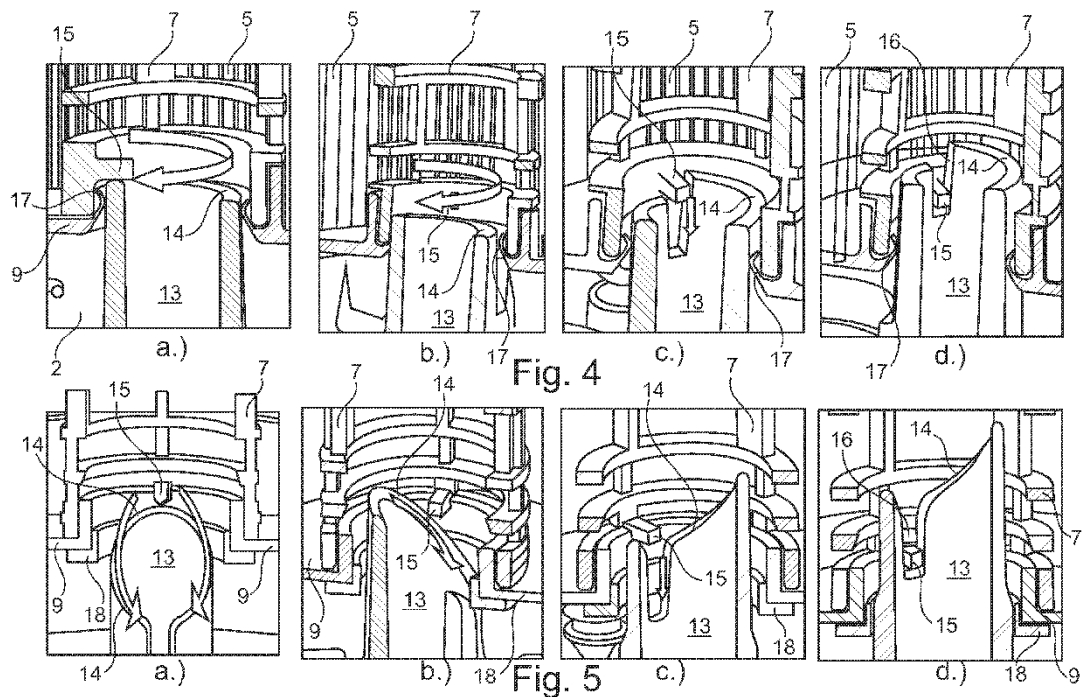
Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 2-3, 4-5:





For example, Deschamps discloses a guide (16) for the nose (15) which runs in an axial direction and is connected to a lower end of the inclined plane (14).

Claim 19

[19] The ring filter insert according to claim 15, wherein the inclined plane is formed by one of a radially protruding rib and step which forms a contact surface for the nose on one of an upper or lower side thereof.

Deschamps discloses the inclined plane is formed by one of a radially protruding rib and step which forms a contact surface for the nose on one of an upper or lower side thereof.

See, e.g.,

Deschamps at [0033] – [0036]:

According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a

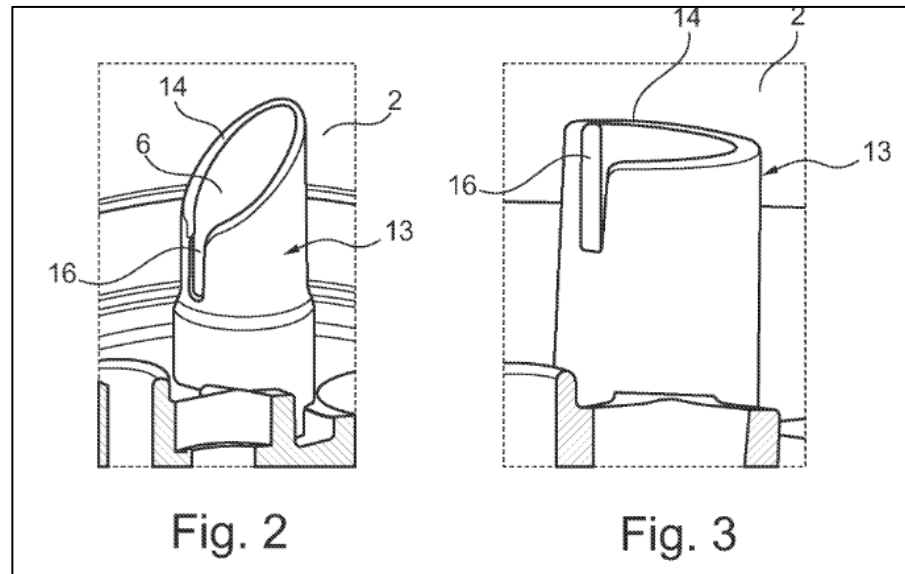
support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel.

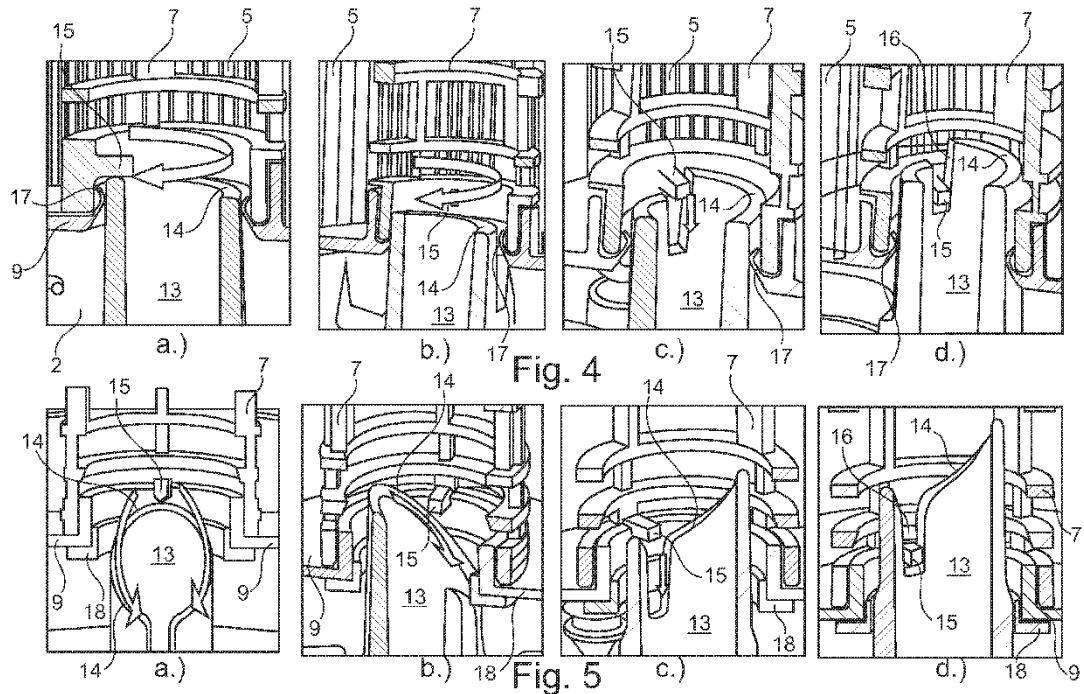
Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 2-3, 4-5:





Further, the subject matter of claim 19 as a whole would have been obvious in light of Deschamps and the general background knowledge of the POSA. The POSA would have understood that implementing the inclined planes of Deschamps by forming one of a radially protruding rib and step which forms a contact surface for the nose on one of an upper or lower side thereof was a simple design option and choice for implementing the inclines planes.

Claim 23

[23] The ring filter insert according to claim 15, wherein the nose is formed integrally with the bottom front panel of the ring filter insert.

Deschamps discloses the nose is formed integrally with the bottom front panel of the ring filter insert.

See, e.g.,

Deschamps at [0033] – [0036]:

According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel.

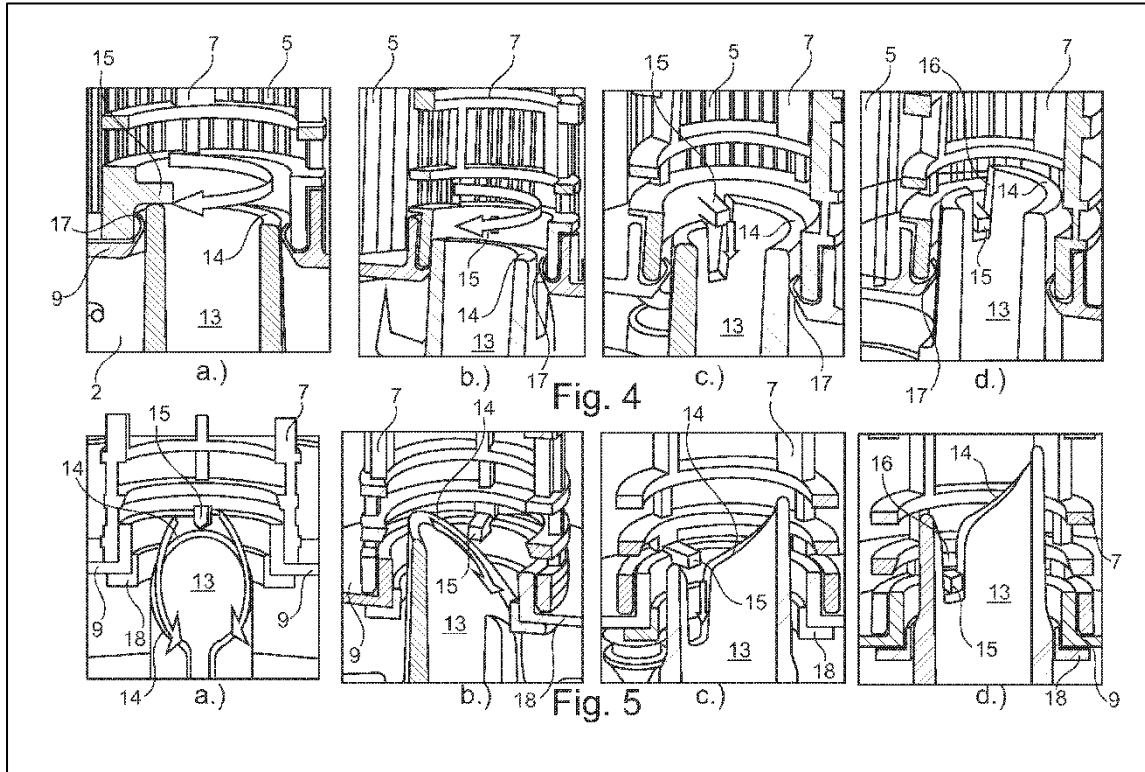
Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is

not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 4-5, 9, 17:



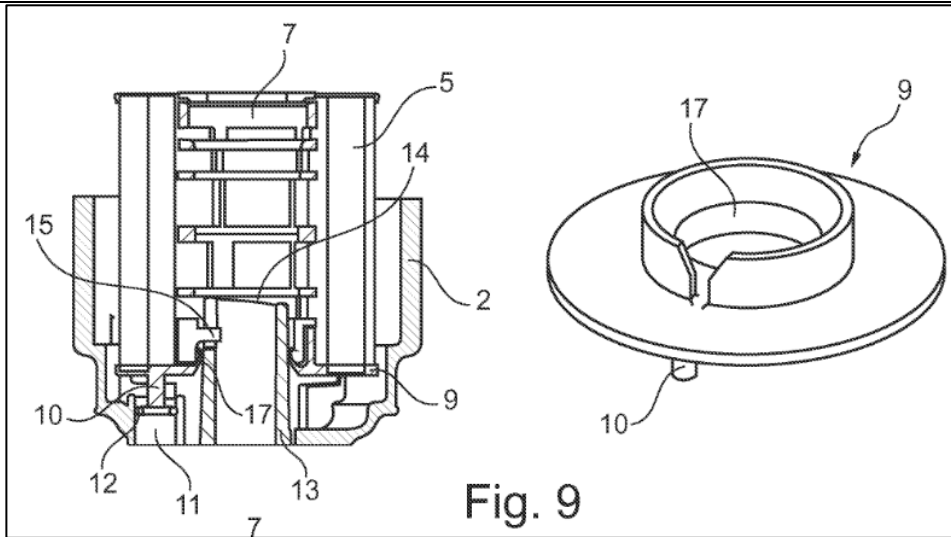


Fig. 9

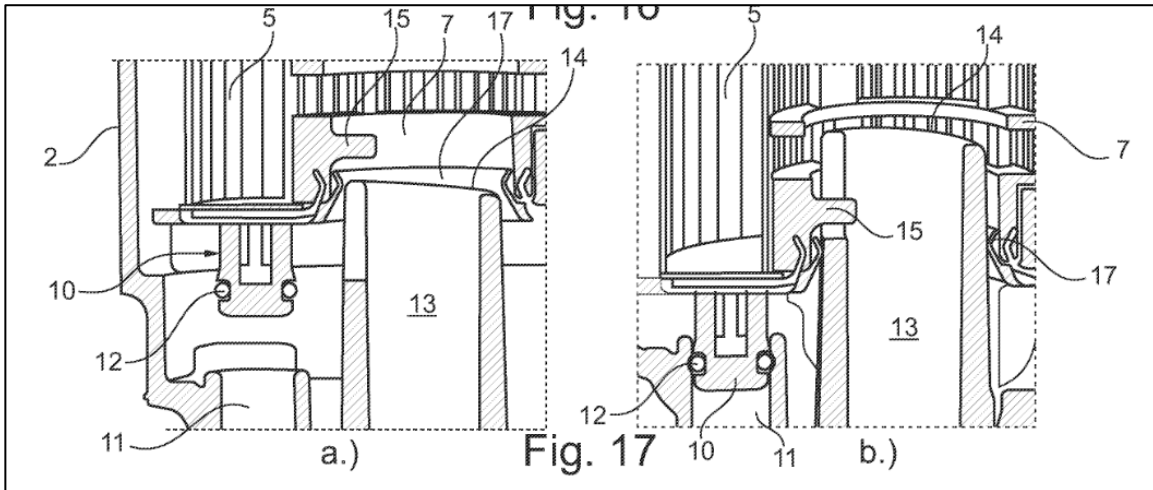


Fig. 17

As one example, Deschamps discloses the nose (15) is formed integrally with the bottom front panel (7, 9) of ring filter insert (5).

Claim 24

[24] The ring filter insert according to claim 15, wherein the blocking element is one of a radially sealing valve element, an axially sealing valve element, and a radially sealing

Deschamps discloses the blocking element is one of a radially sealing valve element, an axially sealing valve element, and a radially sealing plug which is one of rigidly connected to the lower front panel and rigidly arranged on the lower front panel.

plug which is one of rigidly connected to the lower front panel and rigidly arranged on the lower front panel.

See, e.g.,

Deschamps at [0033] – [0036]:

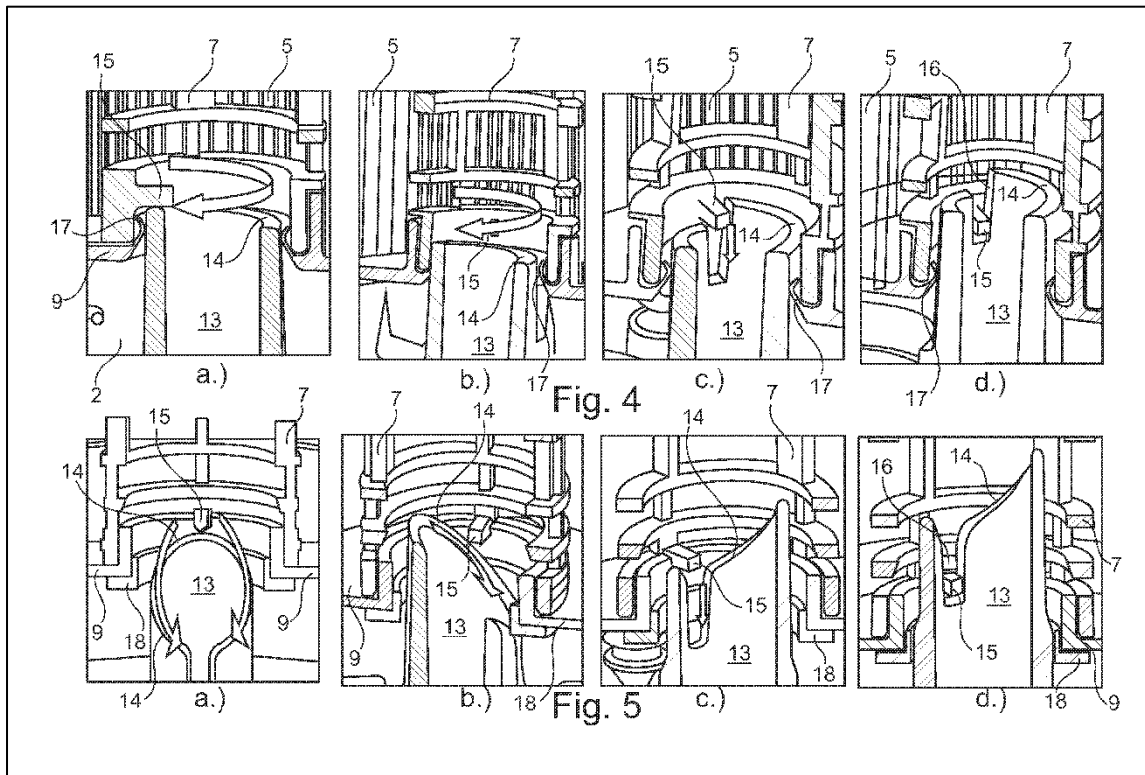
According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel.

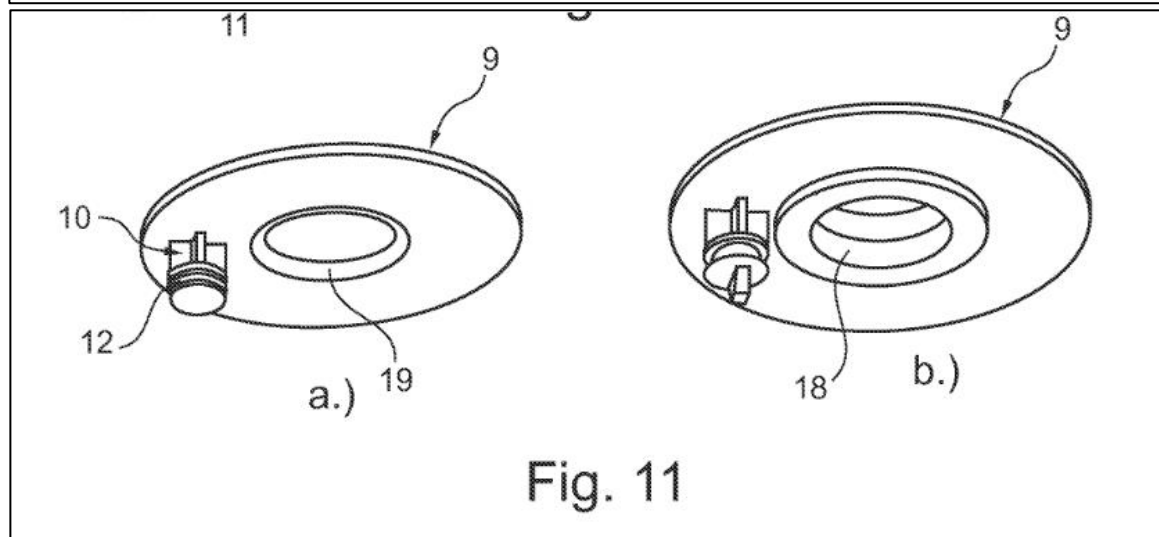
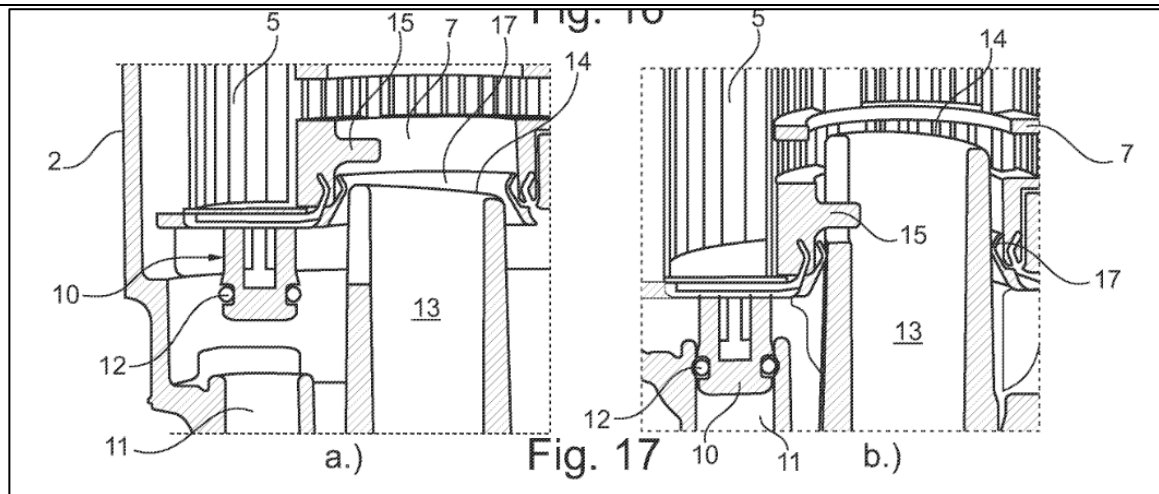
Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 4-5, 17, 11:





As one example, Deschamps discloses the blocking element (10) is a radially sealing plug which is rigidly arranged on the bottom front panel (9).

Claim 25

[25] The ring filter insert according to claim 15, wherein the blocking element is an axially sealing valve element which is elastically arranged on the bottom front panel.

Deschamps discloses the blocking element is an axially sealing valve element which is elastically arranged on the bottom front panel.

See, e.g.,

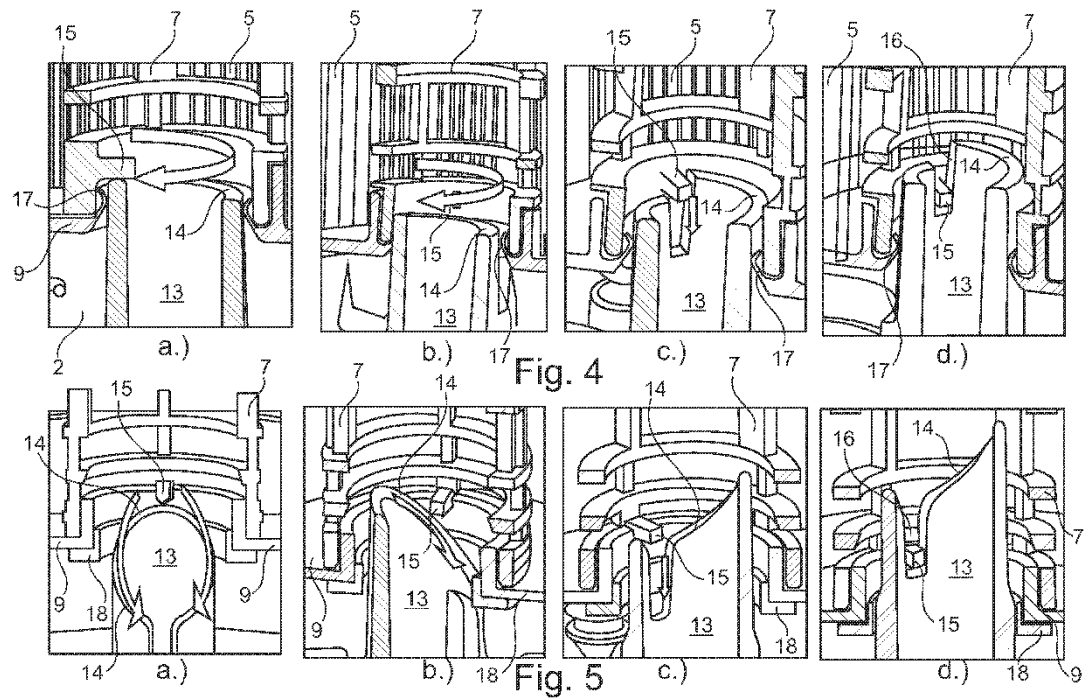
Deschamps at [0033] – [0036]:

According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel.

Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

	An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards. Deschamps at [0038]: A particular advantage of the filter device 1 according to the invention is that the pin 10, rather than sliding along the ramp and thereby being configured as a sliding element as in the prior art, can be elastic, for example formed from rubber, as the pin 10 no longer has to have any sliding properties. Deschamps at Figs. 4-5, 7-8, 17:
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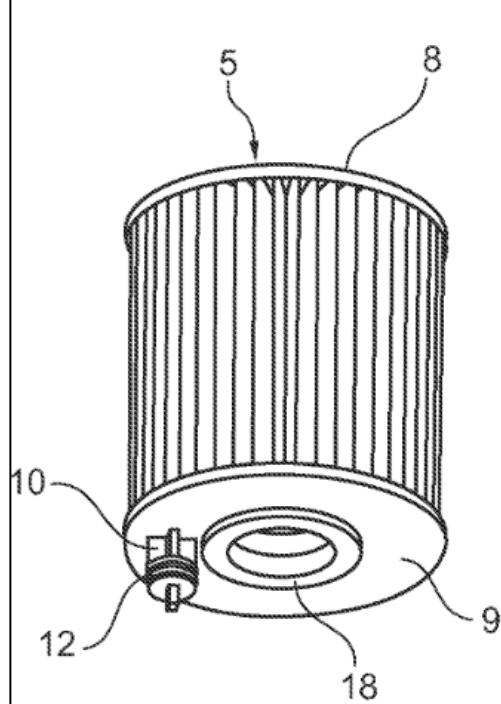


Fig. 7

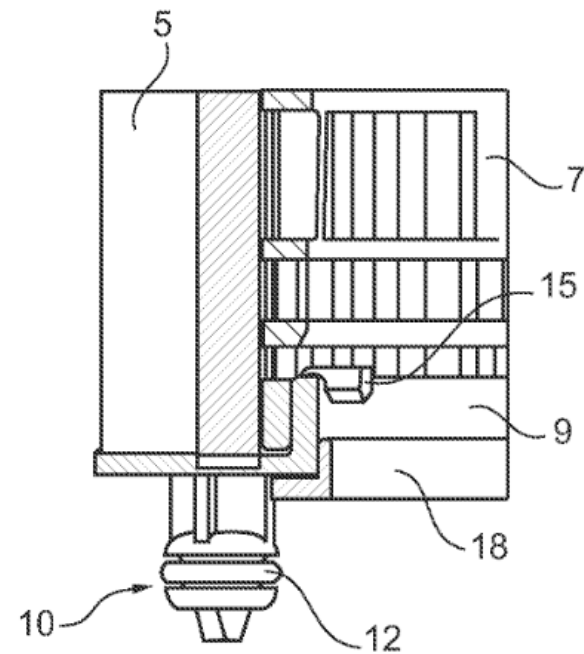


Fig. 8

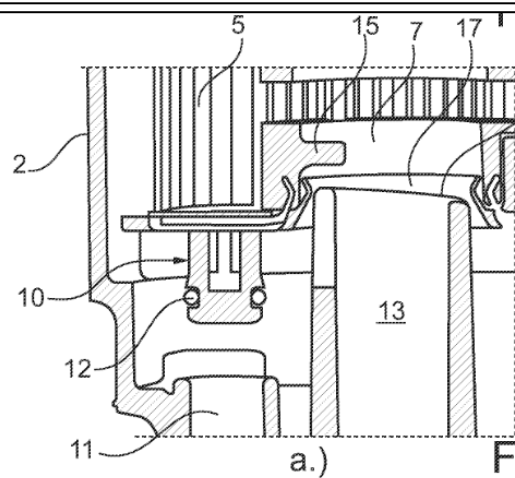
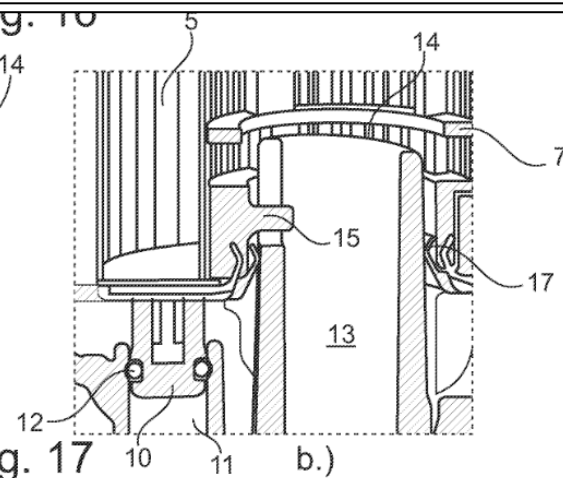


Fig. 17

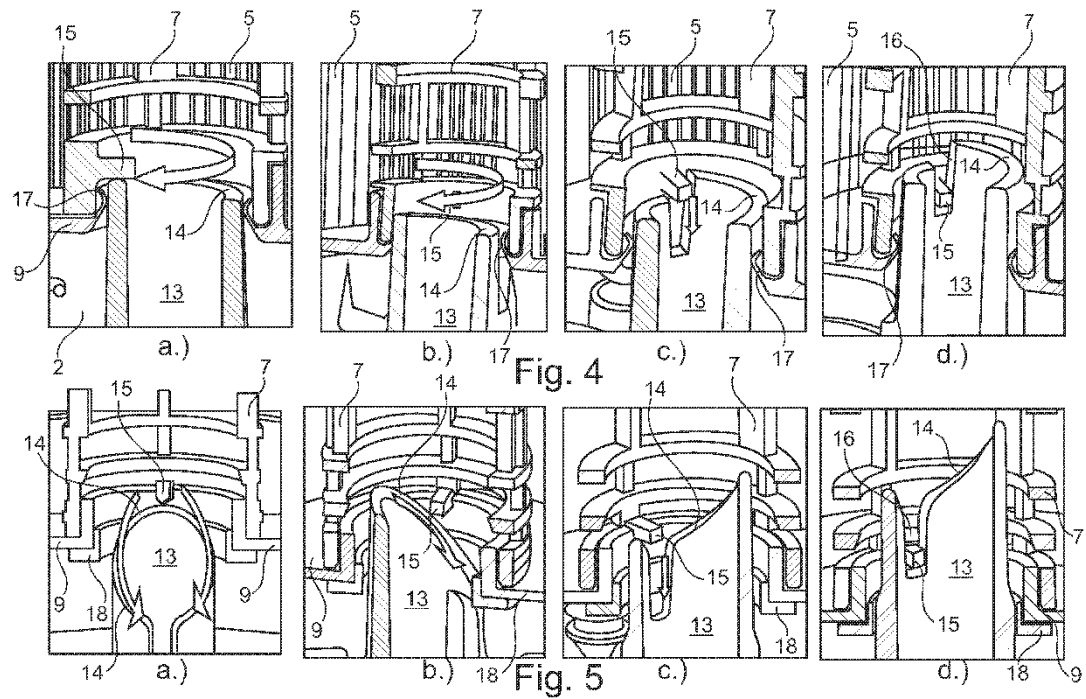


	For example, Deschamps discloses the blocking element (10) is an axially sealing valve element which is elastically arranged on the bottom front panel (9).
Claim 28	
[28] The ring filter insert according to claim 15, wherein the blocking element is formed from two parts, the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.	Deschamps discloses the blocking element is formed from two parts, the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors. <i>See, e.g.,</i> Deschamps at [0033] – [0036]: According to FIG. 1, a filter device 1 according to the invention, for example an oil or fuel filter, or an air filter for a motor vehicle, has a filter housing 4 formed from a filter housing crucible 2 and a filter housing cover 3 which can be screwed to the latter. Arranged inside the filter housing 4 is a ring filter element 5, which is known per se and is for example supported by means of a support-structure-like inner shroud 7 with respect to an inner chamber 6. The ring filter element 5 is delimited in the axial direction in a likewise known manner by an upper end disc 8 and a lower end disc 9. A pin 10 which projects from the lower end disc 9 in the axial direction is provided (cf. for example FIGS. 6 and 7), which preferably engages in a leakproof manner in a channel 11 on the filter housing crucible side and thereby seals it when the filter device 1 is completely assembled. To this end, a sealing element formed in a known manner, for example an O-ring seal 12, can be provided on the pin 10. The channel 11 is in most cases a no-load channel. Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

An installation process of the ring filter element 5 functions in the same manner if the guide contour 14 is configured like a hollow needle, as shown in FIGS. 5 a to 5 d. With such a guide contour 14, the axial groove 16 preferably lies at the lowest point of the guide contour 14. It is not important whether the guide element 15 is arranged on the inner shroud 7, as shown for example in FIGS. 4 a to 4 d, or on the lower end disc 9, as shown in FIGS. 5 a to 5 d. In both cases the guide element 15 is formed as a guide pin pointing radially inwards.

Deschamps at Figs. 4-5, 7-8, 17:



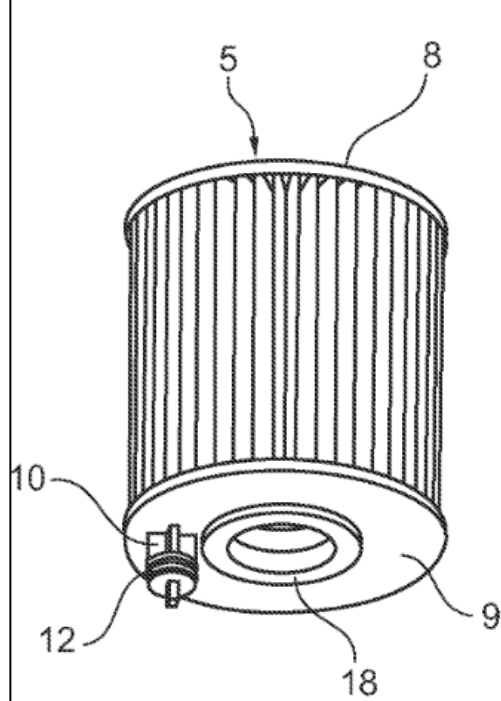


Fig. 7

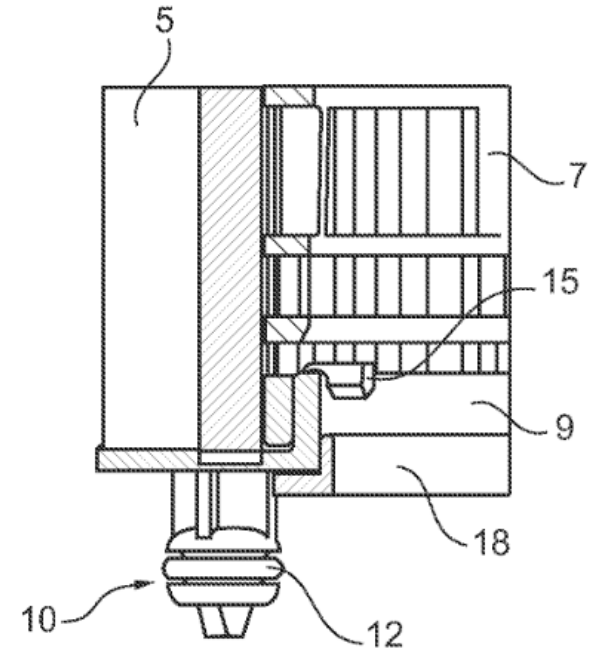


Fig. 8

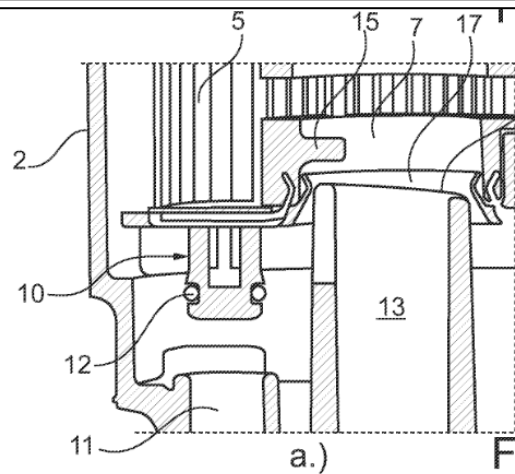
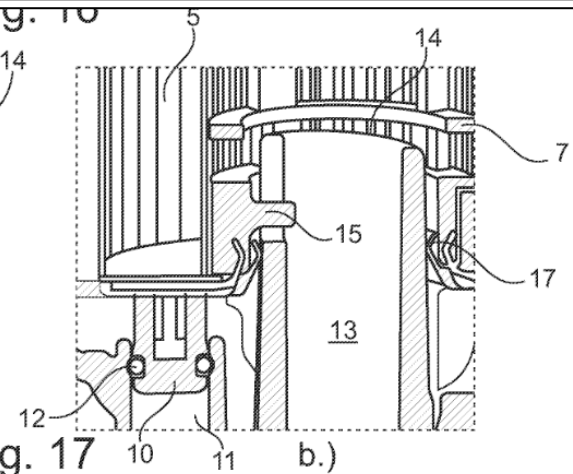
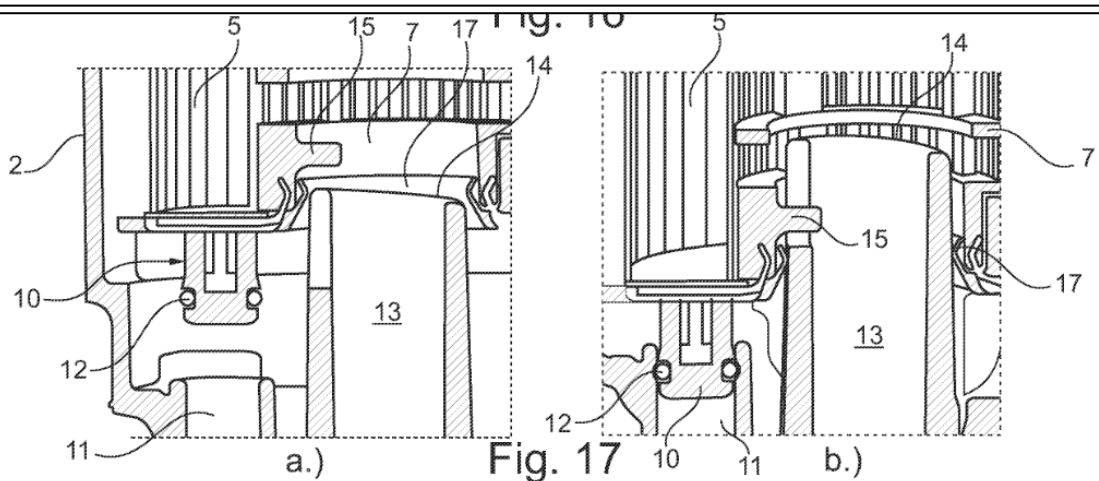
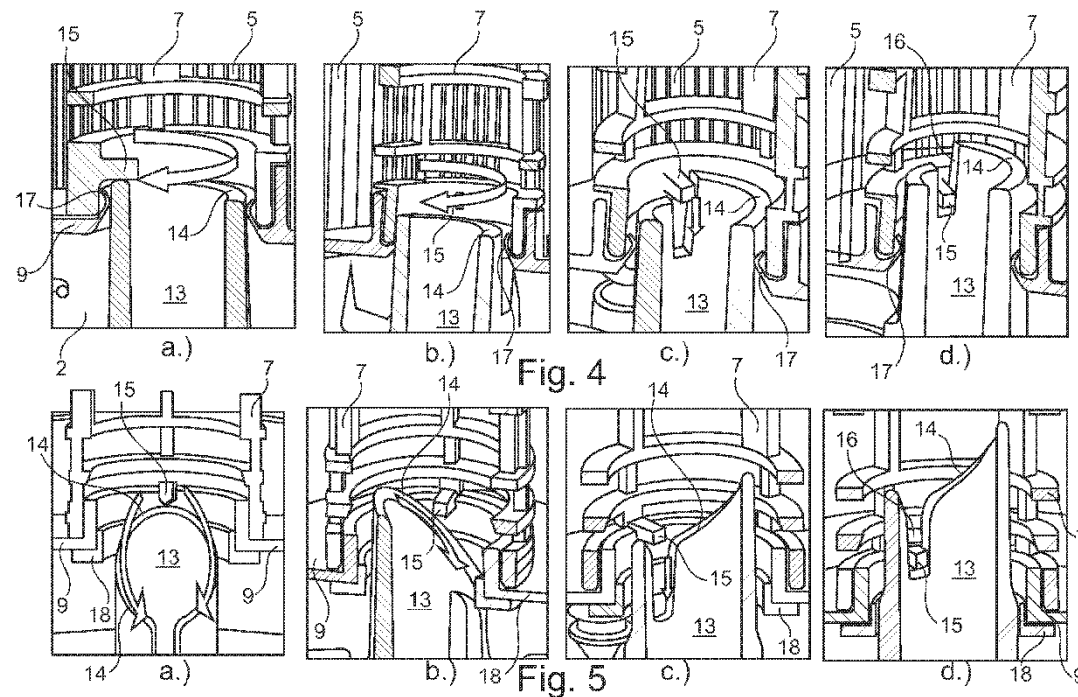


Fig. 17



	For example, Deschamps discloses the blocking element (10) is formed from two parts (10, 12), the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.
Claim 29	
[29] The liquid filter according to claim 1, wherein the protruding nose protrudes radially.	Deschamps discloses the protruding nose protrudes radially. <i>See, e.g.,</i> Deschamps at [0034]-[0035]: Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16. Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d. Deschamps at Figs. 4-5, 17:



For example, Deschamps discloses the protruding nose (15) protrudes radially.

Claim 30

[30] The ring filter insert according to claim 15, wherein the protruding nose protrudes radially.

Deschamps discloses the protruding nose protrudes radially.

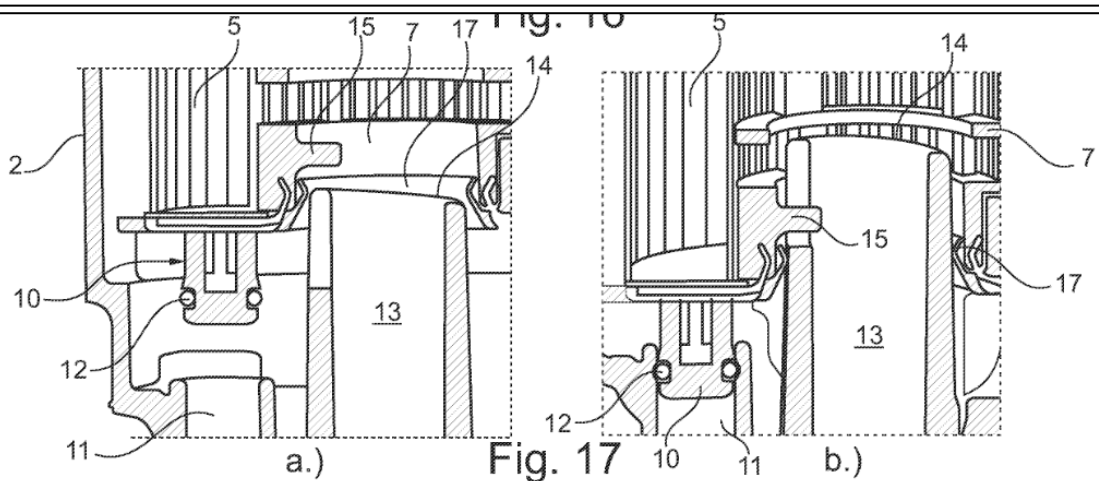
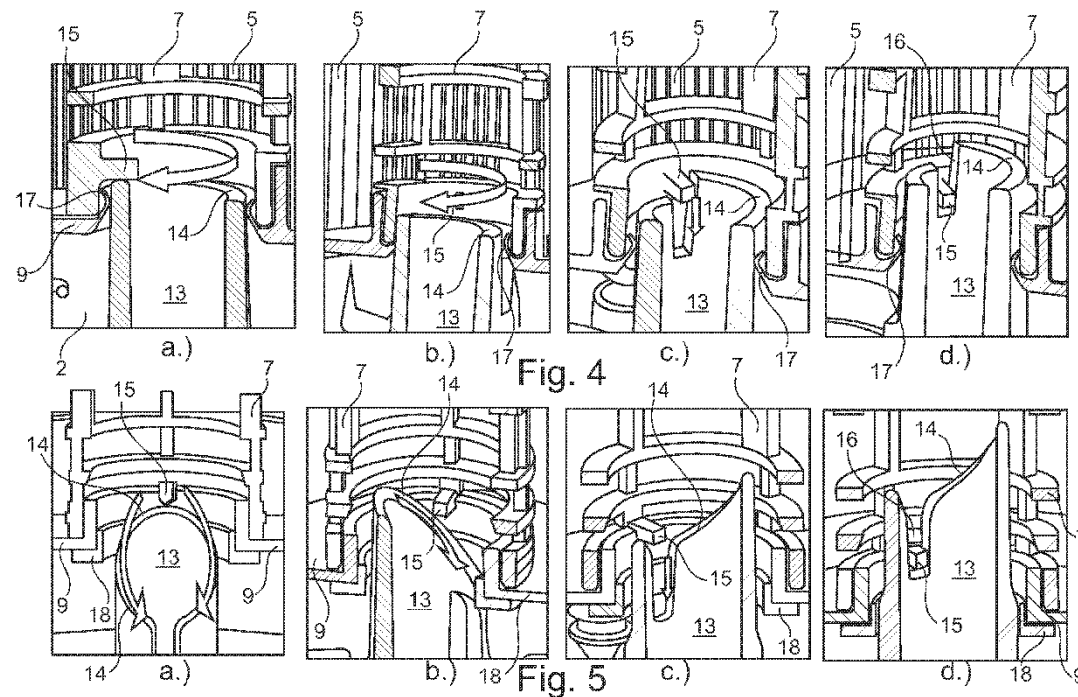
See, e.g.,

Deschamps at [0034]-[0035]:

Furthermore, a tube-shaped dome 13 (cf. FIGS. 2 and 3) is provided on the filter housing crucible 2, which dome engages in the inner chamber 6 of the ring filter element 5 and for example forms part of a clean channel when the filter device 1 is assembled. According to the invention, a guide contour 14 is provided on a free end of the said tube-shaped dome 13, which guide contour interacts with a guide element 15 (cf. for example FIGS. 4 and 5) arranged on the ring filter element 5. This guide contour 14 can for example be formed like a circular ramp, as shown in FIG. 3, or else like an inclined hollow needle, as shown for example in FIG. 2. A common feature of both guide contours 14 is that they have an axial groove 16, towards which the guide element 15 is guided during assembly of the filter device 1, and which is aligned relative to the pin 10 in such a manner that the latter can be introduced into the channel 11 on the filter housing crucible side if the guide element 15 enters or is pushed into the axial groove 16.

Assembly of the filter device 1 is shown in different method steps in FIGS. 4 a to 4 d. First, in assembly step 4 a, the ring filter element 5 is inserted into the filter housing crucible 2 until it rests with the guide element 15 on the guide contour 14 on the dome side. The ring filter element 5 is then rotated, for example by screwing on the filter housing cover 3, so that the guide element 15, as shown in FIG. 4 b, slides along the guide contour 14 as far as the axial groove 16, which is preferably arranged between the highest and the lowest point of the ramp-like guide contour 14. After it has reached the axial groove 16, the pin 10 is aligned coaxially flush with the channel 11, so that the ring filter element 5 can be pushed in the axial direction with the guide element 15 into the axial groove 16 and at the same time with the pin 10 into the channel 11. This state is shown for example in FIG. 4 d.

Deschamps at Figs. 4-5, 17:



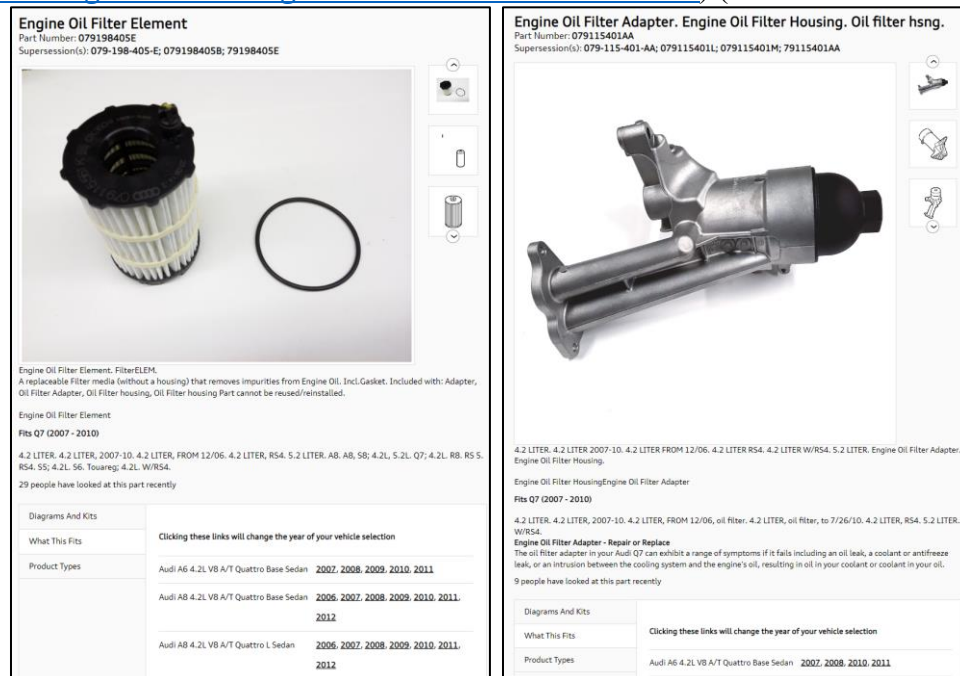
For example, Deschamps discloses the protruding nose (15) protrudes radially.

**Exhibit C-2 – Invalidity of U.S. Patent No. 9,023,203 Based on
Japan Patent Application Publication No. 2004136203 to Yokoyama et al. (“Yokoyama”) in View of Audi System**

Japan Patent Application Publication No. 2004136203 to Yokoyama et al. (“Yokoyama”) was filed on October 17, 2002 and published on May 13, 2004. The Audi engine oil filter system (“Audi System”) implemented in vehicles including at least 2007-2011 4.2L V8 A/T Quattro Audi A6, 2006-2012 4.2L V8 A/T Quattro Audi A8 and A8L, and 2007-2009 4.2L V8 A/T Premium Audi Q7, was in public use, on sale, sold, known in this country, or otherwise available to the public since at least 2006 – before the priority date of the asserted claims of the U.S. Patent No. 9,023,203 (the “’203 patent”). Accordingly, Yokoyama, alone based on the state of the art, or in combination with Audi System constitutes prior art and invalidates the asserted claims of the ’203 patent under at least pre-AIA 35 U.S.C. § 103.

On information and belief, at least the following documents, or the documents referenced therein, describe the functionality of Audi System:

- Audi Engine Oil Filter Element Part Number: 079198405E (https://parts.audiusa.com/p/Audi_Q7/Engine-Oil-Filter-Element/48003807/079198405E.html) (“Audi Filter Insert”);
- Audi Engine Oil Filter Housing Part Number: 079115401AA (https://parts.audiusa.com/p/Audi_Q7/Engine-Oil-Filter-Adapter-Engine-Oil-Filter-Housing-Oil-filter-hsng/48003711/079115401AA.html) (“Audi Filter Housing”);



See, e.g., Audi Filter Insert; Audi Filter Housing.

- MAHLE OX 350/4D ECO Oil Filter (<https://www.amazon.com/MAHLE-Original-350-ECO-Filter/dp/B0068MWZZW>) (“MAHLE Audi Filter”);

Technical Details	
Manufacturer	Mahle
Brand	MAHLE
Model	OX3504DECO
Item Weight	3.52 ounces
Product Dimensions	9.96 x 7.02 x 5.31 inches
Item model number	OX3504DECO
Is Discontinued By Manufacturer	No
Exterior	Machined
Manufacturer Part Number	OX 350/4D
OEM Part Number	079198405E

○

- MAHLE Products and Patents Search for MAHLE OX 350/4D Oil Filter (<https://www.mahle-aftermarket.com/eu/en/catalog/patents/>):



- Germany Patent Publication No. 10,2007,062,102 to Grass et al. (“Grass”), filed December 21, 2007 and published June 25, 2009;
- U.S. Patent No. 6,706,181 to Baumann et al. (“Baumann”), filed September 30, 2000 and published March 16, 2024.

A Person of Skill in the Art (“POSA”) would have been motivated to combine these references, because they are in the same field, they are aimed at solving the same perceived problems in the art, the nature of the problem to be solved was the same, and there is express motivation in these references. Known design incentives and market forces would have also motivated one of ordinary skill to combine these references. Furthermore, one of skill in the art would understand that each limitation not expressly disclosed in Yokoyama would be was a standard implementation and an obvious design choice in the design of a filter by the priority date of the asserted patent. Such an implementation simply reflects one of a finite number of well-known techniques (*e.g.*, whether to use an eccentric blocking element or not, or the particular means of ensuring only a certain type of filter insert is installable on a given housing) implemented in a predictable manner, to achieve well-known, predictable results.

The use of claim terms in the below chart is based on Hengst’s construction of claim terms in its infringement contentions as understood by Champion, as well as the plain and ordinary meaning of the claim terms. This chart should not be construed as consenting to or agreeing with Hengst’s construction of claim terms. Because discovery is ongoing and the claims have not yet been construed, Champion reserves all rights to amend its invalidity contentions based on discovery or on the Court’s constructions.

The citations to portions of any reference in this chart are exemplary only. For example, a citation that refers to or discusses a figure or figure item should be understood to also incorporate by reference that figure and any additional descriptions of that figure as if set forth fully therein. Champion reserves the right to rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid. Citations presented for one claim limitation are expressly incorporated by reference into all other limitations for that claim as well as all limitations of all claims on which that claim depends. Champion also reserves the right to rely on additional citations or sources of evidence that also may be applicable, or that may become applicable in light of claim construction, changes in Plaintiff's infringement contentions, and/or information obtained during discovery as the case progresses.

Claim Element	Exemplary Disclosures
Claim 15	
[15.pre] A hollow-cylindrical filter material body surrounded on front sides by top and bottom front panels and which can be replaceably arranged in a filter housing,	To the extent it is a limitation, Yokoyama discloses a hollow-cylindrical filter material body surrounded on front sides by top and bottom front panels and which can be replaceably arranged in a filter housing. <i>See, e.g.,</i> Yokoyama at [0002]: [Prior art] The filter device has a configuration in which a replaceable filter element is held in the filter case. After the fluid flowing in from the fluid inflow path formed in the filter case passes through the filter element, the filter device is also formed in the filter case. Dust and dust contained in the fluid can be removed by flowing out from the fluid outflow passage. Yokoyama at [0018]: As shown in FIGS. 1, 3 and 4, the filter element 40 has a structure in which a filter medium 42 bent in a bellows shape is attached around an inner cylinder 41 formed in a thin cylindrical shape in a lattice shape. A disk-shaped upper plate 43 is attached to the upper end portion, and a disk-like lower plate 44 is attached to the lower end portion. Yokoyama at Figs. 1-2:

	For example, Yokoyama discloses a hollow-cylindrical filter material body (42) surrounded on front sides by top (43) and bottom (44) front panels and which can be replaceably arranged in a filter housing (5) (<i>see</i> figure 2 showing filter housing).
[15.a] an eccentric blocking element arranged on the bottom front panel for engaging an eccentric opening in the filter housing,	Yokoyama in combination with Audi System, and/or the background knowledge of a POSA, discloses an eccentric blocking element arranged on the bottom front panel for engaging an eccentric opening in the filter housing. It would have been obvious to combine Yokoyama with Audi System for the reasons discussed herein and in Defendant’s cover pleading. A POSA would have motivation to make this combination for numerous reasons. Both Yokoyama and Audi System disclose similar structures, components, and subject matter (<i>e.g.</i> filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element (<i>e.g.</i>, Grass 13) and an eccentric opening in the filter housing (<i>e.g.</i>, Grass 14) has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Yokoyama. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the drain plug/cap located at the bottom surface (<i>e.g.</i>, 31) of the filter

case disclosed in Yokoyama, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (e.g., 5) during filter change, because the eccentric blocking element eliminates the need to manually open any drain plug/cap in order to drain the remaining oil. Further, eccentric blocking element disclosed in Audi System offers similar advantage to filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Yokoyama. Because, during an oil change, when the lower case (e.g., 30) is removed with the filter insert (e.g., 40) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching any cap/plug from outside, or pouring any remaining oil over the lip or connecting screw (e.g. 13) of the lower case. A POSA would have a reasonable expectation of success in adding this feature to Yokoyama and/or incorporating the teachings of Yokoyama into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

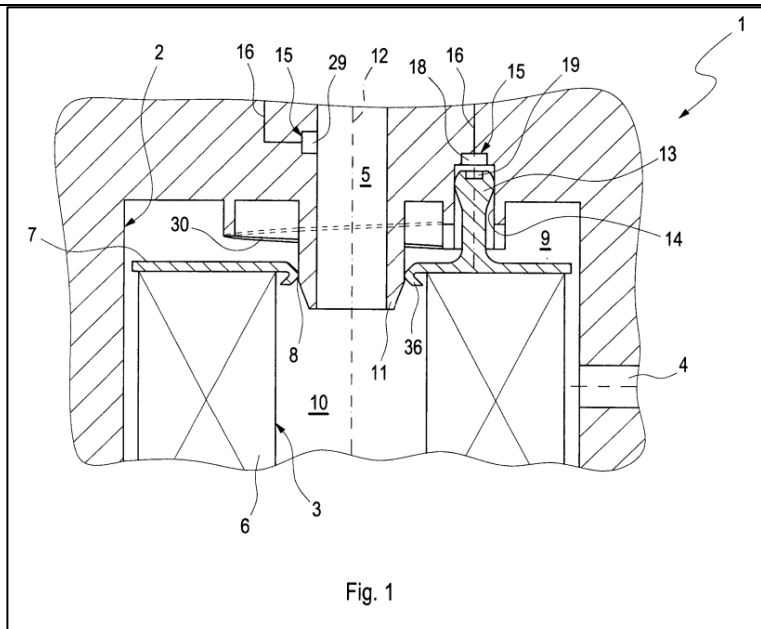
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



As one example, Yokoyama in combination with Audi System discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: first positioning means (Yokoyama 46) on the ring filter insert (Yokoyama 40), which interact with second positioning means (Yokoyama 19, 19a) on the filter housing (Yokoyama 5) when the ring filter insert (Yokoyama 40) is inserted into the filter housing (Yokoyama 5) and which are arranged to bring the blocking element (Grass 13) into engagement with the eccentric opening (Grass 14).

[15.b] first positioning means on the ring filter insert, which interact with second positioning means on the filter housing when the ring filter insert is inserted into the filter housing and which are arranged to bring the blocking element into engagement with the eccentric opening,

Yokoyama in combination with Audi System, and/or the background knowledge of a POSA, discloses first positioning means on the ring filter insert, which interact with second positioning means on the filter housing when the ring filter insert is inserted into the filter housing and which are arranged to bring the blocking element into engagement with the eccentric opening. It would have been obvious to combine Yokoyama with Audi System for the reasons discussed herein and in Defendant's cover pleading.

A POSA would have motivation to make this combination for numerous reasons. For example, Both Yokoyama and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers

attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, it was well known in the art to use a positioning means to ensure proper alignment of components in a filter assembly and/or that only the proper filter insert is installed on a filter housing. See, e.g., US 2006/0219621, [0003] (“Published German patent application no. DE 4402836, for example, describes an arrangement in which the correct use of Suitable replacement parts is ensured by the fact that the respective part for attachment can be attached to the unit only according to a lock-and-key principle.”), [0006] (“Another object of the invention is to provide a filter device which establishes a definitive correlation between the filter housing and an installed filter element.”), [0007] (“A further object of the invention is to provide a filter device which prevents installation of an incorrect filter element.”), [0028] (“If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24.”). Such a positioning means also ensures a user need not visually align or guess at proper alignment through trial and error, potentially damaging the blocking element or incorrectly installing it. Thus there was common sense—and express—motivation in the art to use a positioning means to ensure proper alignment of components such as an eccentric blocking element within the filter housing. The protrusions (e.g., 46) and ramp (e.g., 19, 21) alignment system disclosed in Yokoyama offers the advantages of automatically aligning the filter insert (e.g., 42) with the filter housing (e.g., 10) in a pre-determined way during filter installation, particularly when the filter insert is installed in the filter case along an axial direction. Because both Yokoyama and Audi System disclose similar structures and filter installation methods and that Audi System discloses an eccentric blocking element that need to be aligned with the filter housing during installation, a POSA would be motivated to add this advantageous alignment feature to the filter and housing of Audi System. Moreover, as disclosed in Audi System, including an eccentric blocking element (e.g., Grass 13) and an eccentric opening in the filter housing (e.g., Grass 14) has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Yokoyama. For example, a POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the drain plug/cap located at the bottom surface (e.g., 31) of the filter case disclosed in Yokoyama, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (e.g., 5) during filter change, because the eccentric blocking element eliminate the need to manually open any drain plug/cap in order to drain the remaining oil. Further, eccentric blocking element disclosed in Audi System offers similar advantage to filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Yokoyama. Because, during an oil change,

when the lower case (*e.g.*, 30) is removed with the filter insert (*e.g.*, 40) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching any cap/plug from outside, or pouring any remaining oil over the lip or connecting screw (*e.g.* 13) of the lower case. A POSA would have a reasonable expectation of success in adding this feature to Yokoyama and/or incorporating the teachings of Yokoyama into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

Based on Hengst's construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

For example:

Yokoyama at [0016]:

As shown in FIG. 1, three hook-shaped portions 19 extending downward are provided on the outer peripheral portion of the pipe portion 18 provided in the upper case half 10 (in FIG. 1, the hook-shaped portion 19 is Only two of the three are visible). FIG. 5 is a developed view of the pipe portion 18 provided in the upper case half body 10, and as shown in this figure, the left and right side surface portions 19a of each of the bowl-shaped portions 19 are parallel to the vertical direction. Although it may extend, it is preferably formed in a tapered shape that narrows downward as shown in this figure. Moreover, it is preferable that the lower end part of each hook-shaped part 19 has the shape pointed downward, Furthermore, the lower end part of one hook-shaped part 19 is below the lower end part of the other hook-shaped part 19. It is preferable that the protrusion extends (see the protrusion 20 shown in FIG. 5).

Yokoyama at [0019]:

As shown in FIGS. 1 and 4, three locking protrusions 46 that protrude toward the center of the opening 45 are provided on the inner peripheral portion of the opening 45 of the upper plate 43. As will be described later, these three locking projections 46 are attached to the upper case half 10 so that the tube portion 18 of the upper case half 10 is inserted into the opening 45 of the filter element 40. In this case, it enters into a recess 21 formed between adjacent ones of the three bowl-shaped portions 19 provided on the upper case 10 side (the engagement shown by a broken line in FIG. 5). (See projection 46). In addition, it is preferable that the front-end | tip (upper end) part of these three latching protrusions 46 has a shape pointed upward as shown in FIG. 1.

Yokoyama at [0021]-[0023]:

In order to assemble the filter element 40 in the filter case 5, first, the tube portion 18 (and the three hook-shaped portions 19) of the upper case half 10 is inserted through the opening 45 of the upper plate 43 in the filter element 40 from above. The filter element 40 is pushed upward. As a result, the three locking projections 46 provided on the upper plate 43 are guided upward by the side surface portions 19a of the three hook-shaped portions 19 provided on the upper case half 10 (at this time, the filter element 40). Is slightly rotated in the twisting direction), and enters into the recess 21 formed between two adjacent flanges 19. FIG. 6 shows an example of a path followed by the locking projection 46 that contacts the side surface portion 19a of the bowl-shaped portion 19 when the filter element 40 is pushed up toward the upper case half 10. The projection 46 advances in the direction indicated by the arrow in the figure and fits into a recess 21 formed between two adjacent flanges 19.

In addition, in this state where each locking projection 46 of the filter element 40 enters the recess 21 formed between the adjacent flanges 19 of the upper case half 10, the upper protrusion 43 of the filter element 40 is placed on the upper plate 43. The provided seal member 47 is fitted into the groove portion 22 of the upper case half 10. At this time, the three W-shaped portions 48 provided on the seal member 47 are fitted into the portions of the groove portion 22 that are inverted from the W-shaped portions 48. As a result, the filter element 40 is temporarily fixed to the upper case half 10.

Here, as described above, the three hook-shaped portions 19 provided in the upper case half 10 each have a shape in which the lower end portion is pointed downward, and each of the locking protrusions 46 provided in the filter element 40. If the upper end portion has an upwardly sharp shape, when the filter element 40 is to be attached to the upper case half 10, the tip (upper end) portion of the locking projection 46 on the filter element 40 side is exactly Even if it is at a position facing the tip (lower end) portion of the hook-shaped portion 19, the locking protrusion 46 is displaced to either the left or right when contacting the hook-shaped portion 19. Therefore, the filter element 40 is mounted on the upper case half 10 smoothly. Moreover, in this filter apparatus 1, since the lower end part of one hook-shaped part 19 has protruded and extended below the lower end part of the other hook-shaped part 19, the effect is very big. It has become.

Yokoyama at [Brief description of the drawings]:

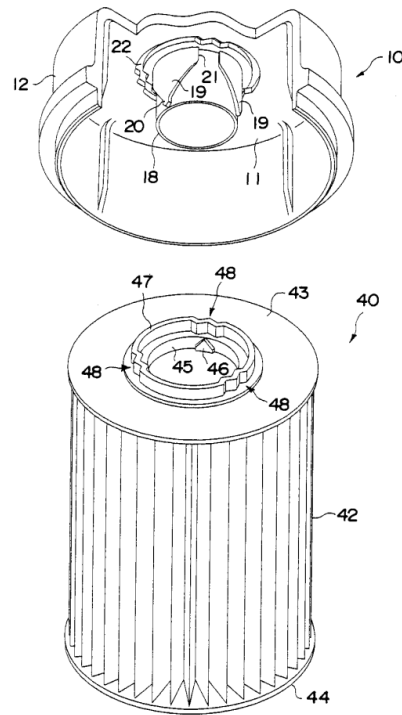
FIG. 1 is a view showing a perspective view of an upper case half of a fuel filter according to an embodiment of the present invention viewed from below and a perspective view of a filter element viewed obliquely from above.

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FIG. 6 is a diagram showing a path followed by a locking projection that comes into contact with the side surface of the hook-shaped portion when the filter element is pushed up toward the upper case half.

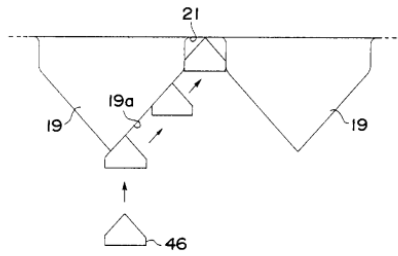
Yokoyama at Fig. 1:

【図 1】



Yokoyama at Fig. 6:

【 図 6 】



MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

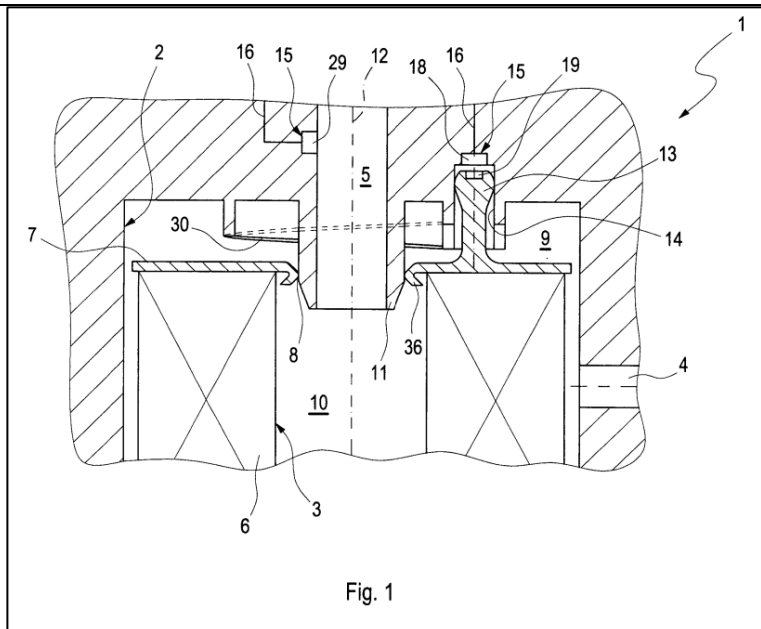
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



As one example, Yokoyama in combination with Audi System discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: first positioning means (Yokoyama 46) on the ring filter insert (Yokoyama 40), which interact with second positioning means (Yokoyama 19, 19a) on the filter housing (Yokoyama 5) when the ring filter insert (Yokoyama 40) is inserted into the filter housing (Yokoyama 5) and which are arranged to bring the blocking element (Grass 13) into engagement with the eccentric opening (Grass 14).

[15.c] the first positioning means being one of an inclined plane and a protruding nose, with the second positioning means being the other of the inclined plane and the protruding nose,

Yokoyama discloses the first positioning means being one of an inclined plane and a protruding nose, with the second positioning means being the other of the inclined plane and the protruding nose.

Based on Hengst's construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

See, e.g.,

Yokoyama at [0016]:

As shown in FIG. 1, three hook-shaped portions 19 extending downward are provided on the outer peripheral portion of the pipe portion 18 provided in the upper case half 10 (in FIG. 1, the hook-shaped portion 19 is Only two of the three are visible). FIG. 5 is a developed view of the pipe portion 18 provided in the upper case half body 10, and as shown in this figure, the left and right side surface portions 19a of each of the bowl-shaped portions 19 are parallel to the vertical direction. Although it may extend, it is preferably formed in a tapered shape that narrows downward as shown in this figure. Moreover, it is preferable that the lower end part of each hook-shaped part 19 has the shape pointed downward, Furthermore, the lower end part of one hook-shaped part 19 is below the lower end part of the other hook-shaped part 19. It is preferable that the protrusion extends (see the protrusion 20 shown in FIG. 5).

Yokoyama at [0019]:

As shown in FIGS. 1 and 4, three locking protrusions 46 that protrude toward the center of the opening 45 are provided on the inner peripheral portion of the opening 45 of the upper plate 43. As will be described later, these three locking projections 46 are attached to the upper case half 10 so that the tube portion 18 of the upper case half 10 is inserted into the opening 45 of the filter element 40. In this case, it enters into a recess 21 formed between adjacent ones of the three bowl-shaped portions 19 provided on the upper case 10 side (the engagement shown by a broken line in FIG. 5). (See projection 46). In addition, it is preferable that the front-end | tip (upper end) part of these three latching protrusions 46 has a shape pointed upward as shown in FIG. 1.

Yokoyama at [0021]-[0023]:

In order to assemble the filter element 40 in the filter case 5, first, the tube portion 18 (and the three hook-shaped portions 19) of the upper case half 10 is inserted through the opening 45 of the upper plate 43 in the filter element 40 from above. The filter element 40 is pushed upward. As a result, the three locking projections 46 provided on the upper plate 43 are guided upward by the side surface portions 19a of the three hook-shaped portions 19 provided on the upper case half 10 (at this time, the filter element 40). Is slightly rotated in the twisting direction), and enters into the recess 21 formed between two adjacent flanges 19. FIG. 6 shows an example of a path followed by the locking projection 46 that contacts the side surface portion 19a of the bowl-shaped portion

19 when the filter element 40 is pushed up toward the upper case half 10. The projection 46 advances in the direction indicated by the arrow in the figure and fits into a recess 21 formed between two adjacent flanges 19.

In addition, in this state where each locking projection 46 of the filter element 40 enters the recess 21 formed between the adjacent flanges 19 of the upper case half 10, the upper protrusion 43 of the filter element 40 is placed on the upper plate 43. The provided seal member 47 is fitted into the groove portion 22 of the upper case half 10. At this time, the three W-shaped portions 48 provided on the seal member 47 are fitted into the portions of the groove portion 22 that are inverted from the W-shaped portions 48. As a result, the filter element 40 is temporarily fixed to the upper case half 10.

Here, as described above, the three hook-shaped portions 19 provided in the upper case half 10 each have a shape in which the lower end portion is pointed downward, and each of the locking protrusions 46 provided in the filter element 40. If the upper end portion has an upwardly sharp shape, when the filter element 40 is to be attached to the upper case half 10, the tip (upper end) portion of the locking projection 46 on the filter element 40 side is exactly Even if it is at a position facing the tip (lower end) portion of the hook-shaped portion 19, the locking protrusion 46 is displaced to either the left or right when contacting the hook-shaped portion 19. Therefore, the filter element 40 is mounted on the upper case half 10 smoothly. Moreover, in this filter apparatus 1, since the lower end part of one hook-shaped part 19 has protruded and extended below the lower end part of the other hook-shaped part 19, the effect is very big. It has become.

Yokoyama at [Brief description of the drawings]:

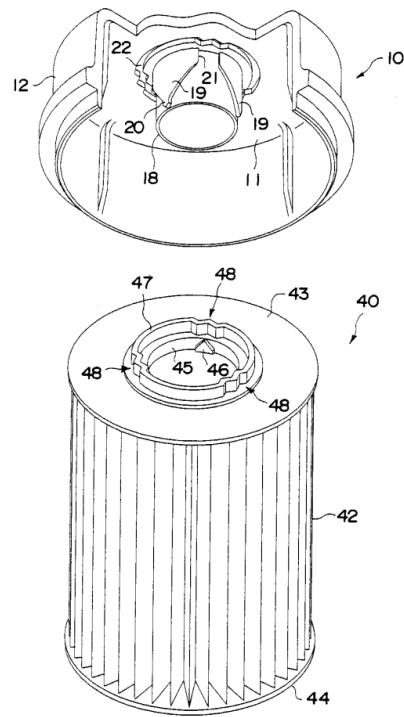
FIG. 1 is a view showing a perspective view of an upper case half of a fuel filter according to an embodiment of the present invention viewed from below and a perspective view of a filter element viewed obliquely from above.

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FIG. 6 is a diagram showing a path followed by a locking projection that comes into contact with the side surface of the hook-shaped portion when the filter element is pushed up toward the upper case half.

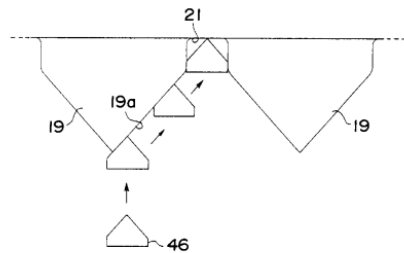
Yokoyama at Fig. 1:

【 図 1 】



Yokoyama at Fig. 6:

【 図 6 】



As one example, Yokoyama discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: the

	first positioning means being a protruding nose (46), with the second positioning means being an inclined plane (19, 19a).
[15.d] the inclined plane and the nose arranged to be moved in relation to each other in such a way that they slide along each other and bring the blocking element into engagement with the eccentric opening, by rotating the ring filter insert relative to the filter housing,	Yokoyama in combination with Audi System, and/or the background knowledge of a POSA, discloses the inclined plane and the nose arranged to be moved in relation to each other in such a way that they slide along each other and bring the blocking element into engagement with the eccentric opening, by rotating the ring filter insert relative to the filter housing. It would have been obvious to combine Yokoyama with Audi System for the reasons discussed herein and in Defendant’s cover pleading. A POSA would have motivation to make this combination for numerous reasons. For example, both Yokoyama and Audi System disclose similar structures, components, and subject matter (<i>e.g.</i> filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element (<i>e.g.</i>, Grass 13) and an eccentric opening in the filter housing (<i>e.g.</i>, Grass 14) has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Yokoyama. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the drain plug/cap located at the bottom surface (<i>e.g.</i>, 31) of the filter case disclosed in Yokoyama, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (<i>e.g.</i>, 5) during filter change, because the eccentric blocking element eliminate the need to manually open any drain plug/cap in order to drain the remaining oil. Further, eccentric blocking element disclosed in Audi System offers similar advantage to filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Yokoyama. Because, during an oil change, when the lower case (<i>e.g.</i>, 30) is removed with the filter insert (<i>e.g.</i>, 40) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching the outer surface of the lower case or any cap/plug from outside, or pouring any remaining oil over the lip or connecting screw (<i>e.g.</i> 13) of the lower case. Further, it was well known in the art to use a positioning means to ensure proper alignment of components in a filter assembly and/or that only the proper filter insert is installed on a filter housing. <i>See, e.g.</i>, US 2006/0219621, [0003] (“Published German patent application no. DE 4402836, for example, describes an arrangement in which the correct use of Suitable replacement parts is ensured by the fact that the respective part for attachment can be attached to the unit only

according to a lock-and-key principle.”), [0006] (“Another object of the invention is to provide a filter device which establishes a definitive correlation between the filter housing and an installed filter element.”), [0007] (“A further object of the invention is to provide a filter device which prevents installation of an incorrect filter element.”), [0028] (“If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24.”). Such a positioning means also ensures a user need not visually align or guess at proper alignment through trial and error, potentially damaging the blocking element or incorrectly installing it. Thus there was common sense—and express—motivation in the art to use a positioning means to ensure proper alignment of components such as an eccentric blocking element within the filter housing. The protrusions (*e.g.*, 46) and ramp (*e.g.*, 19, 21) alignment system disclosed in Yokoyama offers the advantages of automatically aligning the filter insert (*e.g.*, 42) with the filter housing (*e.g.*, 10) in a pre-determined way during filter installation, particularly when the filter insert is installed in the filter case along an axial direction. Because both Yokoyama and Audi System disclose similar structures and filter installation methods and that Audi System discloses an eccentric blocking element that need to be aligned with the filter housing during installation, a POSA would be motivated to add this advantageous alignment feature to the filter and housing of Audi System. A POSA would have a reasonable expectation of success in adding this feature to Yokoyama and/or incorporating the teachings of Yokoyama into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

Yokoyama at [0016]:

As shown in FIG. 1, three hook-shaped portions 19 extending downward are provided on the outer peripheral portion of the pipe portion 18 provided in the upper case half 10 (in FIG. 1, the hook-shaped portion 19 is Only two of the three are visible). FIG. 5 is a developed view of the pipe portion 18 provided in the upper case half body 10, and as shown in this figure, the left and right side surface portions 19a of each of the bowl-shaped portions 19 are parallel to the vertical direction. Although it may extend, it is preferably formed in a tapered shape that narrows downward as shown in this figure. Moreover, it is preferable that the lower end part of each hook-shaped part 19 has the shape pointed downward, Furthermore, the lower end part of one hook-shaped part 19 is below the lower end part of the other hook-shaped part 19. It is preferable that the protrusion extends (see the protrusion 20 shown in FIG. 5).

Yokoyama at [0019]:

As shown in FIGS. 1 and 4, three locking protrusions 46 that protrude toward the center of the opening 45 are provided on the inner peripheral portion of the opening 45 of the upper plate 43. As will be described later, these three locking projections 46 are attached to the upper case half 10 so that the tube portion 18 of the upper case half 10 is inserted into the opening 45 of the filter element 40. In this case, it enters into a recess 21 formed between adjacent ones of the three bowl-shaped portions 19 provided on the upper case 10 side (the engagement shown by a broken line in FIG. 5). (See projection 46). In addition, it is preferable that the front-end | tip (upper end) part of these three latching protrusions 46 has a shape pointed upward as shown in FIG. 1.

Yokoyama at [0021]-[0023]:

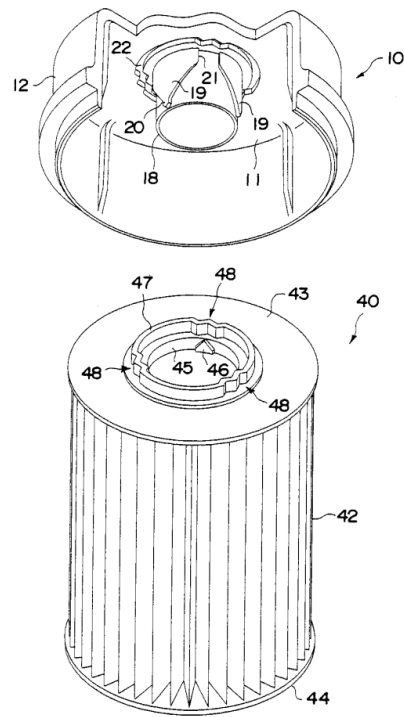
In order to assemble the filter element 40 in the filter case 5, first, the tube portion 18 (and the three hook-shaped portions 19) of the upper case half 10 is inserted through the opening 45 of the upper plate 43 in the filter element 40 from above. The filter element 40 is pushed upward. As a result, the three locking projections 46 provided on the upper plate 43 are guided upward by the side surface portions 19a of the three hook-shaped portions 19 provided on the upper case half 10 (at this time, the filter element 40). Is slightly rotated in the twisting direction), and enters into the recess 21 formed between two adjacent flanges 19. FIG. 6 shows an example of a path followed by the locking projection 46 that contacts the side surface portion 19a of the bowl-shaped portion 19 when the filter element 40 is pushed up toward the upper case half 10. The projection 46 advances in the direction indicated by the arrow in the figure and fits into a recess 21 formed between two adjacent flanges 19.

In addition, in this state where each locking projection 46 of the filter element 40 enters the recess 21 formed between the adjacent flanges 19 of the upper case half 10, the upper protrusion 43 of the filter element 40 is placed on the upper plate 43. The provided seal member 47 is fitted into the groove portion 22 of the upper case half 10. At this time, the three W-shaped portions 48 provided on the seal member 47 are fitted into the portions of the groove portion 22 that are inverted from the W-shaped portions 48. As a result, the filter element 40 is temporarily fixed to the upper case half 10.

Here, as described above, the three hook-shaped portions 19 provided in the upper case half 10 each have a shape in which the lower end portion is pointed downward, and each of the locking protrusions 46 provided in the filter element 40. If the upper end portion has an upwardly sharp shape, when the filter element 40 is to be attached to the upper case half 10, the tip (upper end) portion of the locking projection 46 on the filter element 40 side is exactly Even if it is at a position facing the tip (lower end) portion of the hook-shaped portion 19, the locking protrusion

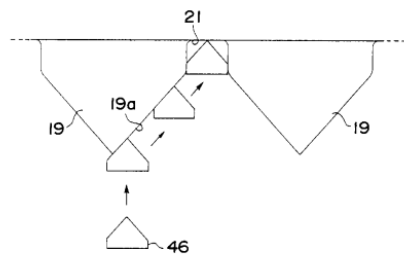
	46 is displaced to either the left or right when contacting the hook-shaped portion 19. Therefore, the filter element 40 is mounted on the upper case half 10 smoothly. Moreover, in this filter apparatus 1, since the lower end part of one hook-shaped part 19 has protruded and extended below the lower end part of the other hook-shaped part 19, the effect is very big. It has become. Yokoyama at [Brief description of the drawings]: FIG. 1 is a view showing a perspective view of an upper case half of a fuel filter according to an embodiment of the present invention viewed from below and a perspective view of a filter element viewed obliquely from above. ... FIG. 6 is a diagram showing a path followed by a locking projection that comes into contact with the side surface of the hook-shaped portion when the filter element is pushed up toward the upper case half. Yokoyama at Fig. 1:
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【 図 1 】

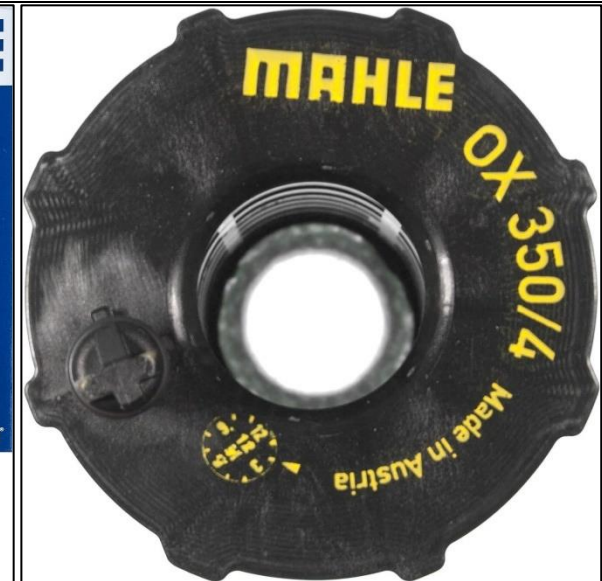


Yokoyama at Fig. 6:

【 図 6 】



MAHLE Audi Filter:



Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

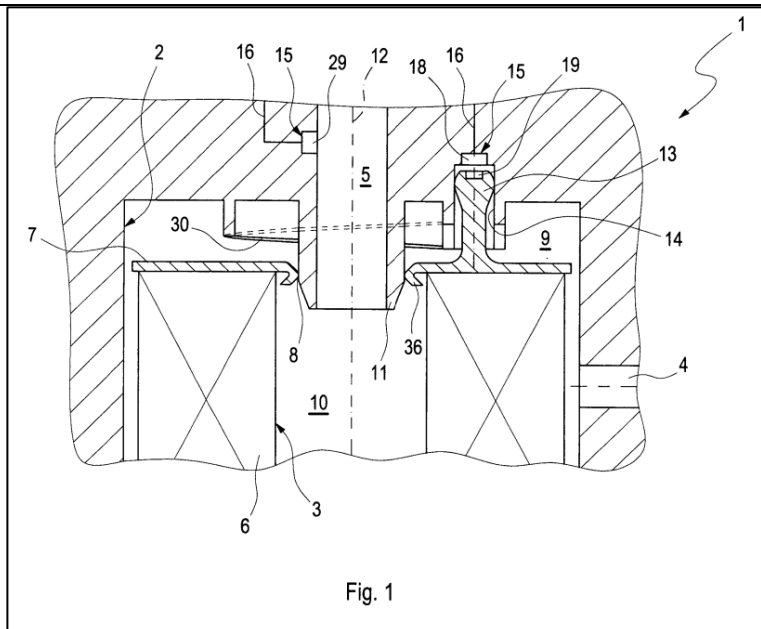
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



For example, Yokoyama in combination with Audi System discloses the inclined plane (Yokoyama 19, 19a) and the nose (Yokoyama 46) arranged to be moved in relation to each other in such a way that they slide along each other (see Yokoyama fig. 6, showing the inclined plane and the nose sliding along each other) and bring the blocking element (Grass 13) into engagement with the eccentric opening (Grass 14), by rotating the ring filter insert relative to the filter housing (see Yokoyama at [0021], “at this time, the filter element 40 is slightly rotated in the twisting direction”).

[15.e] the first positioning means being one of embodied and arranged on an inner circumference of the ring filter insert.

Yokoyama in combination with Audi System, and/or the background knowledge of a POSA, discloses the first positioning means being one of embodied and arranged on an inner circumference of the ring filter insert.

Based on Hengst’s construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

A POSA would have motivation to make this combination for numerous reasons. For example, both Yokoyama and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element (*e.g.*, Grass 13) and an eccentric opening in the filter housing (*e.g.*, Grass 14) has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Yokoyama. Further, it was well known in the art to use a positioning means to ensure proper alignment of components in a filter assembly and/or that only the proper filter insert is installed on a filter housing. *See, e.g.*, US 2006/0219621, [0003] (“Published German patent application no. DE 4402836, for example, describes an arrangement in which the correct use of Suitable replacement parts is ensured by the fact that the respective part for attachment can be attached to the unit only according to a lock-and-key principle.”), [0006] (“Another object of the invention is to provide a filter device which establishes a definitive correlation between the filter housing and an installed filter element.”), [0007] (“A further object of the invention is to provide a filter device which prevents installation of an incorrect filter element.”), [0028] (“If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24.”). Such a positioning means also ensures a user need not visually align or guess at proper alignment through trial and error, potentially damaging the blocking element or incorrectly installing it. Thus there was common sense—and express—motivation in the art to use a positioning means to ensure proper alignment of components such as an eccentric blocking element within the filter housing. The protrusions (*e.g.*, 46) and ramp (*e.g.*, 19, 21) alignment system disclosed in Yokoyama offers the advantages of automatically aligning the filter insert (*e.g.*, 42) with the filter housing (*e.g.*, 10) in a pre-determined way during filter installation, particularly when the filter insert is installed in the filter case along an axial direction. Because both Yokoyama and Audi System disclose similar structures and filter installation methods and that Audi System discloses an eccentric blocking element that need to be aligned with the filter housing during installation, a POSA would be motivated to add this advantageous alignment feature to the filter and housing of Audi System. A POSA would have a reasonable expectation of success in adding this feature to Yokoyama and/or incorporating the teachings of Yokoyama into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

Yokoyama at [0019]:

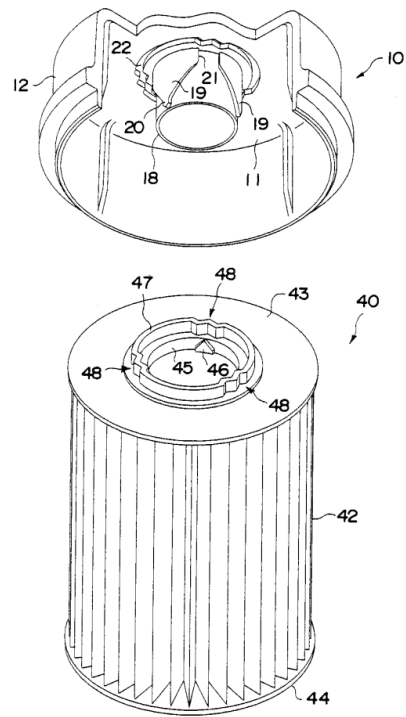
As shown in FIGS. 1 and 4, three locking protrusions 46 that protrude toward the center of the opening 45 are provided on the inner peripheral portion of the opening 45 of the upper plate 43. As will be described later, these three locking projections 46 are attached to the upper case half 10 so that the tube portion 18 of the upper case half 10 is inserted into the opening 45 of the filter element 40. In this case, it enters into a recess 21 formed between adjacent ones of the three bowl-shaped portions 19 provided on the upper case 10 side (the engagement shown by a broken line in FIG. 5). (See projection 46). In addition, it is preferable that the front-end | tip (upper end) part of these three latching protrusions 46 has a shape pointed upward as shown in FIG. 1.

Yokoyama at [Brief description of the drawings]:

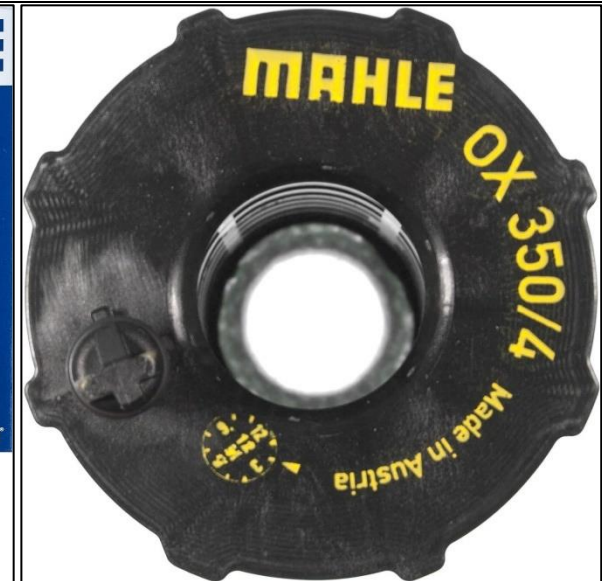
FIG. 1 is a view showing a perspective view of an upper case half of a fuel filter according to an embodiment of the present invention viewed from below and a perspective view of a filter element viewed obliquely from above.

Yokoyama at Fig. 1:

【 図 1 】



MAHLE Audi Filter:



Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:

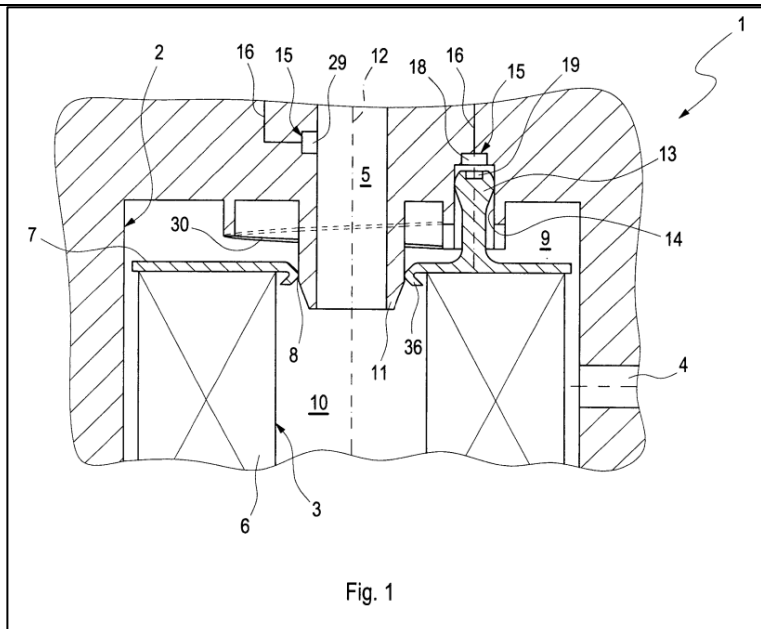


Fig. 1

As one example, Yokoyama in combination with Audi System discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: the first positioning means being a protruding nose (Yokoyama 46) and arranged on an inner circumference (Yokoyama 45) of the ring filter insert (Yokoyama 40).

Claim 16

[16] The ring filter insert according to claim 15, wherein the inclined plane is formed by two partial planes which run towards each other in opposite directions and which in each case extend across half of an inner circumference of the ring filter insert.

The subject matter of claim 16 as a whole would have been obvious in light of Yokoyama and the general background knowledge of the POSA. The POSA would have understood that implementing the inclined planes of Yokoyama by forming two partial planes which run towards each other in opposite directions and which in each case extend across half of one of an inner circumference of the ring filter insert and an outer circumference of the filter housing part arranged inside the ring filter insert was a simple design option and choice for implementing the inclines planes.

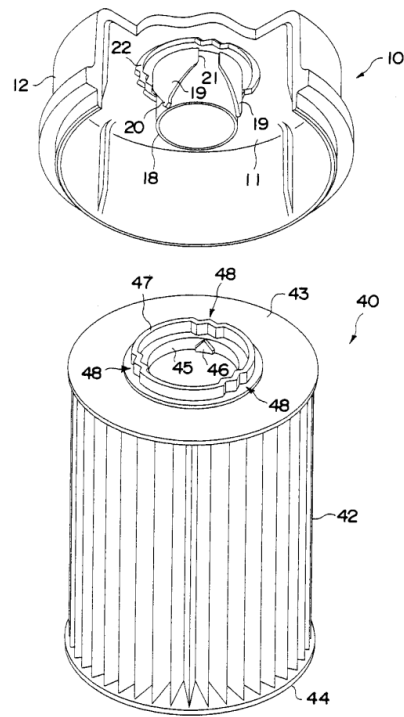
Claim 17

[17] The ring filter insert according to claim 15, including a guide for the nose which runs

Yokoyama discloses a guide for the nose which runs in an axial direction and is connected to a lower end of the inclined plane.

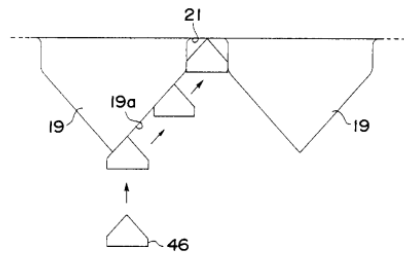
in an axial direction and is connected to a lower end of the inclined plane.	<i>See, e.g.,</i> Yokoyama at [0019]: As shown in FIGS. 1 and 4, three locking protrusions 46 that protrude toward the center of the opening 45 are provided on the inner peripheral portion of the opening 45 of the upper plate 43. As will be described later, these three locking projections 46 are attached to the upper case half 10 so that the tube portion 18 of the upper case half 10 is inserted into the opening 45 of the filter element 40. In this case, it enters into a recess 21 formed between adjacent ones of the three bowl-shaped portions 19 provided on the upper case 10 side (the engagement shown by a broken line in FIG. 5). (See projection 46). In addition, it is preferable that the front-end tip (upper end) part of these three latching protrusions 46 has a shape pointed upward as shown in FIG. 1. Yokoyama at [0021]: In order to assemble the filter element 40 in the filter case 5, first, the tube portion 18 (and the three hook-shaped portions 19) of the upper case half 10 is inserted through the opening 45 of the upper plate 43 in the filter element 40 from above. The filter element 40 is pushed upward. As a result, the three locking projections 46 provided on the upper plate 43 are guided upward by the side surface portions 19a of the three hook-shaped portions 19 provided on the upper case half 10 (at this time, the filter element 40). Is slightly rotated in the twisting direction), and enters into the recess 21 formed between two adjacent flanges 19. FIG. 6 shows an example of a path followed by the locking projection 46 that contacts the side surface portion 19a of the bowl-shaped portion 19 when the filter element 40 is pushed up toward the upper case half 10. The projection 46 advances in the direction indicated by the arrow in the figure and fits into a recess 21 formed between two adjacent flanges 19. Yokoyama at Fig. 1:
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【 図 1 】



Yokoyama at Fig. 6:

【 図 6 】



For example, Yokoyama discloses a guide (21) for the nose (46) which runs in an axial direction and is connected to a lower end of the inclined plane (19, 19a).

Claim 19

[19] The ring filter insert according to claim 15, wherein the inclined plane is formed by one of a radially protruding rib and step which forms a contact surface for the nose on one of an upper or lower side thereof.

Yokoyama discloses the inclined plane is formed by one of a radially protruding rib and step which forms a contact surface for the nose on one of an upper or lower side thereof.

See, e.g.,

Yokoyama at [0016]:

As shown in FIG. 1, three hook-shaped portions 19 extending downward are provided on the outer peripheral portion of the pipe portion 18 provided in the upper case half 10 (in FIG. 1, the hook-shaped portion 19 is Only two of the three are visible). FIG. 5 is a developed view of the pipe portion 18 provided in the upper case half body 10, and as shown in this figure, the left and right side surface portions 19a of each of the bowl-shaped portions 19 are parallel to the vertical direction. Although it may extend, it is preferably formed in a tapered shape that narrows downward as shown in this figure. Moreover, it is preferable that the lower end part of each hook-shaped part 19 has the shape pointed downward, Furthermore, the lower end part of one hook-shaped part 19 is below the lower end part of the other hook-shaped part 19. It is preferable that the protrusion extends (see the protrusion 20 shown in FIG. 5).

Yokoyama at [0019]:

As shown in FIGS. 1 and 4, three locking protrusions 46 that protrude toward the center of the opening 45 are provided on the inner peripheral portion of the opening 45 of the upper plate 43. As will be described later, these three locking projections 46 are attached to the upper case half 10 so that the tube portion 18 of the upper case half 10 is inserted into the opening 45 of the filter element 40. In this case, it enters into a recess 21 formed between adjacent ones of the three bowl-shaped portions 19 provided on the upper case 10 side (the engagement shown by a broken line in FIG. 5). (See projection 46). In addition, it is preferable that the front-end | tip (upper end) part of these three latching protrusions 46 has a shape pointed upward as shown in FIG. 1.

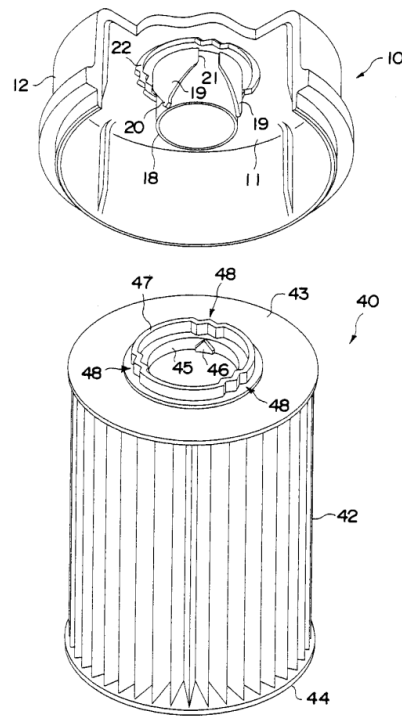
Yokoyama at [0021]:

In order to assemble the filter element 40 in the filter case 5, first, the tube portion 18 (and the three hook-shaped portions 19) of the upper case half 10 is inserted through the opening 45 of the upper plate 43 in the filter element 40 from above. The filter element 40 is pushed upward. As a

result, the three locking projections 46 provided on the upper plate 43 are guided upward by the side surface portions 19a of the three hook-shaped portions 19 provided on the upper case half 10 (at this time, the filter element 40). Is slightly rotated in the twisting direction), and enters into the recess 21 formed between two adjacent flanges 19. FIG. 6 shows an example of a path followed by the locking projection 46 that contacts the side surface portion 19a of the bowl-shaped portion 19 when the filter element 40 is pushed up toward the upper case half 10. The projection 46 advances in the direction indicated by the arrow in the figure and fits into a recess 21 formed between two adjacent flanges 19.

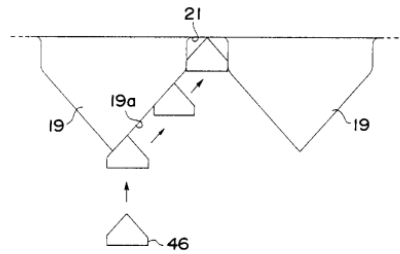
Yokoyama at Fig. 1:

【 図 1 】



Yokoyama at Fig. 6:

【図 6】



As one example, Yokoyama discloses the inclined plane (19, 19a) is formed by a radially protruding step, which forms a contact surface (19a) for the nose (46) on a lower side thereof.

Claim 23

[23] The ring filter insert according to claim 15, wherein the nose is formed integrally with the bottom front panel of the ring filter insert.

Yokoyama discloses the nose is formed integrally with the bottom front panel of the ring filter insert.

See, e.g.,

Yokoyama at [0015]:

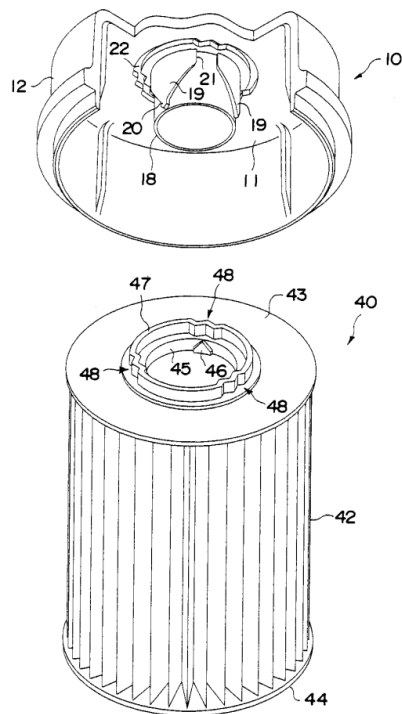
As shown in Figure 3, a cavity 14 is provided on the upper left side of the upper case half body 10, and a fuel inflow path 15, which communicates with this cavity 14, is provided extending in the left-right direction in the ceiling part 11. Also, at the center of the ceiling part 11 of the upper case 10, a cylindrical tube part 18, which protrudes downward from its lower surface side and extends into the filter element holding space 7, is formed. Its inner space communicates with the fuel outflow path 17, which is provided extending up and down at the center of the ceiling part 11.

Yokoyama at [0019]:

As shown in FIGS. 1 and 4, three locking protrusions 46 that protrude toward the center of the opening 45 are provided on the inner peripheral portion of the opening 45 of the upper plate 43. As will be described later, these three locking projections 46 are attached to the upper case half 10 so that the tube portion 18 of the upper case half 10 is inserted into the opening 45 of the filter

	element 40. In this case, it enters into a recess 21 formed between adjacent ones of the three bowl-shaped portions 19 provided on the upper case 10 side (the engagement shown by a broken line in FIG. 5). (See projection 46). In addition, it is preferable that the front-end tip (upper end) part of these three latching protrusions 46 has a shape pointed upward as shown in FIG. 1. Yokoyama at [0021]: In order to assemble the filter element 40 in the filter case 5, first, the tube portion 18 (and the three hook-shaped portions 19) of the upper case half 10 is inserted through the opening 45 of the upper plate 43 in the filter element 40 from above. The filter element 40 is pushed upward. As a result, the three locking projections 46 provided on the upper plate 43 are guided upward by the side surface portions 19a of the three hook-shaped portions 19 provided on the upper case half 10 (at this time, the filter element 40). Is slightly rotated in the twisting direction), and enters into the recess 21 formed between two adjacent flanges 19. FIG. 6 shows an example of a path followed by the locking projection 46 that contacts the side surface portion 19a of the bowl-shaped portion 19 when the filter element 40 is pushed up toward the upper case half 10. The projection 46 advances in the direction indicated by the arrow in the figure and fits into a recess 21 formed between two adjacent flanges 19. Yokoyama at Fig. 1:
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【 図 1 】



As one example, Yokoyama discloses the nose (46) is formed integrally with the ring filter insert (45, 40) and panel 43.

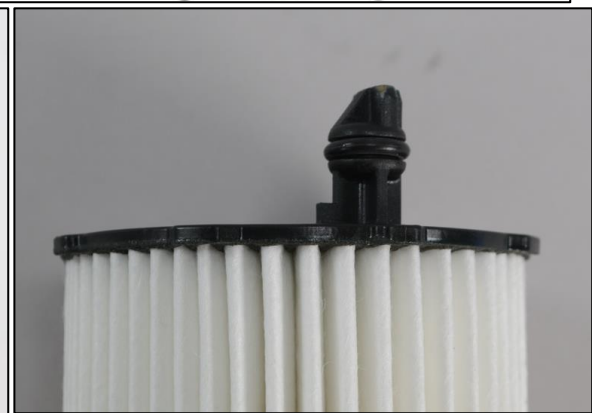
Claim 24

[24] The ring filter insert according to claim 15, wherein the blocking element is one of a radially sealing valve element, an axially sealing valve element, and a radially sealing plug which is one of rigidly connected to the lower front panel and rigidly arranged on the lower front panel.

Yokoyama in combination with Audi System, and/or the background knowledge of a POSA, discloses the blocking element is one of a radially sealing valve element, an axially sealing valve element, and a radially sealing plug which is one of rigidly connected to the lower front panel and rigidly arranged on the lower front panel.

A POSA would have motivation to make this combination for numerous reasons. For example, both Yokoyama and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms),

	and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element (<i>e.g.</i>, Grass 13) and an eccentric opening in the filter housing (<i>e.g.</i>, Grass 14) has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Yokoyama. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the drain plug/cap located at the bottom surface (<i>e.g.</i>, 31) of the filter case disclosed in Yokoyama, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (<i>e.g.</i>, 5) during filter change, because the eccentric blocking element eliminate the need to manually open any drain plug/cap in order to drain the remaining oil. Further, eccentric blocking element disclosed in Audi System offers similar advantage to filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Yokoyama. Because, during an oil change, when the lower case (<i>e.g.</i>, 30) is removed with the filter insert (<i>e.g.</i>, 40) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching the outer surface of the lower case or any cap/plug from outside, or pouring any remaining oil over the lip or connecting screw (<i>e.g.</i> 13) of the lower case. A POSA would have a reasonable expectation of success in adding this feature to Yokoyama and/or incorporating the teachings of Yokoyama into Audi as doing so involves no more than routine techniques well established in the mechanical arts. <i>See, e.g.,</i> MAHLE Audi Filter:
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Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

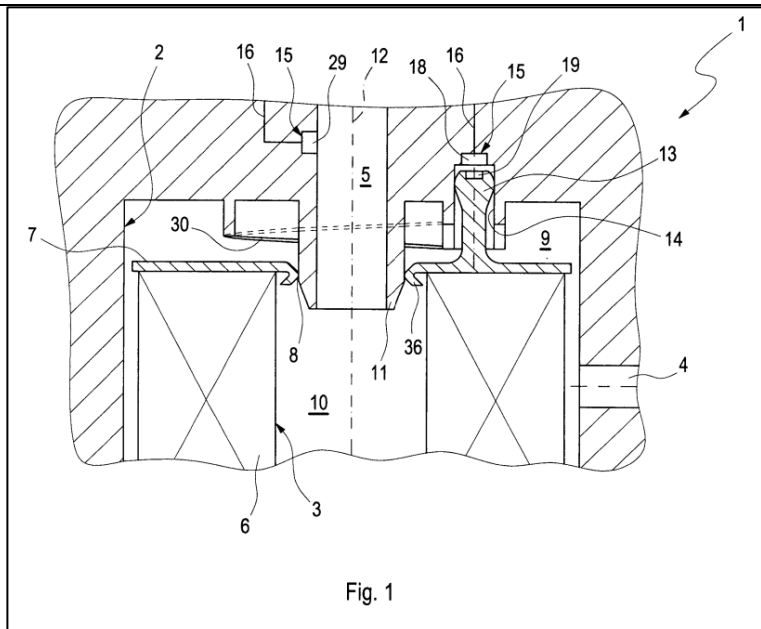
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



As one example, Yokoyama in combination with Audi System discloses the blocking element (Grass 13) is a radially sealing plug which is rigidly arranged on the bottom front panel (Grass 7).

Claim 25

[25] The ring filter insert according to claim 15, wherein the blocking element is an axially sealing valve element which is elastically arranged on the bottom front panel.

Yokoyama in combination with Audi System, and/or the background knowledge of a POSA, discloses the blocking element is an axially sealing valve element which is elastically arranged on the bottom front panel.

A POSA would have motivation to make this combination for numerous reasons. For example, both Yokoyama and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element (*e.g.*, Grass 13) and an eccentric opening in the filter housing (*e.g.*, Grass 14) has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Yokoyama. A POSA would understand that, the eccentric blocking element disclosed in Audi

System, when compared to the drain plug/cap located at the bottom surface (e.g., 31) of the filter case disclosed in Yokoyama, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (e.g., 5) during filter change, because the eccentric blocking element eliminate the need to manually open any drain plug/cap in order to drain the remaining oil. Further, eccentric blocking element disclosed in Audi System offers similar advantage to filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Yokoyama. Because, during an oil change, when the lower case (e.g., 30) is removed with the filter insert (e.g., 40) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching the outer surface of the lower case or any cap/plug from outside, or pouring any remaining oil over the lip or connecting screw (e.g. 13) of the lower case. A POSA would have a reasonable expectation of success in adding this feature to Yokoyama and/or incorporating the teachings of Yokoyama into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

MAHLE Audi Filter:

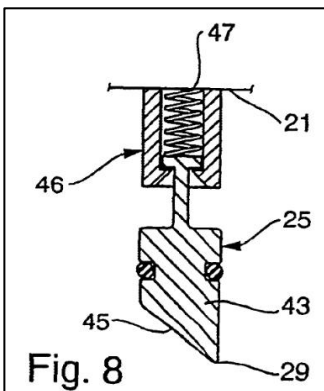




Baumann at :

In the special embodiment illustrated in FIG. 8, the pin 25 is supported so it is adjustable in the axial direction by means of a holder 46 on the lower end disk 21. The holder 46 contains a spring 47, which applies tension to the pin 25, pulling it away from the lower end disk 21, i.e., in the direction of the ramp 28.

Baumann at Fig. 8:



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

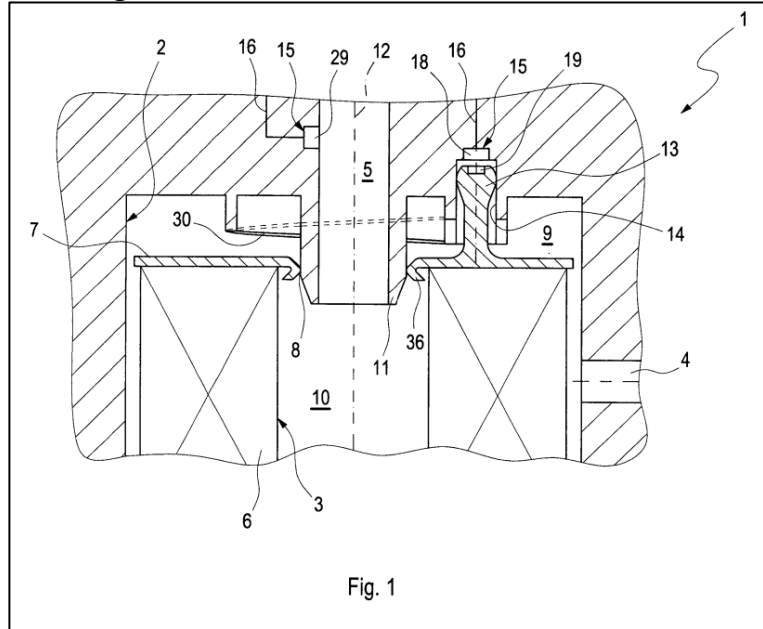
The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean

	room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11. The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 . The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 . Grass at [0033]-[0036]: According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified. If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function. To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the
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respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



For example, Yokoyama in combination with Audi System discloses the blocking element (Baumann 25) is an axially sealing valve element which is elastically arranged on the bottom front panel (Baumann 47).

Claim 28

[28] The ring filter insert according to claim 15, wherein the blocking element is formed from two parts, the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.

Yokoyama in combination with Audi System, and/or the background knowledge of a POSA, discloses the blocking element is formed from two parts, the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.

A POSA would have motivation to make this combination for numerous reasons. For example, both Yokoyama and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element (*e.g.*, Grass 13) and an eccentric opening in the filter housing (*e.g.*, Grass 14) has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Yokoyama. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the drain plug/cap located at the bottom surface (*e.g.*, 31) of the filter case disclosed in Yokoyama, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (*e.g.*, 5) during filter change, because the eccentric blocking element eliminate the need to manually open any drain plug/cap in order to drain the remaining oil. Further, eccentric blocking element disclosed in Audi System offers similar advantage to filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Yokoyama. Because, during an oil change, when the lower case (*e.g.*, 30) is removed with the filter insert (*e.g.*, 40) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching the outer surface of the lower case or any cap/plug from outside, or pouring any remaining oil over the lip or connecting screw (*e.g.* 13) of the lower case. A POSA would have a reasonable expectation of success in adding this feature to Yokoyama and/or incorporating the teachings of Yokoyama into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

MAHLE Audi Filter:



Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0023]:

	According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine. The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11. The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 . The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 . The filter device 1 also has at least one signal generator 15 on, which is designed and / or arranged so that thus the absence and / or the presence of the pin 13 in the pin
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holder 14 recognizable and possibly electrically signaled. The respective signal generator 15 can for example via a corresponding signal line 16 be connected to a controller not shown here.

At the in 1 the embodiment shown is the pin receptacle 14 designed as a blind hole. In particular, this Blindloch or the pin receiving 14 in addition to the ability, the pin 13 record, so no more functionality. In contrast, shows 2 an embodiment in which the pin receiving 14 through an inlet region of a return or idle 17 is formed, with the crude space 9 communicated. The pin 13 here additionally fulfills the function, the idle or the return 17 when closing in the pin receptacle 14 , So in the inlet area of the return or idle 17 is plugged in. The pin 13 can do this with a corresponding radial seal 31 equipped, which is for example an O-ring.

Grass at [0033]-[0036]:

According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

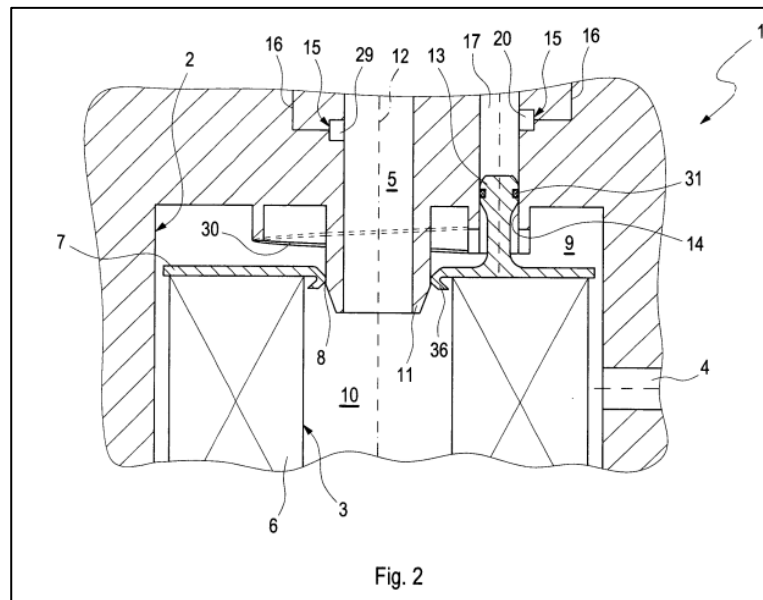
If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is

dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 2:

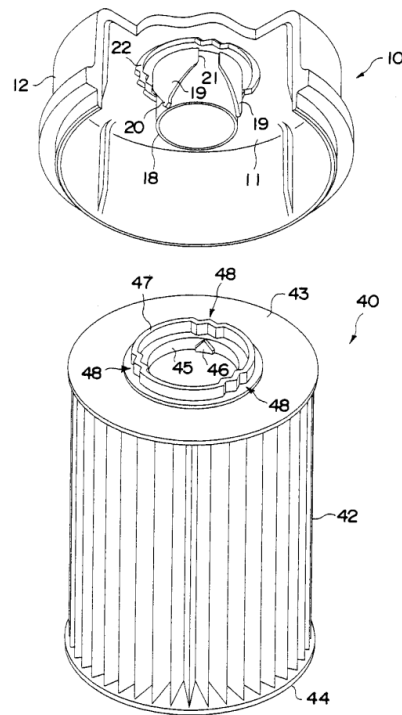


For example, Yokoyama in combination with Audi System discloses the blocking element (Grass 13) is formed from two parts (Grass 13, 31), the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.

Claim 29

[29] The liquid filter according to claim 1, wherein the protruding nose protrudes radially.	Yokoyama discloses the protruding nose protrudes radially. <i>See, e.g.,</i> Yokoyama at [0019]: As shown in FIGS. 1 and 4, three locking protrusions 46 that protrude toward the center of the opening 45 are provided on the inner peripheral portion of the opening 45 of the upper plate 43. As will be described later, these three locking projections 46 are attached to the upper case half 10 so that the tube portion 18 of the upper case half 10 is inserted into the opening 45 of the filter element 40. In this case, it enters into a recess 21 formed between adjacent ones of the three bowl-shaped portions 19 provided on the upper case 10 side (the engagement shown by a broken line in FIG. 5). (See projection 46). In addition, it is preferable that the front-end tip (upper end) part of these three latching protrusions 46 has a shape pointed upward as shown in FIG. 1. Yokoyama at Fig. 1:
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【 図 1 】



For example, Yokoyama discloses the protruding nose (46) protrudes radially.

Claim 30

[30] The ring filter insert according to claim 15, wherein the protruding nose protrudes radially.

Yokoyama discloses the protruding nose protrudes radially.

See, e.g.,

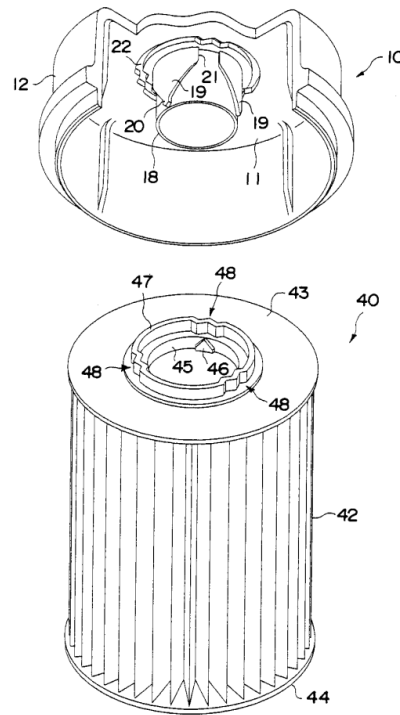
Yokoyama at [0019]:

As shown in FIGS. 1 and 4, three locking protrusions 46 that protrude toward the center of the opening 45 are provided on the inner peripheral portion of the opening 45 of the upper plate 43. As will be described later, these three locking projections 46 are attached to the upper case half 10 so that the tube portion 18 of the upper case half 10 is inserted into the opening 45 of the filter

element 40. In this case, it enters into a recess 21 formed between adjacent ones of the three bowl-shaped portions 19 provided on the upper case 10 side (the engagement shown by a broken line in FIG. 5). (See projection 46). In addition, it is preferable that the front-end | tip (upper end) part of these three latching protrusions 46 has a shape pointed upward as shown in FIG. 1.

Yokoyama at Fig. 1:

【図 1】



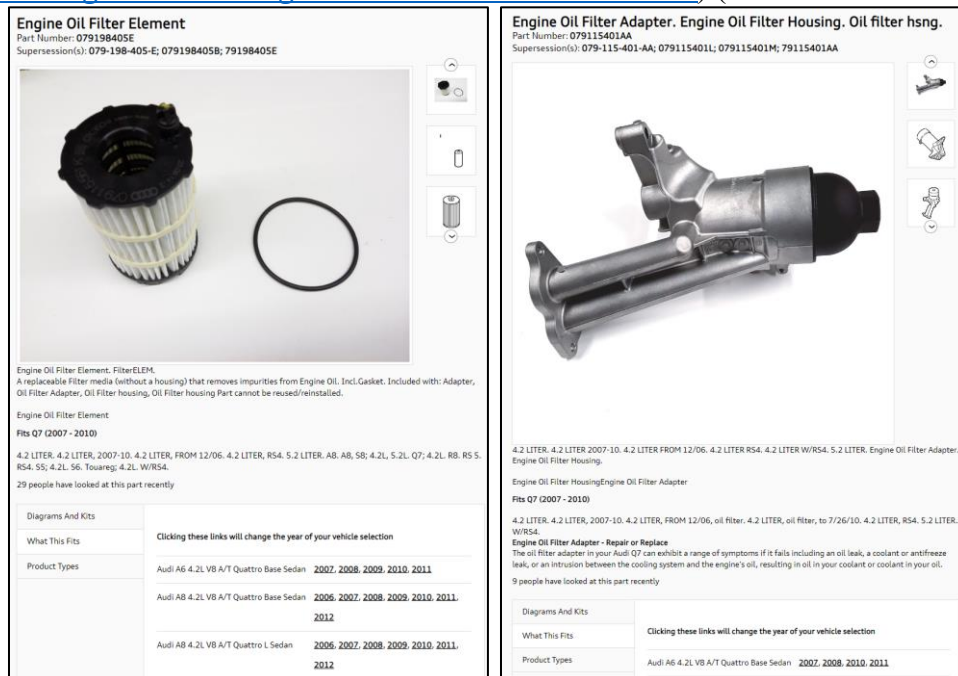
For example, Yokoyama discloses the protruding nose (46) protrudes radially.

**Exhibit C-3 – Invalidity of U.S. Patent No. 9,023,203 Based on
PCT International Patent Application Publication No. 2008134494 to Honermann et al. (“Honermann”) in View of Audi System**

PCT International Patent Application Publication No. 2008134494 to Honermann et al. (“Honermann”) was filed on April 25, 2008 and published on November 6, 2004. The Audi engine oil filter system (“Audi System”) implemented in vehicles including at least 2007-2011 4.2L V8 A/T Quattro Audi A6, 2006-2012 4.2L V8 A/T Quattro Audi A8 and A8L, and 2007-2009 4.2L V8 A/T Premium Audi Q7, was in public use, on sale, sold, known in this country, or otherwise available to the public since at least 2006 – before the priority date of the asserted claims of the U.S. Patent No. 9,023,203 (the “’203 patent”). Accordingly, Honermann, alone based on the state of the art, or in combination with Audi System constitutes prior art and invalidates the asserted claims of the ’203 patent under at least pre-AIA 35 U.S.C. § 103.

On information and belief, at least the following documents, or the documents referenced therein, describe the functionality of Audi System:

- Audi Engine Oil Filter Element Part Number: 079198405E (https://parts.audiusa.com/p/Audi_Q7/Engine-Oil-Filter-Element/48003807/079198405E.html) (“Audi Filter Insert”);
- Audi Engine Oil Filter Housing Part Number: 079115401AA (https://parts.audiusa.com/p/Audi_Q7/Engine-Oil-Filter-Adapter-Engine-Oil-Filter-Housing-Oil-filter-hsng/48003711/079115401AA.html) (“Audi Filter Housing”);



See, e.g., Audi Filter Insert; Audi Filter Housing.

- MAHLE OX 350/4D ECO Oil Filter (<https://www.amazon.com/MAHLE-Original-350-ECO-Filter/dp/B0068MWZZW>) (“MAHLE Audi Filter”);

Technical Details	
Manufacturer	Mahle
Brand	MAHLE
Model	OX3504DECO
Item Weight	3.52 ounces
Product Dimensions	9.96 x 7.02 x 5.31 inches
Item model number	OX3504DECO
Is Discontinued By Manufacturer	No
Exterior	Machined
Manufacturer Part Number	OX 350/4D
OEM Part Number	079198405E

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- MAHLE Products and Patents Search for MAHLE OX 350/4D Oil Filter (<https://www.mahle-aftermarket.com/eu/en/catalog/patents/>):



- Germany Patent Publication No. 10,2007,062,102 to Grass et al. (“Grass”), filed December 21, 2007 and published June 25, 2009;
- U.S. Patent No. 6,706,181 to Baumann et al. (“Baumann”), filed September 30, 2000 and published March 16, 2024.

A Person of Skill in the Art (“POSA”) would have been motivated to combine these references, because they are in the same field, they are aimed at solving the same perceived problems in the art, the nature of the problem to be solved was the same, and there is express motivation in these references. Known design incentives and market forces would have also motivated one of ordinary skill to combine these references. Furthermore, one of skill in the art would understand that each limitation not expressly disclosed in Honermann would be was a standard implementation and an obvious design choice in the design of a filter by the priority date of the asserted patent. Such an implementation simply reflects one of a finite number of well-known techniques (*e.g.*, whether to use an eccentric blocking element or not, or the particular means of ensuring only a certain type of filter insert is installable on a given housing) implemented in a predictable manner, to achieve well-known, predictable results.

The use of claim terms in the below chart is based on Hengst’s construction of claim terms in its infringement contentions as understood by Champion, as well as the plain and ordinary meaning of the claim terms. This chart should not be construed as consenting to or agreeing with Hengst’s construction of claim terms. Because discovery is ongoing and the claims have not yet been construed, Champion reserves all rights to amend its invalidity contentions based on discovery or on the Court’s constructions.

The citations to portions of any reference in this chart are exemplary only. For example, a citation that refers to or discusses a figure or figure item should be understood to also incorporate by reference that figure and any additional descriptions of that figure as if set forth fully therein. Champion reserves the right to rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid. Citations presented for one claim limitation are expressly incorporated by reference into all other limitations for that claim as well as all limitations of all claims on which that claim depends. Champion also reserves the right to rely on additional citations or sources of evidence that also may be applicable, or that may become applicable in light of claim construction, changes in Plaintiff's infringement contentions, and/or information obtained during discovery as the case progresses.

Claim Element	Exemplary Disclosures
	Claim 15
[15.pre] A hollow-cylindrical filter material body surrounded on front sides by top and bottom front panels and which can be replaceably arranged in a filter housing,	To the extent it is a limitation, Honermann discloses a hollow-cylindrical filter material body surrounded on front sides by top and bottom front panels and which can be replaceably arranged in a filter housing. <i>See, e.g.,</i> Honermann at 9:19-10:20. An example embodiment of a filtration system including a filter assembly and a filter head is depicted in FIGS. 1 -39. It should be realized that many examples are envisioned and not illustrated in the drawings. FIG. 1 shows a filter system 30, including a filter head 32 and a filter assembly 34. In the embodiment of FIG. 1, there is one common filter head 32 accommodating at least first and second filter assemblies 34. Also attached to the filter head 32 is a bypass filter assembly 35. The filter assemblies 34 are full-flow filters, while the filter assembly 35 is a bypass filter assembly. In FIG. 1, one of the filter assemblies 34 is shown in an exploded, perspective view as including filter bowl 36 and a removable and replaceable filter cartridge 38. Each of the filter assemblies 34, 35 is selectively connectable and mountable on the filter head 32. The filter head 32 is connected with other equipment, including a lubrication system of an engine, a fuel system for an engine, a hydraulic system for heavy-duty equipment, and generators for industrial use. In the embodiment illustrated, the filter assembly 34 includes features including a lock-out mechanism, an auto-drain valve mechanism, and a cartridge retention mechanism. Each of these features can be implemented independently of the other features. The particular embodiment illustrated in the drawings shows all three features integrated into the same filter assembly. One skilled in the art will appreciate that each feature can be implemented independently of the others.

In general, the lock-out mechanism ensures that the filter system 30 is not accidentally operated with equipment without the filter cartridge 38 installed therein (see FIG. 39, for example). Furthermore, in the particular system 30, the lock-out mechanism helps to ensure that the filter cartridge that goes within the bypass filter assembly 35 is not mistakenly used with the filter cartridge of the full-flow filter assemblies 34. The equipment upon which the filter system 30 is mounted is protected by ensuring that the filter head 32 and the filter bowl 36 cannot be operably connected unless there is a filter cartridge 38 operably oriented within the filter bowl 36 (FIG. 39). It also protects the equipment by ensuring that the correct filter cartridge 38 is mounted within the filter bowl 36, rather than, for example, the bypass filter cartridge utilized in the bypass filter assembly 35. Details on an example lock-out mechanism are described in Section K of this disclosure.

Honermann at 11:8-21:

Reference is made to FIGS. 6 and 7, which illustrate one embodiment of filter cartridge 38 usable in this arrangement. In the embodiment shown, the filter cartridge 38 includes first and second opposite endcaps 41, 42 and a tubular construction of filter media 44 extending between the first and second endcaps 41, 42. In the embodiment shown, the media 44 is cylindrical in construction and defines an open filter interior 46. A variety of different types of media 44 can be used and will depend upon the particular fluid that is being filtered. In the embodiment shown, the media 44 is pleated media 48. The pleated media 48 can include cellulose, synthetic, and blends of synthetic and cellulose, for example. In general, fluid to be filtered flows through the media 44, which functions to remove particulate or other debris from the fluid before flowing into the open filter 46. In some systems, it will be possible to operate the filter system 30 in a reverse-flow manner, in which the liquid to be filtered flows from the open filter interior 46, through the media 44, and to a region outside of the media 44.

Honermann at Figs. 1, 3:

FIG. 1

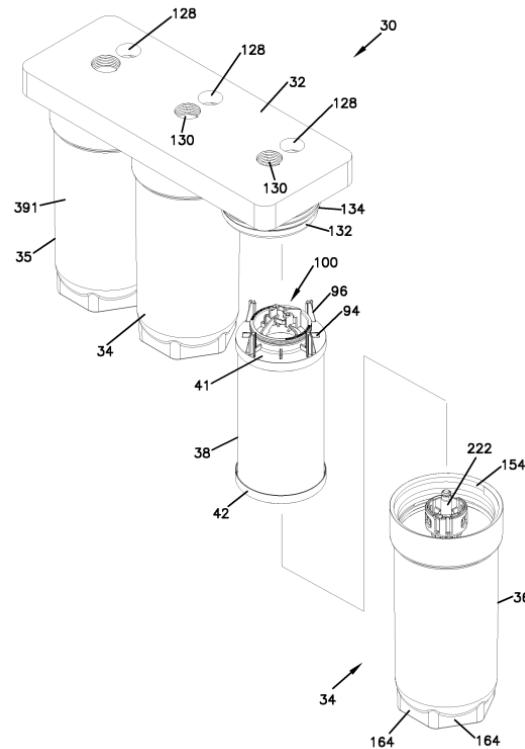
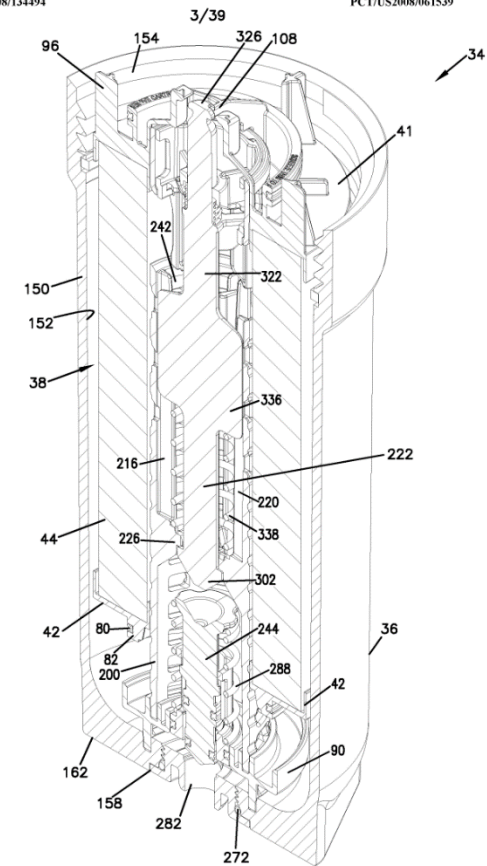


FIG. 3



For example, Honermann discloses a hollow-cylindrical filter material body (44) surrounded on front sides by top (41) and bottom (42) front panels and which can be replaceably arranged in a filter housing (36).

[15.a] an eccentric blocking element arranged on the bottom front panel for engaging an eccentric opening in the filter housing,

Honermann in combination with Audi System, and/or the background knowledge of a POSA, discloses an eccentric blocking element arranged on the bottom front panel for engaging an eccentric opening in the filter housing. It would have been obvious to combine Honermann with Audi System for the reasons discussed herein and in Defendant's cover pleading.

	A POSA would have motivation to make this combination for numerous reasons. Both Honermann and Audi System disclose similar structures, components, and subject matter (<i>e.g.</i> filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element (<i>e.g.</i>, Grass 13) and an eccentric opening in the filter housing (<i>e.g.</i>, Grass 14) has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Honermann. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the plug seals (<i>e.g.</i> 240, 244) and drain port (<i>e.g.</i> 282) system with springs (<i>e.g.</i> 338) disclosed in Honermann, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (<i>e.g.</i>, 5) during filter change, because the operator can manually choose to delay the release of the liquid by removing the filter insert from the lower filter housing after the lower housing has been unscrewed from the rest of the filter system— an advantage especially suited for filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Honermann. Such delay would avoid splash or contamination of the liquid on the operator as the lower filter housing is unscrewed. A POSA would have a reasonable expectation of success in adding this feature to Honermann and/or incorporating the teachings of Honermann into Audi as doing so involves no more than routine techniques well established in the mechanical arts. <i>See, e.g.,</i> MAHLE Audi Filter:
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Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:

unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318.

Honermann at 31:16-32:12:

During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it will contact or engage the second slide surface 318. The contact with the second slide surface 318 can be made through a protrusion located in the location of the fourth protrusion 124, as well. In embodiments that have protrusions at both locations of the second protrusion 122 and fourth protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

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FIG.23

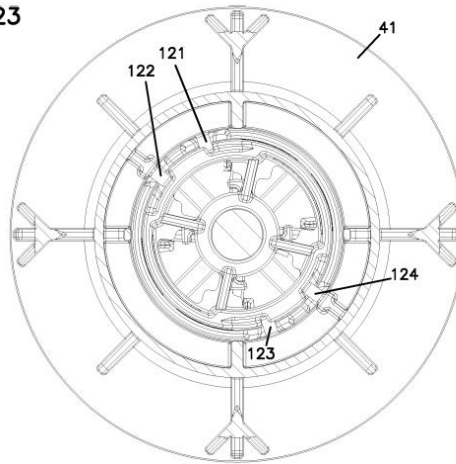


FIG.24

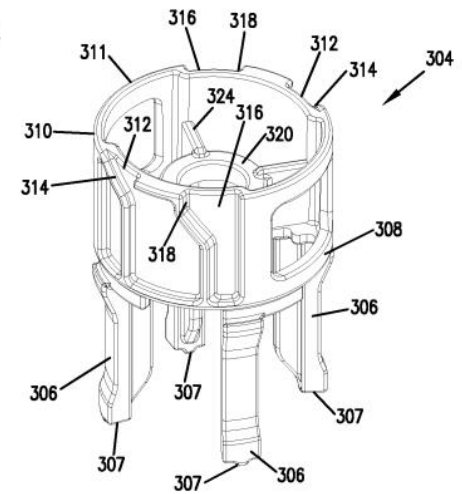
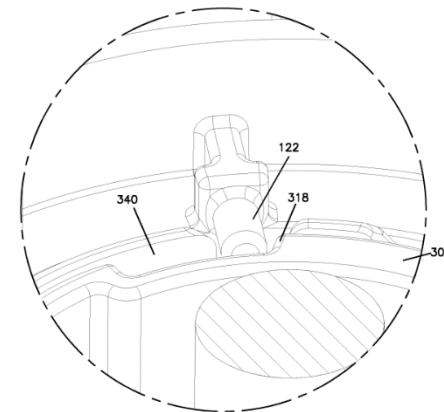
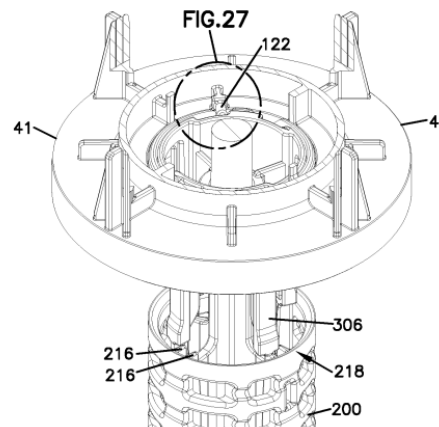


FIG.25



As one example, Honermann in combination with Audi System discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: first positioning means (Honermann 122) on the ring filter insert (Honermann 38), which interact with second positioning means (Honermann 316, 318) on the filter housing (Honermann 36) and which are arranged to bring the blocking element (Grass 13) into engagement with the eccentric opening (Grass 14).

[15.b] first positioning means on the ring filter insert, which interact with second positioning means on the filter housing when the ring filter insert is inserted into the filter housing and which are arranged to bring the blocking element into engagement with the eccentric opening,	Honermann in combination with Audi System, and/or the background knowledge of a POSA, discloses first positioning means on the ring filter insert, which interact with second positioning means on the filter housing when the ring filter insert is inserted into the filter housing and which are arranged to bring the blocking element into engagement with the eccentric opening. It would have been obvious to combine Honermann with Audi System for the reasons discussed herein and in Defendant’s cover pleading. A POSA would have motivation to make this combination for numerous reasons. For example, Both Honermann and Audi System disclose similar structures, components, and subject matter (<i>e.g.</i> filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, it was well known in the art to use a positioning means to ensure proper alignment of components in a filter assembly and/or that only the proper filter insert is installed on a filter housing. <i>See, e.g.</i>, US 2006/0219621, [0003] (“Published German patent application no. DE 4402836, for example, describes an arrangement in which the correct use of Suitable replacement parts is ensured by the fact that the respective part for attachment can be attached to the unit only according to a lock-and-key principle.”), [0006] (“Another object of the invention is to provide a filter device which establishes a definitive correlation between the filter housing and an installed filter element.”), [0007] (“A further object of the invention is to provide a filter device which prevents installation of an incorrect filter element.”), [0028] (“If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24.”). Such a positioning means also ensures a user need not visually align or guess at proper alignment through trial and error, potentially damaging the blocking element or incorrectly installing it. Thus there was common sense—and express—motivation in the art to use a positioning means to ensure proper alignment of components such as an eccentric blocking element within the filter housing. The protrusions (<i>e.g.</i>, 122) and ramp (<i>e.g.</i>, 316, 318) alignment system disclosed in Honermann offers the advantages of automatically aligning the filter insert (<i>e.g.</i>, 38) with the filter housing (<i>e.g.</i>, 36) in a pre-determined way during filter installation, particularly when the filter insert is installed in the filter case along an axial direction. Because both Honermann and Audi System disclose similar structures and filter installation methods and that Audi System discloses an eccentric blocking element that need to be aligned with the filter housing during installation, a POSA would be motivated to add this advantageous alignment feature to the filter and housing of Audi System.
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Moreover, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Honermann. For example, a POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the plug seals (*e.g.* 240, 244) and drain port (*e.g.* 282) system with springs (*e.g.* 338) disclosed in Honermann, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (*e.g.*, 5) during filter change, because the operator can manually choose to delay the release of the liquid by removing the filter insert from the lower filter housing after the lower housing has been unscrewed from the rest of the filter system— an advantage especially suited for filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Honermann. Such delay would avoid splash or contamination of the liquid on the operator as the lower filter housing is unscrewed. A POSA would have a reasonable expectation of success in adding this feature to Honermann and/or incorporating the teachings of Honermann into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

Based on Hengst’s construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

For example:

Honermann at 24:24-25:7:

The first slide surface 314 of the first groove 312 is constructed and arranged to engage the filter cartridge 38 and rotate the basket 304 from the first locked position to the second locked position. This rotation of the basket 304 also exposes the second slide surface 318 of the second groove 316 to engagement with the filter cartridge 38. An example can be seen by comparing FIGS. 19 and 20. In FIG. 19, the basket 304 is in the first locked position. The first slide surface 314 is exposed to engagement with the filter cartridge 38. In particular, and as explained further below in Section K, the first slide surface 314 engages the first protrusion 121 of the filter cartridge 38. The third protrusion 123 will engage the other first slide surface 314, in preferred embodiments. The first protrusion 121 engages the first slide surface 314, which rotates the basket 304 clockwise when viewed from above. The basket 304 is rotated to the second locked position, depicted in FIG. 20. The second locked position then exposes the second slide surface 318. The second slide surface 318, in preferred embodiments, has the second protrusion 122 engage

against it, which causes the basket 304 to further rotate clockwise, when viewed above, to the unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318.

Honermann at 31:16-32:12:

During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it will contact or engage the second slide surface 318. The contact with the second slide surface 318 can be made through a protrusion located in the location of the fourth protrusion 124, as well. In embodiments that have protrusions at both locations of the second protrusion 122 and fourth protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

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FIG.23

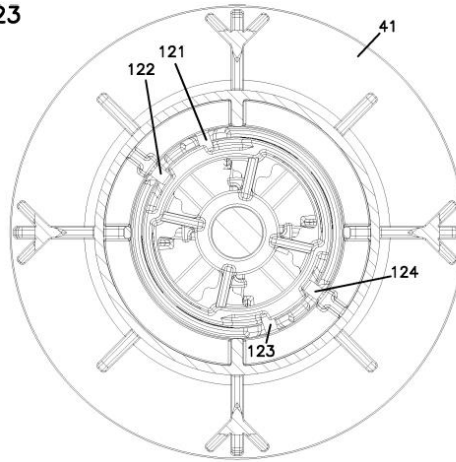


FIG.24

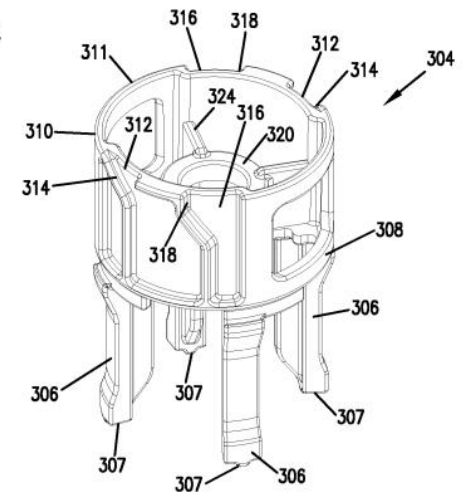


FIG.25

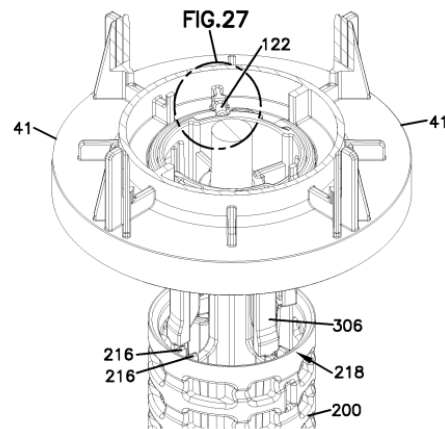
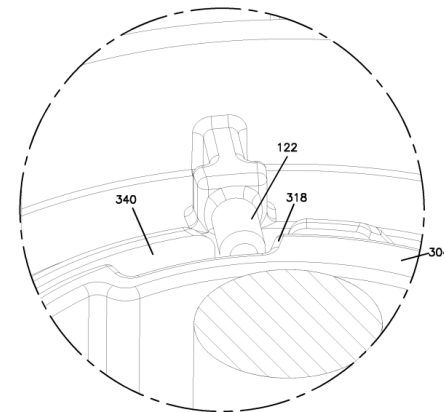


FIG.27



MAHLE Audi Filter:



Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

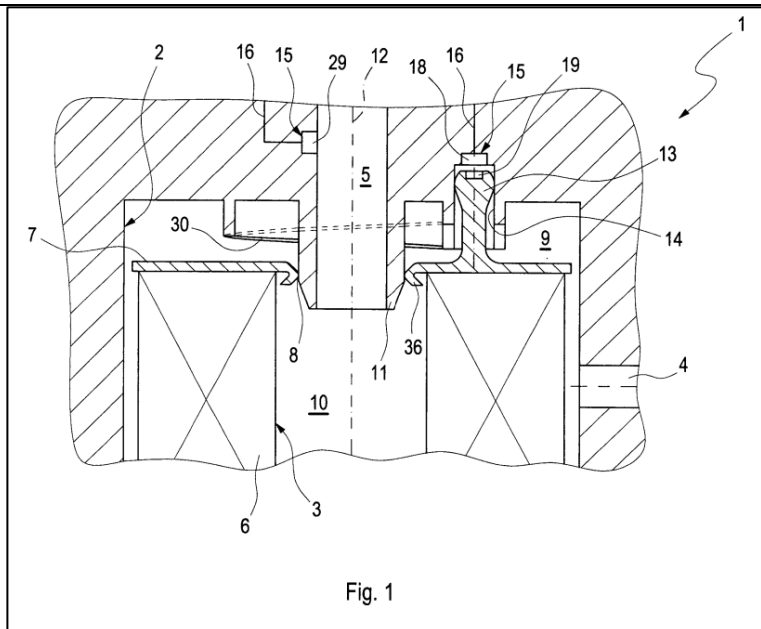
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



As one example, Honermann in combination with Audi System discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: first positioning means (Honermann 122) on the ring filter insert (Honermann 38), which interact with second positioning means (Honermann 316, 318) on the filter housing (Honermann 36) when the ring filter insert (Honermann 38) is inserted into the filter housing (Honermann 36) and which are arranged to bring the blocking element (Grass 13) into engagement with the eccentric opening (Grass 14).

[15.c] the first positioning means being one of an inclined plane and a protruding nose, with the second positioning means being the other of the inclined plane and the protruding nose,

Honermann discloses the first positioning means being one of an inclined plane and a protruding nose, with the second positioning means being the other of the inclined plane and the protruding nose.

Based on Hengst's construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

See, e.g.,

Honermann at 24:24-25:7:

The first slide surface 314 of the first groove 312 is constructed and arranged to engage the filter cartridge 38 and rotate the basket 304 from the first locked position to the second locked position. This rotation of the basket 304 also exposes the second slide surface 318 of the second groove 316 to engagement with the filter cartridge 38. An example can be seen by comparing FIGS. 19 and 20. In FIG. 19, the basket 304 is in the first locked position. The first slide surface 314 is exposed to engagement with the filter cartridge 38. In particular, and as explained further below in Section K, the first slide surface 314 engages the first protrusion 121 of the filter cartridge 38. The third protrusion 123 will engage the other first slide surface 314, in preferred embodiments. The first protrusion 121 engages the first slide surface 314, which rotates the basket 304 clockwise when viewed from above. The basket 304 is rotated to the second locked position, depicted in FIG. 20. The second locked position then exposes the second slide surface 318. The second slide surface 318, in preferred embodiments, has the second protrusion 122 engage against it, which causes the basket 304 to further rotate clockwise, when viewed above, to the unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318.

Honermann at 31:16-32:12:

During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it will contact or engage the second slide surface 318. The contact with the second slide surface 318

can be made through a protrusion located in the location of the fourth protrusion 124, as well. In embodiments that have protrusions at both locations of the second protrusion 122 and fourth protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

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FIG.23

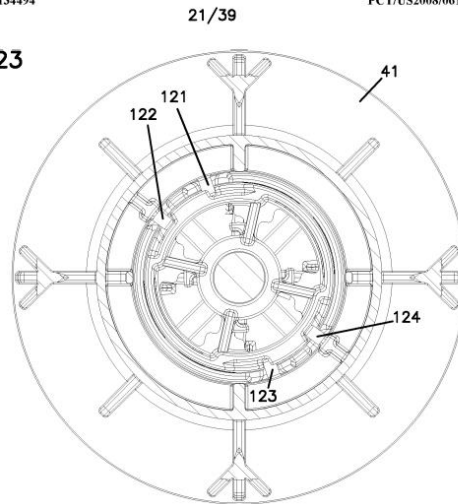


FIG.24

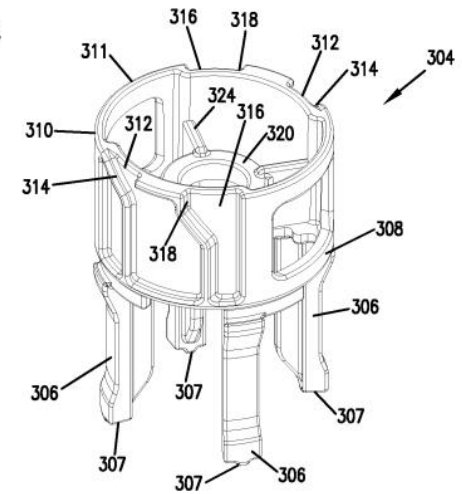


	FIG.25 As one example, Honermann discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: the first positioning means being a protruding nose (122), with the second positioning means being an inclined plane (316, 318).
[15.d] the inclined plane and the nose arranged to be moved in relation to each other in such a way that they slide along each other and bring the blocking element into engagement with the eccentric opening, by rotating the ring filter insert relative to the filter housing,	Honermann in combination with Audi System, and/or the background knowledge of a POSA, discloses the inclined plane and the nose arranged to be moved in relation to each other in such a way that they slide along each other and bring the blocking element into engagement with the eccentric opening, by rotating the ring filter insert relative to the filter housing. It would have been obvious to combine Honermann with Audi System for the reasons discussed herein and in Defendant’s cover pleading. A POSA would have motivation to make this combination for numerous reasons. For example, Both Honermann and Audi System disclose similar structures, components, and subject matter (<i>e.g.</i> filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Honermann. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the plug seals (<i>e.g.</i> 240, 244) and drain port (<i>e.g.</i>

282) system with springs (*e.g.* 338) disclosed in Honermann, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (*e.g.*, 5) during filter change, because the operator can manually choose to delay the release of the liquid by removing the filter insert from the lower filter housing after the lower housing has been unscrewed from the rest of the filter system— an advantage especially suited for filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Honermann. Such delay would avoid splash or contamination of the liquid on the operator as the lower filter housing is unscrewed.

Further, it was well known in the art to use a positioning means to ensure proper alignment of components in a filter assembly and/or that only the proper filter insert is installed on a filter housing. *See, e.g.*, US 2006/0219621, [0003] (“Published German patent application no. DE 4402836, for example, describes an arrangement in which the correct use of Suitable replacement parts is ensured by the fact that the respective part for attachment can be attached to the unit only according to a lock-and-key principle.”), [0006] (“Another object of the invention is to provide a filter device which establishes a definitive correlation between the filter housing and an installed filter element.”), [0007] (“A further object of the invention is to provide a filter device which prevents installation of an incorrect filter element.”), [0028] (“If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24.”). Such a positioning means also ensures a user need not visually align or guess at proper alignment through trial and error, potentially damaging the blocking element or incorrectly installing it. Thus there was common sense—and express—motivation in the art to use a positioning means to ensure proper alignment of components such as an eccentric blocking element within the filter housing. The protrusions (*e.g.*, 122) and ramp (*e.g.*, 316, 318) alignment system disclosed in Honermann offers the advantages of automatically aligning the filter insert (*e.g.*, 38) with the filter housing (*e.g.*, 36) in a pre-determined way during filter installation, particularly when the filter insert is installed in the filter case along an axial direction. Because both Honermann and Audi System disclose similar structures and filter installation methods and that Audi System discloses an eccentric blocking element that need to be aligned with the filter housing during installation, a POSA would be motivated to add this advantageous alignment feature to the filter and housing of Audi System. A POSA would have a reasonable expectation of success in adding this feature to Honermann and/or incorporating the teachings of Honermann into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

Honermann at 24:24-25:7:

The first slide surface 314 of the first groove 312 is constructed and arranged to engage the filter cartridge 38 and rotate the basket 304 from the first locked position to the second locked position. This rotation of the basket 304 also exposes the second slide surface 318 of the second groove 316 to engagement with the filter cartridge 38. An example can be seen by comparing FIGS. 19 and 20. In FIG. 19, the basket 304 is in the first locked position. The first slide surface 314 is exposed to engagement with the filter cartridge 38. In particular, and as explained further below in Section K, the first slide surface 314 engages the first protrusion 121 of the filter cartridge 38. The third protrusion 123 will engage the other first slide surface 314, in preferred embodiments. The first protrusion 121 engages the first slide surface 314, which rotates the basket 304 clockwise when viewed from above. The basket 304 is rotated to the second locked position, depicted in FIG. 20. The second locked position then exposes the second slide surface 318. The second slide surface 318, in preferred embodiments, has the second protrusion 122 engage against it, which causes the basket 304 to further rotate clockwise, when viewed above, to the unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318.

Honermann at 31:16-32:12:

During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it will contact or engage the second slide surface 318. The contact with the second slide surface 318 can be made through a protrusion located in the location of the fourth protrusion 124, as well. In embodiments that have protrusions at both locations of the second protrusion 122 and fourth

protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

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FIG.23

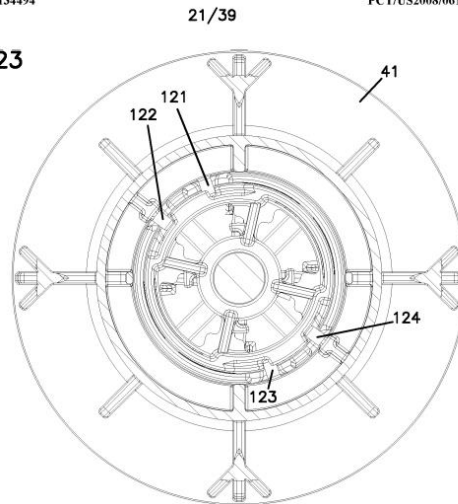


FIG.24

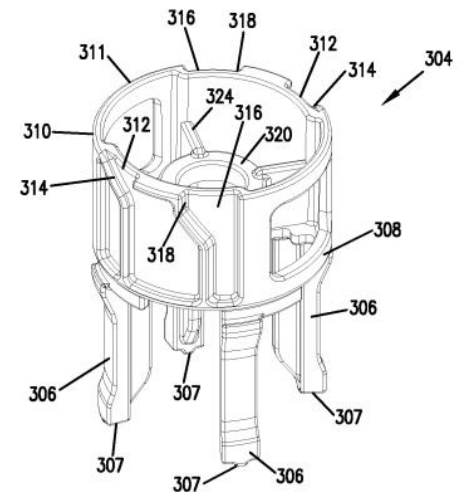
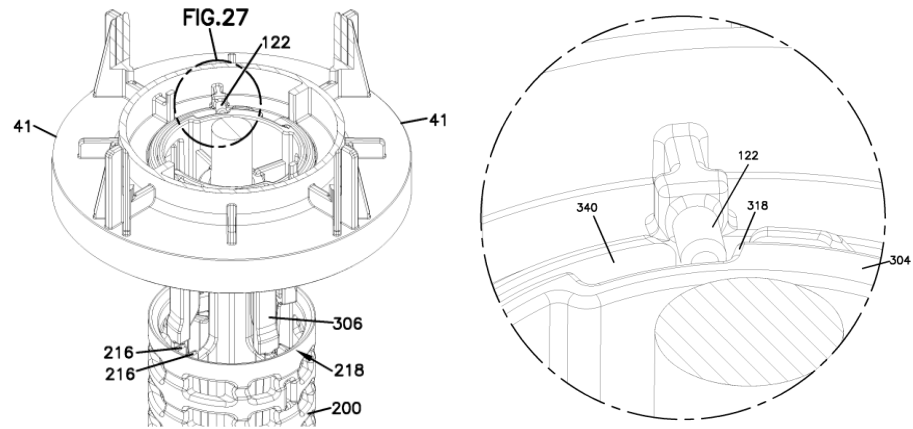


FIG.25



MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

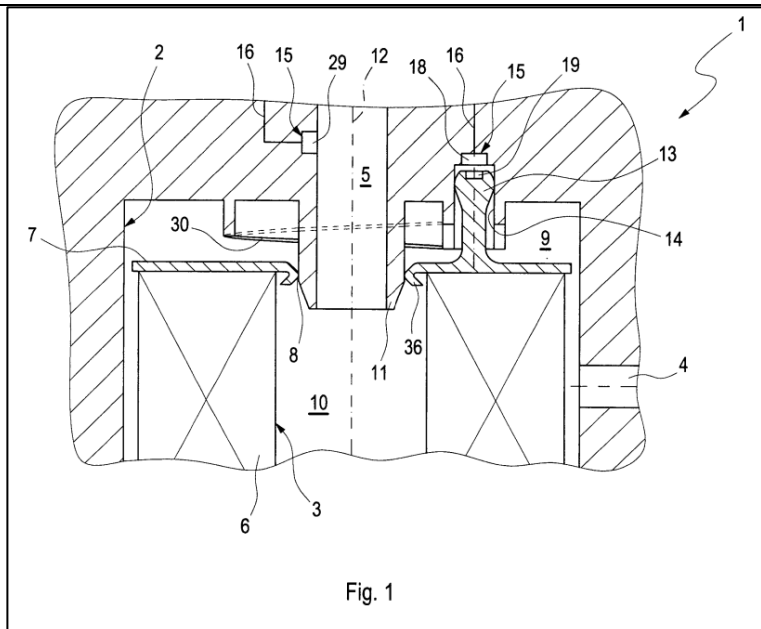
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



For example, Honermann in combination with Audi System discloses the inclined plane (Honermann 316, 318) and the nose (Honermann 122) arranged to be moved in relation to each other in such a way that they slide along each other (see Honermann fig. 27, showing the inclined plane and the nose interacting with each other) and bring the blocking element (Grass 13) into engagement with the eccentric opening (Grass 14), by rotating the ring filter insert relative to the filter housing.

[15.e] the first positioning means being one of embodied and arranged on an inner circumference of the ring filter insert.

Honermann in combination with Audi System, and/or the background knowledge of a POSA, discloses the first positioning means being one of embodied and arranged on an inner circumference of the ring filter insert.

Based on Hengst's construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

A POSA would have motivation to make this combination for numerous reasons. For example, Both Honermann and Audi System disclose similar structures, components, and subject matter

(*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Honermann. Further, it was well known in the art to use a positioning means to ensure proper alignment of components in a filter assembly and/or that only the proper filter insert is installed on a filter housing. *See, e.g.*, US 2006/0219621, [0003] (“Published German patent application no. DE 4402836, for example, describes an arrangement in which the correct use of Suitable replacement parts is ensured by the fact that the respective part for attachment can be attached to the unit only according to a lock-and-key principle.”), [0006] (“Another object of the invention is to provide a filter device which establishes a definitive correlation between the filter housing and an installed filter element.”), [0007] (“A further object of the invention is to provide a filter device which prevents installation of an incorrect filter element.”), [0028] (“If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24.”). Such a positioning means also ensures a user need not visually align or guess at proper alignment through trial and error, potentially damaging the blocking element or incorrectly installing it. Thus there was common sense—and express—motivation in the art to use a positioning means to ensure proper alignment of components such as an eccentric blocking element within the filter housing. The protrusions (*e.g.*, 122) and ramp (*e.g.*, 316, 318) alignment system disclosed in Honermann offers the advantages of automatically aligning the filter insert (*e.g.*, 38) with the filter housing (*e.g.*, 36) in a pre-determined way during filter installation, particularly when the filter insert is installed in the filter case along an axial direction. Because both Honermann and Audi System disclose similar structures and filter installation methods and that Audi System discloses an eccentric blocking element that need to be aligned with the filter housing during installation, a POSA would be motivated to add this advantageous alignment feature to the filter and housing of Audi System. A POSA would have a reasonable expectation of success in adding this feature to Honermann and/or incorporating the teachings of Honermann into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

Honermann at 24:24-25:7:

The first slide surface 314 of the first groove 312 is constructed and arranged to engage the filter cartridge 38 and rotate the basket 304 from the first locked position to the second locked position. This rotation of the basket 304 also exposes the second slide surface 318 of the second groove 316 to engagement with the filter cartridge 38. An example can be seen by comparing FIGS. 19 and 20. In FIG. 19, the basket 304 is in the first locked position. The first slide surface 314 is exposed to engagement with the filter cartridge 38. In particular, and as explained further below in Section K, the first slide surface 314 engages the first protrusion 121 of the filter cartridge 38. The third protrusion 123 will engage the other first slide surface 314, in preferred embodiments. The first protrusion 121 engages the first slide surface 314, which rotates the basket 304 clockwise when viewed from above. The basket 304 is rotated to the second locked position, depicted in FIG. 20. The second locked position then exposes the second slide surface 318. The second slide surface 318, in preferred embodiments, has the second protrusion 122 engage against it, which causes the basket 304 to further rotate clockwise, when viewed above, to the unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318.

Honermann at 31:16-32:12:

During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it will contact or engage the second slide surface 318. The contact with the second slide surface 318 can be made through a protrusion located in the location of the fourth protrusion 124, as well. In embodiments that have protrusions at both locations of the second protrusion 122 and fourth protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the

corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

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FIG.23

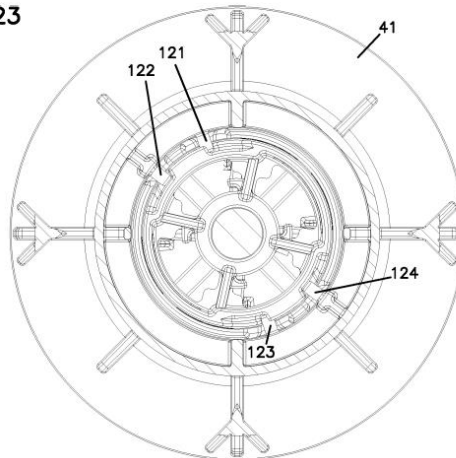


FIG.24

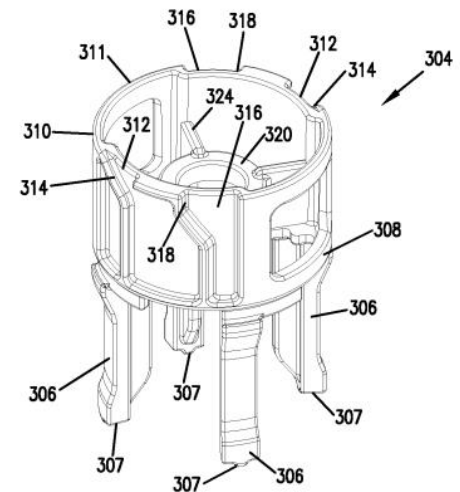
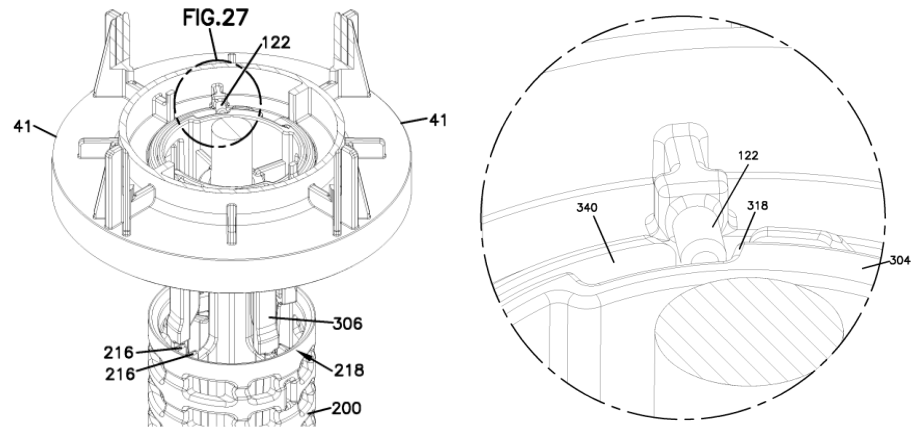


FIG.25



MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:

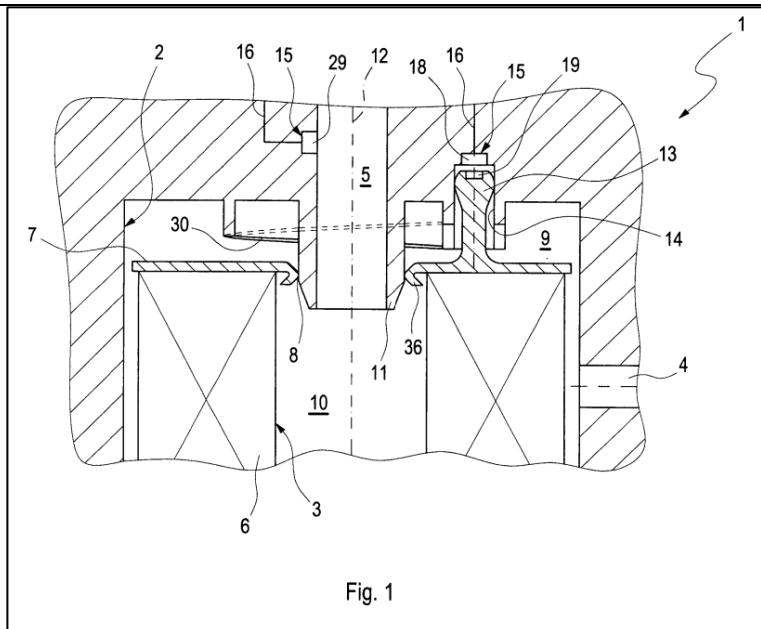


Fig. 1

As one example, Honermann in combination with Audi System discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: the first positioning means being a protruding nose (Honermann 122) and arranged on an inner circumference (Honermann 66) of the ring filter insert (Honermann 38).

Claim 16

[16] The ring filter insert according to claim 15, wherein the inclined plane is formed by two partial planes which run towards each other in opposite directions and which in each case extend across half of an inner circumference of the ring filter insert.

The subject matter of claim 16 as a whole would have been obvious in light of Honermann and the general background knowledge of the POSA. The POSA would have understood that implementing the inclined planes of Honermann by forming two partial planes which run towards each other in opposite directions and which in each case extend across half of one of an inner circumference of the ring filter insert and an outer circumference of the filter housing part arranged inside the ring filter insert was a simple design option and choice for implementing the inclines planes.

Claim 17

[17] The ring filter insert according to claim 15, including a guide for the nose which runs

Honermann discloses a guide for the nose which runs in an axial direction and is connected to a lower end of the inclined plane.

in an axial direction and is connected to a lower end of the inclined plane.	<i>See, e.g.,</i> Honermann at 24:24-25:7: The first slide surface 314 of the first groove 312 is constructed and arranged to engage the filter cartridge 38 and rotate the basket 304 from the first locked position to the second locked position. This rotation of the basket 304 also exposes the second slide surface 318 of the second groove 316 to engagement with the filter cartridge 38. An example can be seen by comparing FIGS. 19 and 20. In FIG. 19, the basket 304 is in the first locked position. The first slide surface 314 is exposed to engagement with the filter cartridge 38. In particular, and as explained further below in Section K, the first slide surface 314 engages the first protrusion 121 of the filter cartridge 38. The third protrusion 123 will engage the other first slide surface 314, in preferred embodiments. The first protrusion 121 engages the first slide surface 314, which rotates the basket 304 clockwise when viewed from above. The basket 304 is rotated to the second locked position, depicted in FIG. 20. The second locked position then exposes the second slide surface 318. The second slide surface 318, in preferred embodiments, has the second protrusion 122 engage against it, which causes the basket 304 to further rotate clockwise, when viewed above, to the unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318. Honermann at 31:16-32:12: During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it will contact or engage the second slide surface 318. The contact with the second slide surface 318
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can be made through a protrusion located in the location of the fourth protrusion 124, as well. In embodiments that have protrusions at both locations of the second protrusion 122 and fourth protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

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FIG.23

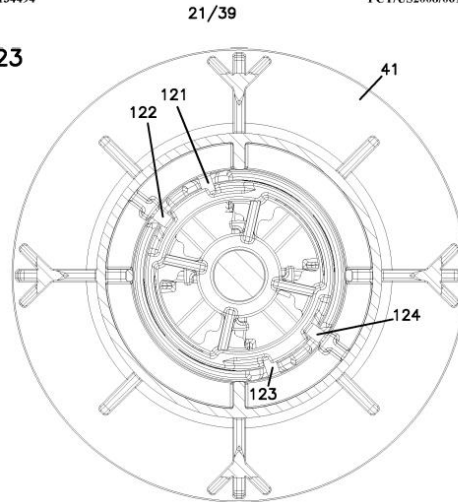


FIG.24

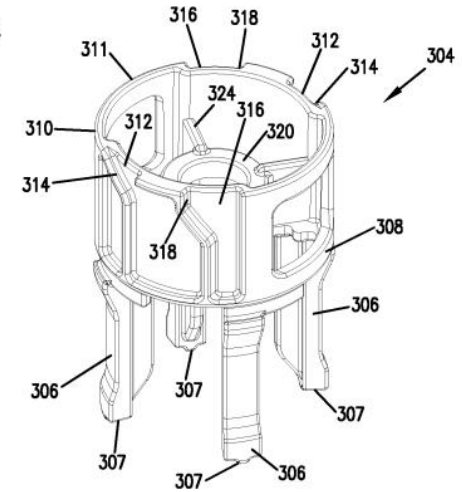
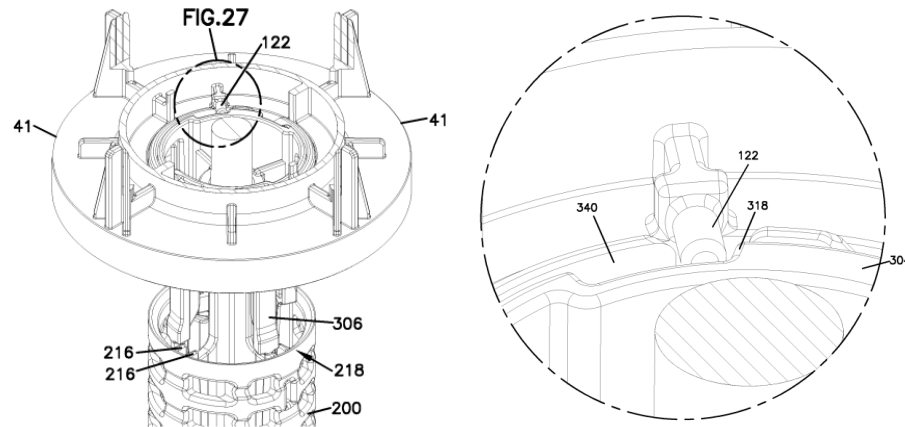


FIG.25



For example, Honermann discloses a guide (see Fig. 24) for the nose (122) which runs in an axial direction and is connected to a lower end of the inclined plane (318).

Claim 19

[19] The ring filter insert according to claim 15, wherein the inclined plane is formed by one of a radially protruding rib and step which forms a contact surface for the nose on one of an upper or lower side thereof.

Honermann discloses the inclined plane is formed by one of a radially protruding rib and step which forms a contact surface for the nose on one of an upper or lower side thereof.

See, e.g.,

Honermann at 24:24-25:7:

The first slide surface 314 of the first groove 312 is constructed and arranged to engage the filter cartridge 38 and rotate the basket 304 from the first locked position to the second locked position. This rotation of the basket 304 also exposes the second slide surface 318 of the second groove 316 to engagement with the filter cartridge 38. An example can be seen by comparing FIGS. 19 and 20. In FIG. 19, the basket 304 is in the first locked position. The first slide surface 314 is exposed to engagement with the filter cartridge 38. In particular, and as explained further below in Section K, the first slide surface 314 engages the first protrusion 121 of the filter cartridge 38. The third protrusion 123 will engage the other first slide surface 314, in preferred embodiments. The first protrusion 121 engages the first slide surface 314, which rotates the basket 304 clockwise when viewed from above. The basket 304 is rotated to the second locked position, depicted in FIG. 20. The second locked position then exposes the second slide surface 318. The

second slide surface 318, in preferred embodiments, has the second protrusion 122 engage against it, which causes the basket 304 to further rotate clockwise, when viewed above, to the unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318.

Honermann at 31:16-32:12:

During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it will contact or engage the second slide surface 318. The contact with the second slide surface 318 can be made through a protrusion located in the location of the fourth protrusion 124, as well. In embodiments that have protrusions at both locations of the second protrusion 122 and fourth protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

21/39

FIG.23

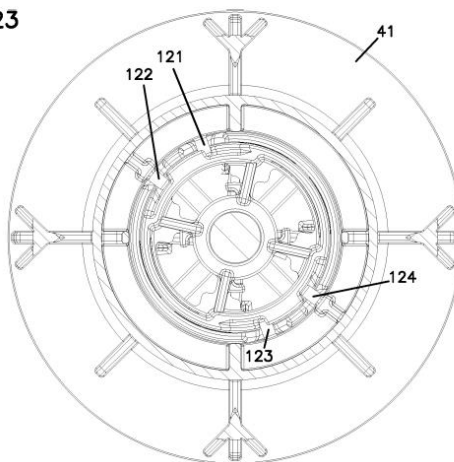


FIG.24

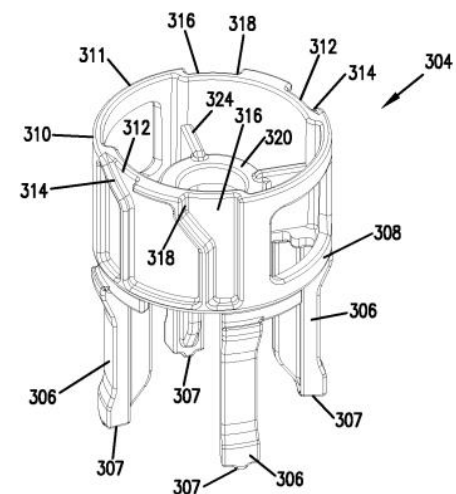


FIG.25

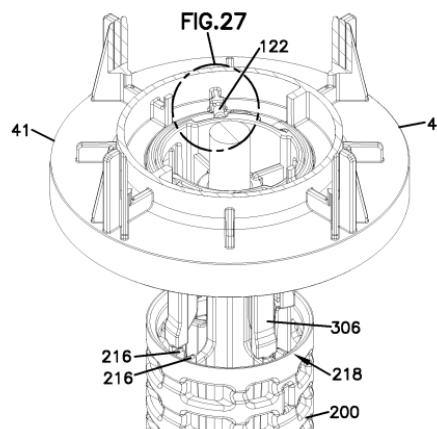
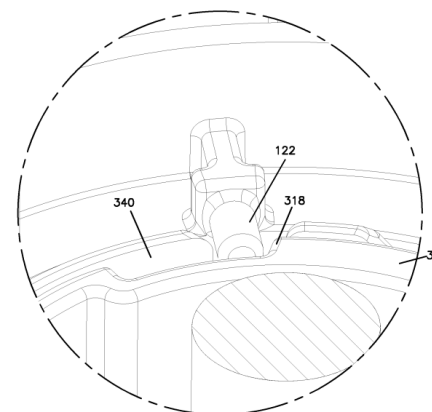


FIG.27



As one example, Honermann discloses the inclined plane (316) is formed by a radially protruding step, which forms a contact surface (318) for the nose (122) on a lower side thereof.

Claim 23

[23] The ring filter insert according to claim 15, wherein the nose is formed integrally with the bottom front panel of the ring filter insert.

Honermann discloses the nose is formed integrally with the bottom front panel of the ring filter insert.

See, e.g.,

Honermann at 24:24-25:7:

The first slide surface 314 of the first groove 312 is constructed and arranged to engage the filter cartridge 38 and rotate the basket 304 from the first locked position to the second locked position. This rotation of the basket 304 also exposes the second slide surface 318 of the second groove 316 to engagement with the filter cartridge 38. An example can be seen by comparing FIGS. 19 and 20. In FIG. 19, the basket 304 is in the first locked position. The first slide surface 314 is exposed to engagement with the filter cartridge 38. In particular, and as explained further below in Section K, the first slide surface 314 engages the first protrusion 121 of the filter cartridge 38. The third protrusion 123 will engage the other first slide surface 314, in preferred embodiments. The first protrusion 121 engages the first slide surface 314, which rotates the basket 304 clockwise when viewed from above. The basket 304 is rotated to the second locked position, depicted in FIG. 20. The second locked position then exposes the second slide surface 318. The second slide surface 318, in preferred embodiments, has the second protrusion 122 engage against it, which causes the basket 304 to further rotate clockwise, when viewed above, to the unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318.

Honermann at 31:16-32:12:

During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it will contact or engage the second slide surface 318. The contact with the second slide surface 318 can be made through a protrusion located in the location of the fourth protrusion 124, as well. In

embodiments that have protrusions at both locations of the second protrusion 122 and fourth protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

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FIG.23

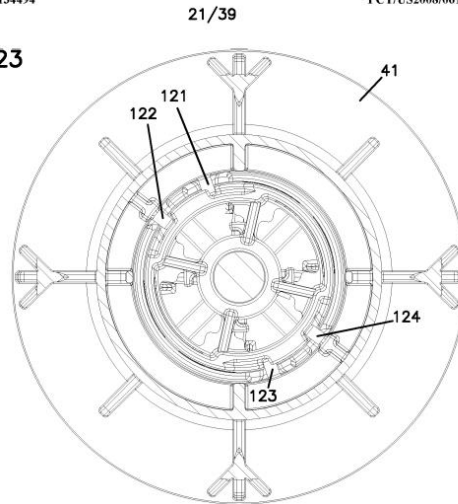


FIG.24

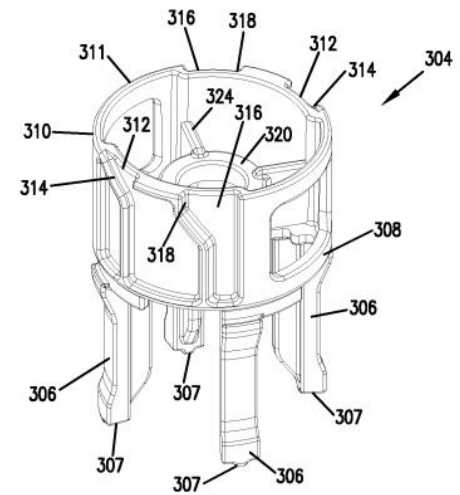
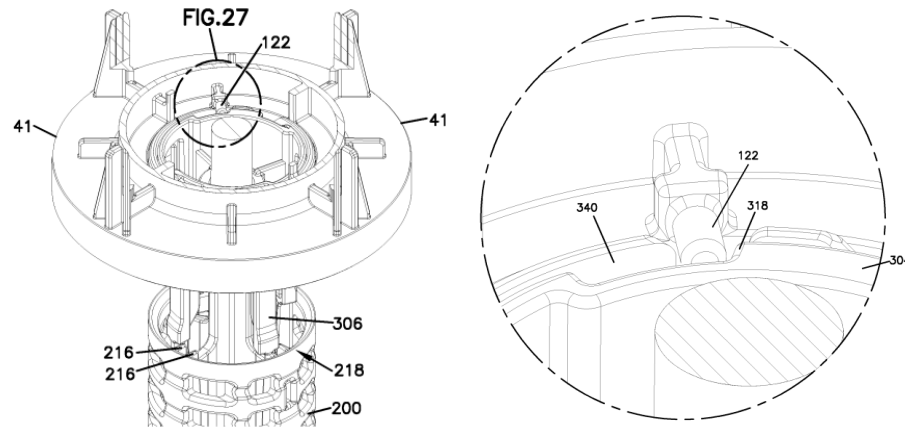


FIG.25



As one example, Honermann discloses the nose (121, 122) is formed integrally with the ring filter insert (66, 41, 38).

Claim 24

[24] The ring filter insert according to claim 15, wherein the blocking element is one of a radially sealing valve element, an axially sealing valve element, and a radially sealing plug which is one of rigidly connected to the lower front panel and rigidly arranged on the lower front panel.

Honermann in combination with Audi System, and/or the background knowledge of a POSA, discloses the blocking element is one of a radially sealing valve element, an axially sealing valve element, and a radially sealing plug which is one of rigidly connected to the lower front panel and rigidly arranged on the lower front panel.

A POSA would have motivation to make this combination for numerous reasons. For example, Both Honermann and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Honermann. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the plug seals (*e.g.* 240, 244) and drain port (*e.g.* 282) system with springs (*e.g.* 338) disclosed in Honermann, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (*e.g.*,

5) during filter change, because the operator can manually choose to delay the release of the liquid by removing the filter insert from the lower filter housing after the lower housing has been unscrewed from the rest of the filter system– an advantage especially suited for filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Honermann. Such delay would avoid splash or contamination of the liquid on the operator as the lower filter housing is unscrewed. A POSA would have a reasonable expectation of success in adding this feature to Honermann and/or incorporating the teachings of Honermann into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

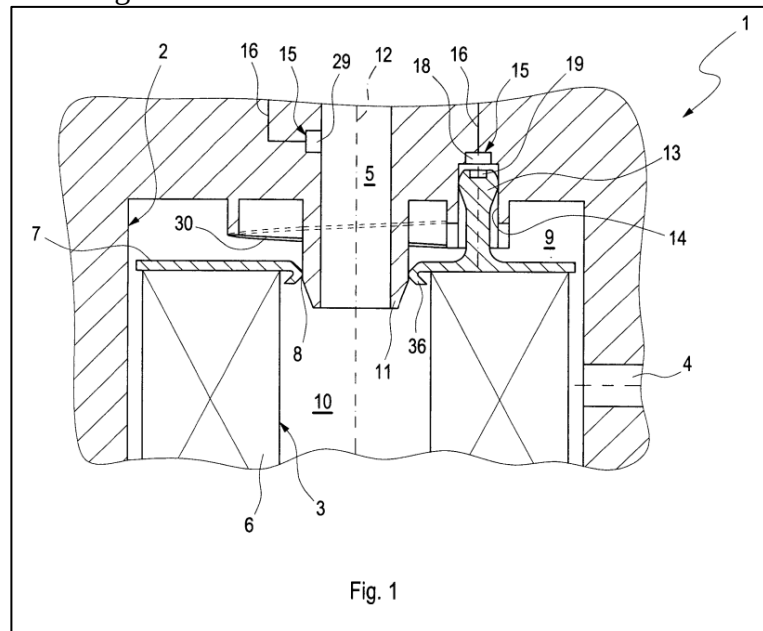
If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is

dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



As one example, Honermann in combination with Audi System discloses the blocking element (Grass 13) is a radially sealing plug which is rigidly arranged on the bottom front panel (Grass 7).

Claim 25

[25] The ring filter insert according to claim 15, wherein the blocking element is an axially sealing valve element which is elastically arranged on the bottom front panel.	Honermann in combination with Audi System, and/or the background knowledge of a POSA, discloses the blocking element is an axially sealing valve element which is elastically arranged on the bottom front panel. A POSA would have motivation to make this combination for numerous reasons. For example, Both Honermann and Audi System disclose similar structures, components, and subject matter (<i>e.g.</i> filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Honermann. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the plug seals (<i>e.g.</i> 240, 244) and drain port (<i>e.g.</i> 282) system with springs (<i>e.g.</i> 338) disclosed in Honermann, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (<i>e.g.</i>, 5) during filter change, because the operator can manually choose to delay the release of the liquid by removing the filter insert from the lower filter housing after the lower housing has been unscrewed from the rest of the filter system— an advantage especially suited for filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Honermann. Such delay would avoid splash or contamination of the liquid on the operator as the lower filter housing is unscrewed. A POSA would have a reasonable expectation of success in adding this feature to Honermann and/or incorporating the teachings of Honermann into Audi as doing so involves no more than routine techniques well established in the mechanical arts. <i>See, e.g.,</i> MAHLE Audi Filter:
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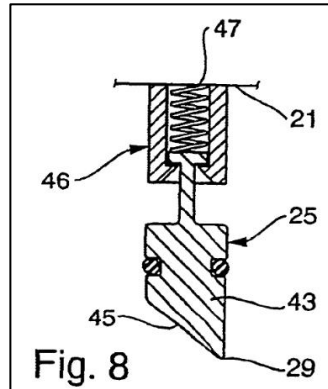


Baumann at :

In the special embodiment illustrated in FIG. 8, the pin 25 is supported so it is adjustable in the axial direction by means of a holder 46 on the lower end disk 21. The holder 46 contains a spring

47, which applies tension to the pin 25, pulling it away from the lower end disk 21, i.e., in the direction of the ramp 28.

Baumann at Fig. 8:



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2, a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

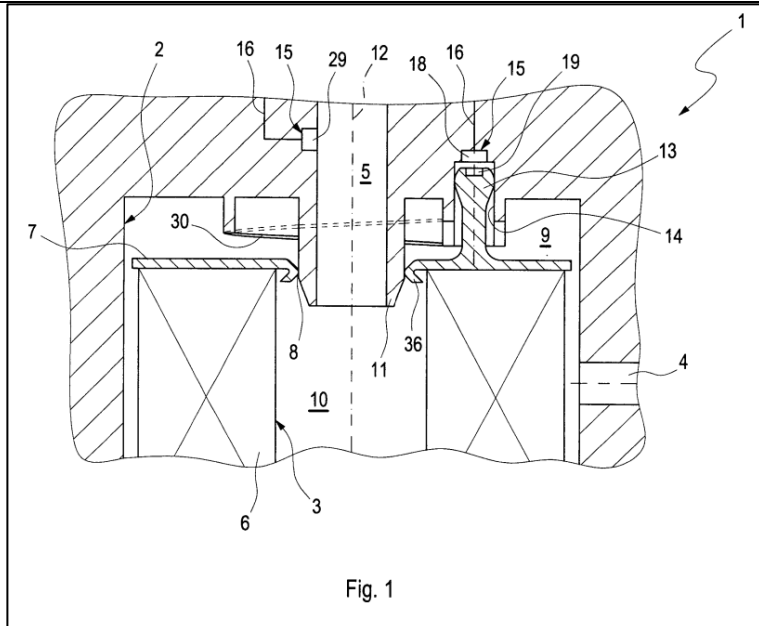
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



For example, Honermann in combination with Audi System discloses the blocking element (Baumann 25) is an axially sealing valve element which is elastically arranged on the bottom front panel (Baumann 47).

Claim 28

[28] The ring filter insert according to claim 15, wherein the blocking element is formed from two parts, the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.

Honermann in combination with Audi System, and/or the background knowledge of a POSA, discloses the blocking element is formed from two parts, the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.

A POSA would have motivation to make this combination for numerous reasons. For example, Both Honermann and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional thread attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and

housing of Honermann. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the plug seals (e.g. 240, 244) and drain port (e.g. 282) system with springs (e.g. 338) disclosed in Honermann, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (e.g., 5) during filter change, because the operator can manually choose to delay the release of the liquid by removing the filter insert from the lower filter housing after the lower housing has been unscrewed from the rest of the filter system– an advantage especially suited for filter housing assemblies that screw upward into a mounting plate and/or upper housing part as those disclosed in Honermann. Such delay would avoid splash or contamination of the liquid on the operator as the lower filter housing is unscrewed. A POSA would have a reasonable expectation of success in adding this feature to Honermann and/or incorporating the teachings of Honermann into Audi as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0023]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

The filter device 1 also has at least one signal generator 15 on, which is designed and / or arranged so that thus the absence and / or the presence of the pin 13 in the pin

holder 14 recognizable and possibly electrically signaled. The respective signal generator 15 can for example via a corresponding signal line 16 be connected to a controller not shown here.

At the in 1 the embodiment shown is the pin receptacle 14 designed as a blind hole. In particular, this Blindloch or the pin receiving 14 in addition to the ability, the pin 13 record, so no more functionality. In contrast, shows 2 an embodiment in which the pin receiving 14 through an inlet region of a return or idle 17 is formed, with the crude space 9 communicated. The pin 13 here additionally fulfills the function, the idle or the return 17 when closing in the pin receptacle 14 , So in the inlet area of the return or idle 17 is plugged in. The pin 13 can do this with a corresponding radial seal 31 equipped, which is for example an O-ring.

Grass at [0033]-[0036]:

According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

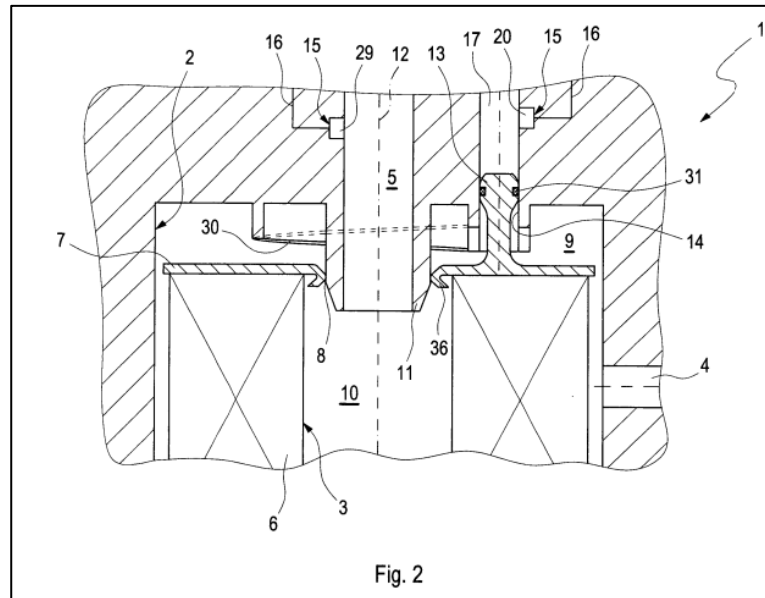
If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is

dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 2:



For example, Honermann in combination with Audi System discloses the blocking element (Grass 13) is formed from two parts (Grass 13, 31), the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.

Claim 29

[29] The liquid filter according to claim 1, wherein the protruding nose protrudes radially.	Honermann discloses the protruding nose protrudes radially. <i>See, e.g.,</i> Honermann at 24:24-25:7: The first slide surface 314 of the first groove 312 is constructed and arranged to engage the filter cartridge 38 and rotate the basket 304 from the first locked position to the second locked position. This rotation of the basket 304 also exposes the second slide surface 318 of the second groove 316 to engagement with the filter cartridge 38. An example can be seen by comparing FIGS. 19 and 20. In FIG. 19, the basket 304 is in the first locked position. The first slide surface 314 is exposed to engagement with the filter cartridge 38. In particular, and as explained further below in Section K, the first slide surface 314 engages the first protrusion 121 of the filter cartridge 38. The third protrusion 123 will engage the other first slide surface 314, in preferred embodiments. The first protrusion 121 engages the first slide surface 314, which rotates the basket 304 clockwise when viewed from above. The basket 304 is rotated to the second locked position, depicted in FIG. 20. The second locked position then exposes the second slide surface 318. The second slide surface 318, in preferred embodiments, has the second protrusion 122 engage against it, which causes the basket 304 to further rotate clockwise, when viewed above, to the unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318. Honermann at 31:16-32:12: During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it
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will contact or engage the second slide surface 318. The contact with the second slide surface 318 can be made through a protrusion located in the location of the fourth protrusion 124, as well. In embodiments that have protrusions at both locations of the second protrusion 122 and fourth protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

WO 2008/134494

PCT/US2008/061539

FIG.23

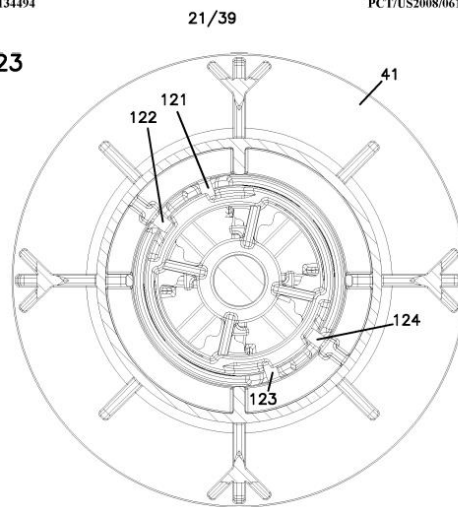


FIG.24

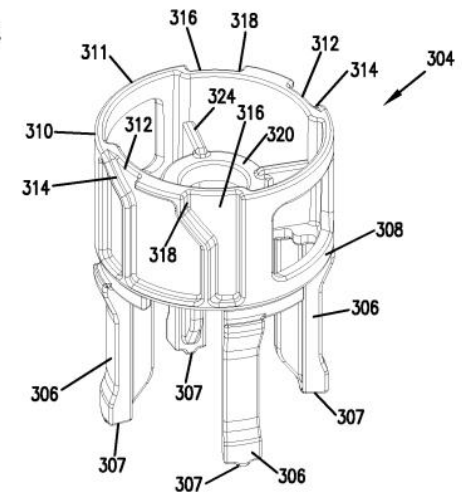
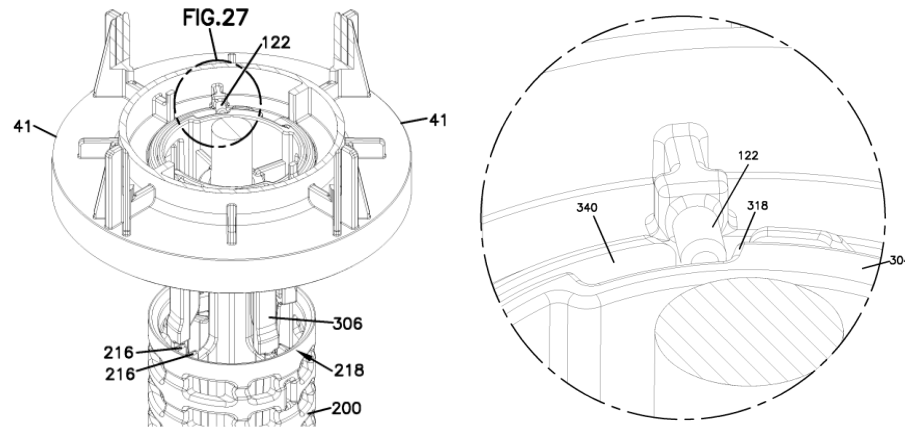


FIG.25



For example, Honermann discloses the protruding nose (122) protrudes radially.

Claim 30

[30] The ring filter insert according to claim 15, wherein the protruding nose protrudes radially.

Honermann discloses the protruding nose protrudes radially.

See, e.g.,

Honermann at 24:24-25:7:

The first slide surface 314 of the first groove 312 is constructed and arranged to engage the filter cartridge 38 and rotate the basket 304 from the first locked position to the second locked position. This rotation of the basket 304 also exposes the second slide surface 318 of the second groove 316 to engagement with the filter cartridge 38. An example can be seen by comparing FIGS. 19 and 20. In FIG. 19, the basket 304 is in the first locked position. The first slide surface 314 is exposed to engagement with the filter cartridge 38. In particular, and as explained further below in Section K, the first slide surface 314 engages the first protrusion 121 of the filter cartridge 38. The third protrusion 123 will engage the other first slide surface 314, in preferred embodiments. The first protrusion 121 engages the first slide surface 314, which rotates the basket 304 clockwise when viewed from above. The basket 304 is rotated to the second locked position, depicted in FIG. 20. The second locked position then exposes the second slide surface 318. The second slide surface 318, in preferred embodiments, has the second protrusion 122 engage against it, which causes the basket 304 to further rotate clockwise, when viewed above, to the

unlocked position as shown in FIG. 21. In preferred embodiments, the fourth protrusion 124 will engage the other second slide surface 318.

Honermann at 31:16-32:12:

During servicing, when a new filter cartridge 38 has been provided, the filter cartridge 38 is oriented in the bowl 36 by placing it through the open mouth 154. When the filter cartridge 38 is properly and operably positioned in the filter bowl 36, the first protrusion 121 comes in contact or engages the ramped first slide surface 314 of the basket 304. See FIGS. 19, 28, 29, and 30. In embodiments that have more than two protrusions, one possibility is that both the first protrusion 121 and the third protrusion 123 will engage a corresponding first slide surface 314 on the basket 304. As the first protrusion 121 engages this first slide surface 314, it causes the basket 304 to rotate against the spring 350. In preferred embodiments, the rotation will be less than 45 degrees, for example, 5-20 degrees. This rotates the basket 304 from the first locked position (FIGS. 19 and 30) to the second unlocked position (FIG. 20). The first groove 312 in the basket 304 become aligned with the first slot 360 of the basket holder 340, which will eventually allow the first protrusion 121 to slide down. When the basket 304 is rotated to the second locked position (FIG. 20), this exposes the second slide surface 318. The second protrusion 122 is oriented such that it will contact or engage the second slide surface 318. The contact with the second slide surface 318 can be made through a protrusion located in the location of the fourth protrusion 124, as well. In embodiments that have protrusions at both locations of the second protrusion 122 and fourth protrusion 124, then both the second protrusion 122 and the fourth protrusion 124 will contact the corresponding second slide surface 318. The initial contact between the second protrusion 122 and the second slide surface 318 causes the basket 304 to rotate against the spring 350 from its second locked position to its unlocked position (FIG. 21). FIGS. 23, 25, and 27 illustrate engagement of the second protrusion 122 against the second slide surface 318. The rotation of the basket 304 from the second locked position (FIG. 20) to the unlocked position (FIG. 21) is preferably less than 45 degrees, for example, 5-20 degrees. Rotation to the unlocked position aligns second groove 316 and second slot 362, which will eventually allow axial sliding of the second protrusion 122 therein downwardly.

Honermann at Figs. 23-25, 27:

21/39

FIG.23

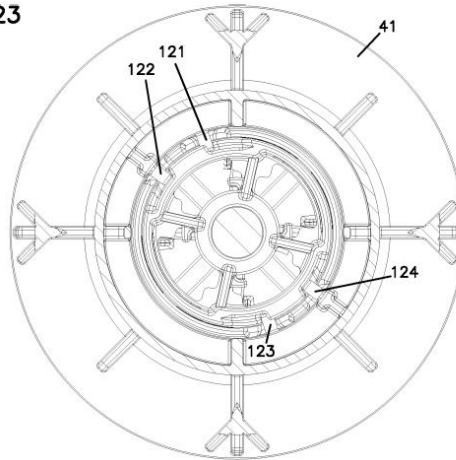


FIG.24

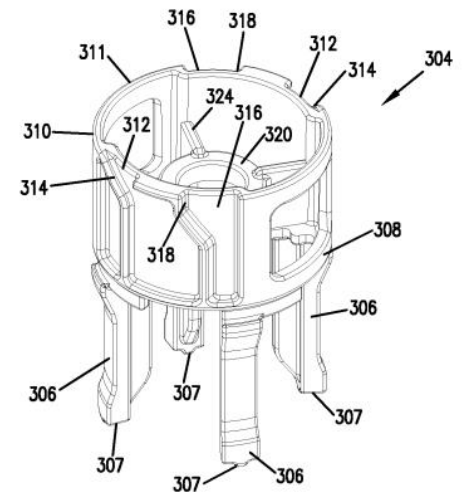
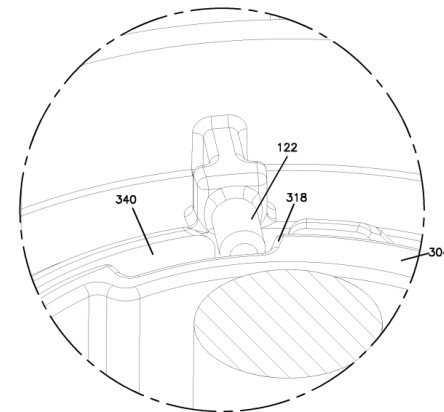
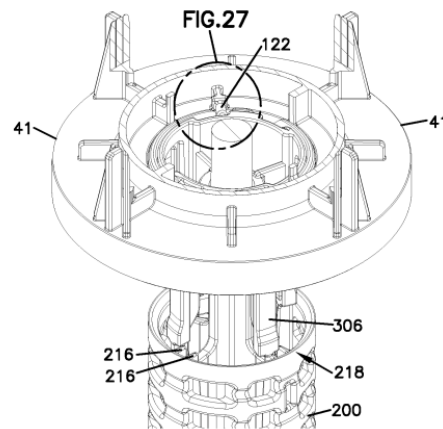


FIG.25



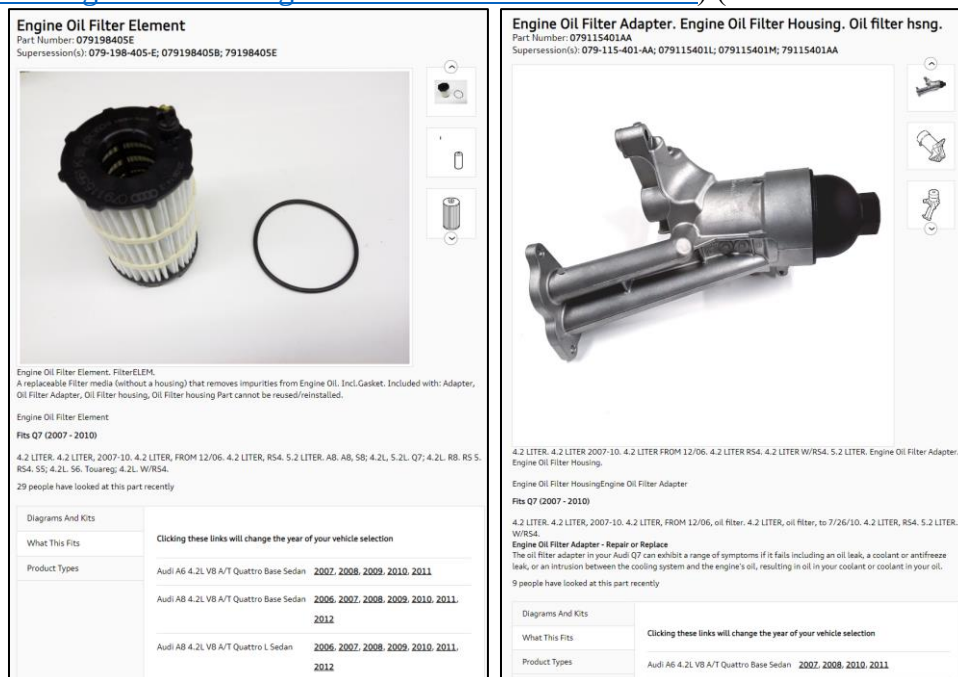
For example, Honermann discloses the protruding nose (122) protrudes radially.

**Exhibit C-4 – Invalidity of U.S. Patent No. 9,023,203 Based on
U.S. Patent Application Publication No. 20060219621 to Dworatzek et al. (“Dworatzek”) in View of Audi System**

U.S. Patent Application Publication No. 20060219621 to Dworatzek et al. (“Dworatzek”) was filed on February 15, 2006 and published on October 5, 2006. The Audi engine oil filter system (“Audi System”) implemented in vehicles including at least 2007-2011 4.2L V8 A/T Quattro Audi A6, 2006-2012 4.2L V8 A/T Quattro Audi A8 and A8L, and 2007-2009 4.2L V8 A/T Premium Audi Q7, was in public use, on sale, sold, known in this country, or otherwise available to the public since at least 2006 – before the priority date of the asserted claims of the U.S. Patent No. 9,023,203 (the “’203 patent”). Accordingly, Dworatzek, alone based on the state of the art, or in combination with Audi System constitutes prior art and invalidates the asserted claims of the ’203 patent under at least pre-AIA 35 U.S.C. § 103.

On information and belief, at least the following documents, or the documents referenced therein, describe the functionality of Audi System:

- Audi Engine Oil Filter Element Part Number: 079198405E (https://parts.audiusa.com/p/Audi_Q7/Engine-Oil-Filter-Element/48003807/079198405E.html) (“Audi Filter Insert”);
- Audi Engine Oil Filter Housing Part Number: 079115401AA (https://parts.audiusa.com/p/Audi_Q7/Engine-Oil-Filter-Adapter-Engine-Oil-Filter-Housing-Oil-filter-hsng/48003711/079115401AA.html) (“Audi Filter Housing”);



See, e.g., Audi Filter Insert; Audi Filter Housing.

- MAHLE OX 350/4D ECO Oil Filter (<https://www.amazon.com/MAHLE-Original-350-ECO-Filter/dp/B0068MWZZW>) (“MAHLE Audi Filter”);

Technical Details	
Manufacturer	Mahle
Brand	MAHLE
Model	OX3504DECO
Item Weight	3.52 ounces
Product Dimensions	9.96 x 7.02 x 5.31 inches
Item model number	OX3504DECO
Is Discontinued By Manufacturer	No
Exterior	Machined
Manufacturer Part Number	OX 350/4D
OEM Part Number	079198405E

- MAHLE Products and Patents Search for MAHLE OX 350/4D Oil Filter (<https://www.mahle-aftermarket.com/eu/en/catalog/patents/>):



- Germany Patent Publication No. 10,2007,062,102 to Grass et al. (“Grass”), filed December 21, 2007 and published June 25, 2009;
- U.S. Patent No. 6,706,181 to Baumann et al. (“Baumann”), filed September 30, 2000 and published March 16, 2024.

A Person of Skill in the Art (“POSA”) would have been motivated to combine these references, because they are in the same field, they are aimed at solving the same perceived problems in the art, the nature of the problem to be solved was the same, and there is express motivation in these references. Known design incentives and market forces would have also motivated one of ordinary skill to combine these references. Furthermore, one of skill in the art would understand that each limitation not expressly disclosed in Dworatzek would be was a standard implementation and an obvious design choice in the design of a filter by the priority date of the asserted patent. Such an implementation simply reflects one of a finite number of well-known techniques (*e.g.*, whether to use an eccentric blocking element or not, or the particular means of ensuring only a certain type of filter insert is installable on a given housing) implemented in a predictable manner, to achieve well-known, predictable results.

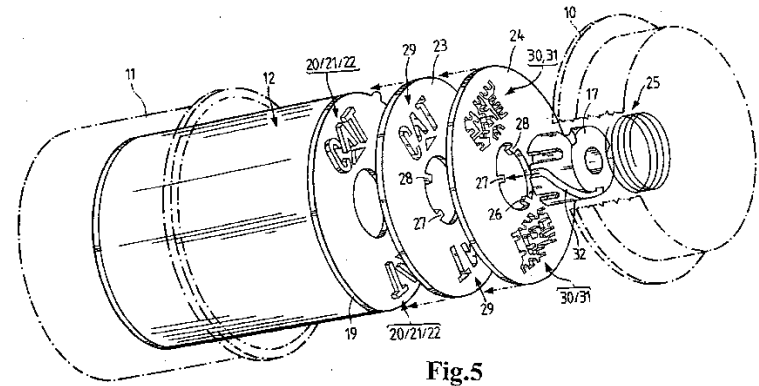
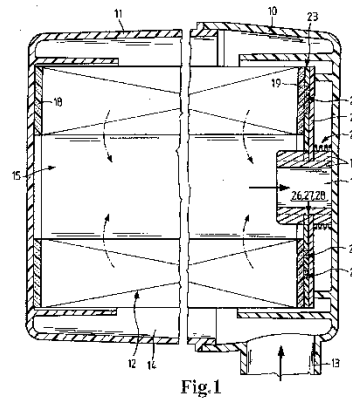
The use of claim terms in the below chart is based on Hengst’s construction of claim terms in its infringement contentions as understood by Champion, as well as the plain and ordinary meaning of the claim terms. This chart should not be construed as consenting to or agreeing with Hengst’s construction of claim terms. Because discovery is ongoing and the claims have not yet been construed, Champion reserves all rights to amend its invalidity contentions based on discovery or on the Court’s constructions.

The citations to portions of any reference in this chart are exemplary only. For example, a citation that refers to or discusses a figure or figure item should be understood to also incorporate by reference that figure and any additional descriptions of that figure as if set forth fully therein. Champion reserves the right to rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid. Citations presented for one claim limitation are expressly incorporated by reference into all other limitations for that claim as well as all limitations of all claims on which that claim depends. Champion also reserves the right to rely on additional citations or sources of evidence that also may be applicable, or that may become applicable in light of claim construction, changes in Plaintiff's infringement contentions, and/or information obtained during discovery as the case progresses.

Claim Element	Exemplary Disclosures
	Claim 15
[15.pre] A hollow-cylindrical filter material body surrounded on front sides by top and bottom front panels and which can be replaceably arranged in a filter housing,	To the extent it is a limitation, Dworatzek discloses a hollow-cylindrical filter material body surrounded on front sides by top and bottom front panels and which can be replaceably arranged in a filter housing. <i>See, e.g.,</i> Dworatzek at [0028]-[0029]: FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked. The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there

is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element.

Dworatzek at Figs. 1, 5:



For example, Dworatzek discloses a hollow-cylindrical filter material body (12) surrounded on front sides by top (19, 23) and bottom (18) front panels and which can be replaceably arranged in a filter housing (10) (see figure 5 showing filter housing).

[15.a] an eccentric blocking element arranged on the bottom front panel for engaging an eccentric opening in the filter housing,

Dworatzek in combination with Audi System, and/or the background knowledge of a POSA, discloses an eccentric blocking element arranged on the bottom front panel for engaging an eccentric opening in the filter housing. It would have been obvious to combine Dworatzek with Audi System for the reasons discussed herein and in Defendant's cover pleading.

A POSA would have motivation to make this combination for numerous reasons. Both Dworatzek and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional attachment mechanisms), and also all

include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element (*e.g.*, Grass 13) and an eccentric opening in the filter housing (*e.g.*, Grass 14) has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Dworatzek. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the filter housing disclosed in Dworatzek, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (*e.g.*, 10, 11) during filter change, because the eccentric blocking element eliminates the need to manually pouring any remaining oil over the lip or connecting mechanisms of the filter housing. During an oil change, when the lower case (*e.g.*, 11) is removed with the filter insert (*e.g.*, 12) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching any opening from outside. A POSA would have a reasonable expectation of success in adding this feature to Dworatzek and/or incorporating the teachings of Dworatzek into Audi system as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:

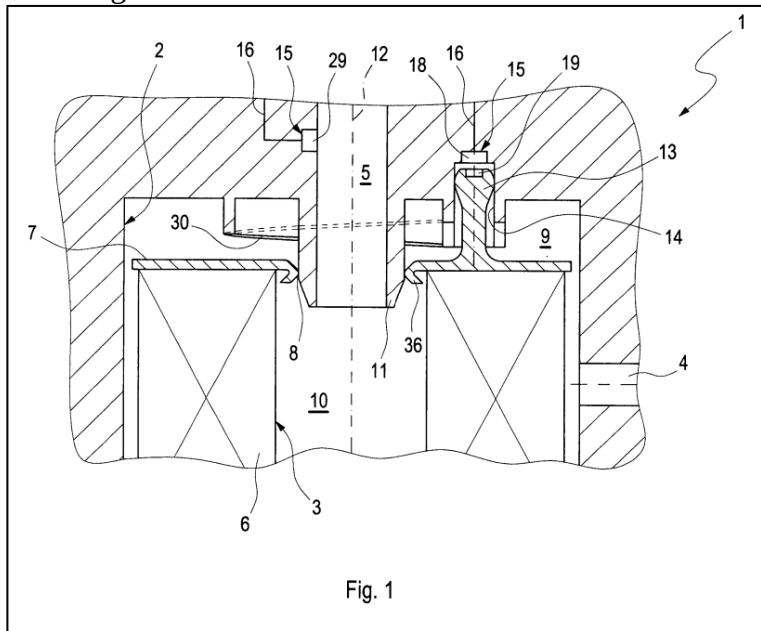


Fig. 1

See, e.g.,

Dworatzek at [0028]-[0029]:

FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked.

The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element.

Dworatzek at Figs. 1, 5:

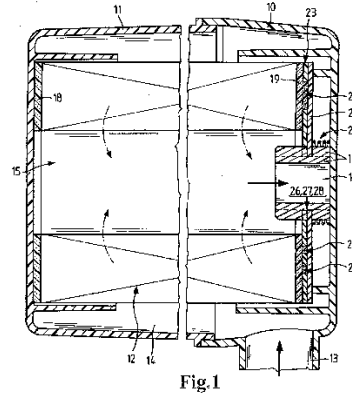


Fig.1

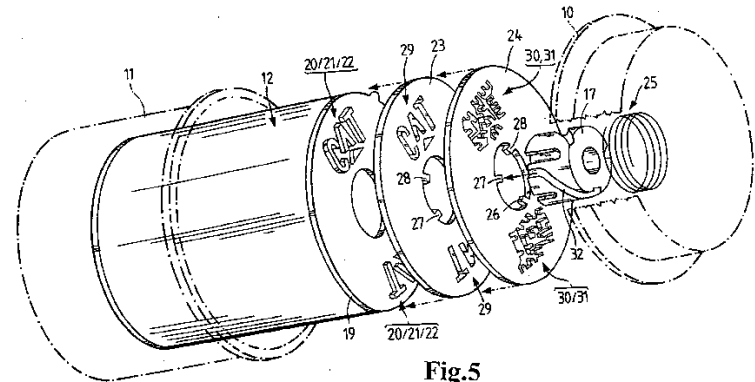


Fig.5

As one example, Dworatzek in combination with Audi System discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: first positioning means (Dworatzek 26-28) on the ring filter insert (Dworatzek 12), which interact with second positioning means (Dworatzek 32-34) on the filter housing (Dworatzek 10) when the ring filter insert (Dworatzek 12) is inserted into the filter housing (Dworatzek 10) and which are arranged to bring the blocking element (Grass 13) into engagement with the eccentric opening (Grass 14).

[15.b] first positioning means on the ring filter insert, which interact with second positioning means on the filter housing when the ring filter insert is inserted into the filter housing and which are arranged to bring the blocking element into engagement with the eccentric opening,

Dworatzek in combination with Audi System, and/or the background knowledge of a POSA, discloses first positioning means on the ring filter insert, which interact with second positioning means on the filter housing when the ring filter insert is inserted into the filter housing and which are arranged to bring the blocking element into engagement with the eccentric opening. It would have been obvious to combine Dworatzek with Audi System for the reasons discussed herein and in Defendant's cover pleading.

A POSA would have motivation to make this combination for numerous reasons. For example, Both Dworatzek and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, it was well known in the art to use a positioning means to ensure proper alignment of components in a filter assembly and/or that only the proper filter insert is installed on a filter housing. *See, e.g.*, US 2006/0219621, [0003] ("Published German patent application no. DE 4402836, for example, describes an arrangement in which the correct use of Suitable replacement parts is ensured by the fact that the respective part for attachment can be attached to the unit only according to a lock-and-key principle."), [0006] ("Another object of the invention is to provide a filter device which establishes a definitive correlation between the filter housing and an installed filter element."), [0007] ("A further object of the invention is to provide a filter device which prevents installation of an incorrect filter element."), [0028] ("If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24."). Such a positioning means also ensures a user need not visually align or guess at proper alignment through trial and error, potentially damaging the blocking element or incorrectly installing it. Thus there was common sense—and express—motivation in the art to use a positioning means to ensure proper alignment of components such as an eccentric blocking element within the filter housing. The protrusions (*e.g.*, 26, 27, 28) and ramp (*e.g.*, 32) alignment system disclosed in Dworatzek offers the advantages of automatically aligning the filter insert (*e.g.*, 12) with the filter housing (*e.g.*, 10, 11) in a pre-determined way during filter installation, particularly when the filter insert is installed in the filter case along an axial direction. Because both Dworatzek and Audi System disclose similar structures and filter installation methods and that Audi System discloses an eccentric blocking element that need to be aligned with the filter housing during installation, a POSA would be motivated to add this advantageous alignment feature to the filter and housing of Audi System.

Moreover, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Dworatzek. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the filter housing disclosed in Dworatzek, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (*e.g.*, 10, 11) during filter change, because the eccentric blocking element eliminates the need to manually pouring any remaining oil over the lip or connecting mechanisms of the filter housing. During an oil change, when the lower case (*e.g.*, 11) is removed with the filter insert (*e.g.*, 12) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching any opening from outside. A POSA would have a reasonable expectation of success in adding this feature to Dworatzek and/or incorporating the teachings of Dworatzek into Audi system as doing so involves no more than routine techniques well established in the mechanical arts.

Based on Hengst's construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

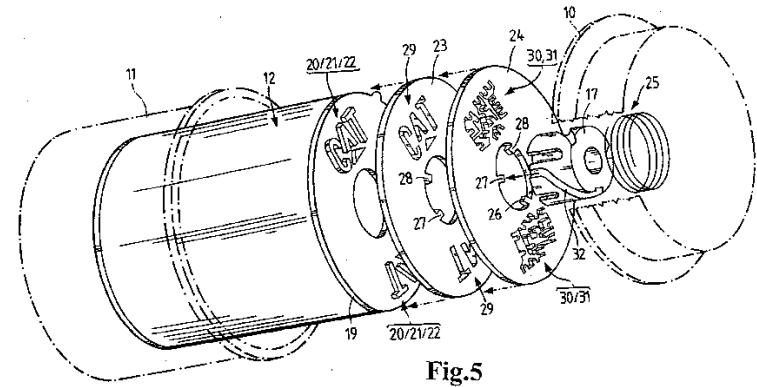
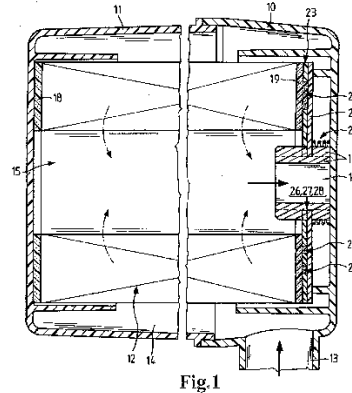
For example:

Dworatzek at [0028]-[0029]:

FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked.

The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element.

Dworatzek at Figs. 1, 5:



MAHLE Audi Filter:



Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

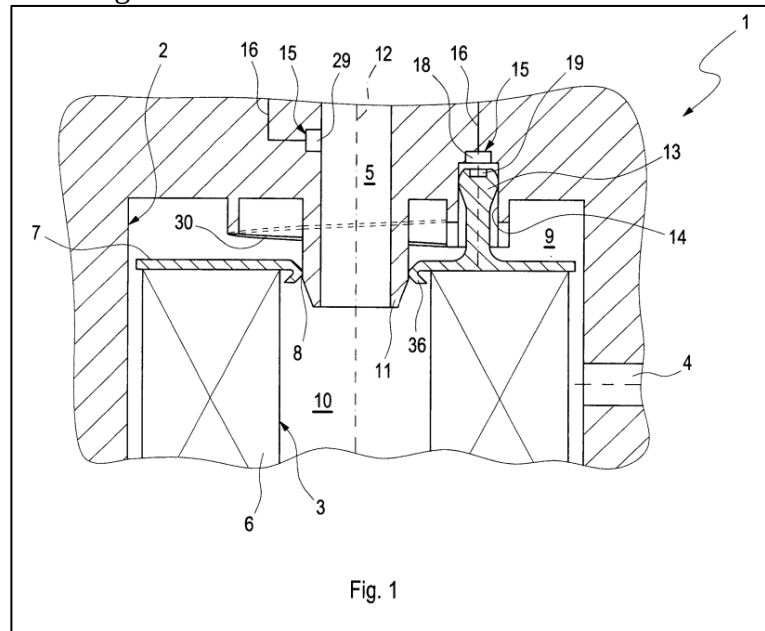
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



As one example, Dworatzek in combination with Audi System discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: first positioning means (Dworatzek 26-28) on the ring filter insert (Dworatzek 12), which interact with second positioning means (Dworatzek 32-34) on the filter housing (Dworatzek 10) when the ring filter insert (Dworatzek 12) is inserted into the filter housing (Dworatzek 10) and which are arranged to bring the blocking element (Grass 13) into engagement with the eccentric opening (Grass 14).

[15.c] the first positioning means being one of an inclined plane and a protruding nose, with the second positioning means being the other of the inclined plane and the protruding nose,

Dworatzek discloses the first positioning means being one of an inclined plane and a protruding nose, with the second positioning means being the other of the inclined plane and the protruding nose.

Based on Hengst's construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs

the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

See, e.g.,

Dworatzek at [0028]-[0029]:

FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked.

The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element.

Dworatzek at Figs. 1, 5:

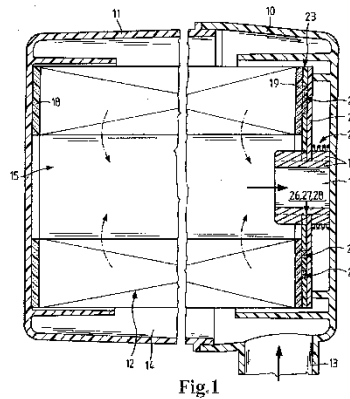


Fig.1

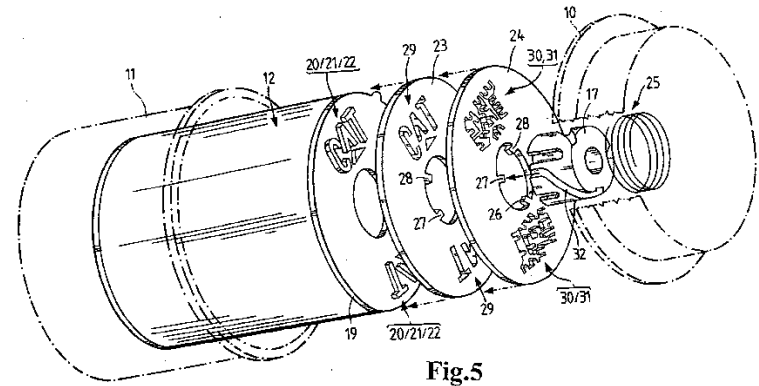


Fig.5

As one example, Dworatzek discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: the first positioning means being a protruding nose (26-28), with the second positioning means being an inclined plane (32-34).

[15.d] the inclined plane and the nose arranged to be moved in relation to each other in such a way that they slide along each other and bring the blocking element into engagement with the eccentric opening, by rotating the ring filter insert relative to the filter housing,

Dworatzek in combination with Audi System, and/or the background knowledge of a POSA, discloses the inclined plane and the nose arranged to be moved in relation to each other in such a way that they slide along each other and bring the blocking element into engagement with the eccentric opening, by rotating the ring filter insert relative to the filter housing. It would have been obvious to combine Dworatzek with Audi System for the reasons discussed herein and in Defendant's cover pleading.

A POSA would have motivation to make this combination for numerous reasons. For example, Both Dworatzek and Audi System disclose similar structures, components, and subject matter (e.g. filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Dworatzek. A POSA would understand that, the eccentric blocking element disclosed

in Audi System, when A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the filter housing disclosed in Dworatzek, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (*e.g.*, 10, 11) during filter change, because the eccentric blocking element eliminates the need to manually pouring any remaining oil over the lip or connecting mechanisms of the filter housing. During an oil change, when the lower case (*e.g.*, 11) is removed with the filter insert (*e.g.*, 12) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching any opening from outside.

Further, it was well known in the art to use a positioning means to ensure proper alignment of components in a filter assembly and/or that only the proper filter insert is installed on a filter housing. *See, e.g.*, US 2006/0219621, [0003] (“Published German patent application no. DE 4402836, for example, describes an arrangement in which the correct use of Suitable replacement parts is ensured by the fact that the respective part for attachment can be attached to the unit only according to a lock-and-key principle.”), [0006] (“Another object of the invention is to provide a filter device which establishes a definitive correlation between the filter housing and an installed filter element.”), [0007] (“A further object of the invention is to provide a filter device which prevents installation of an incorrect filter element.”), [0028] (“If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24.”). Such a positioning means also ensures a user need not visually align or guess at proper alignment through trial and error, potentially damaging the blocking element or incorrectly installing it. Thus there was common sense—and express—motivation in the art to use a positioning means to ensure proper alignment of components such as an eccentric blocking element within the filter housing. The protrusions (*e.g.*, 26, 27, 28) and ramp (*e.g.*, 32) alignment system disclosed in Dworatzek offers the advantages of automatically aligning the filter insert (*e.g.*, 12) with the filter housing (*e.g.*, 10, 11) in a pre-determined way during filter installation, particularly when the filter insert is installed in the filter case along an axial direction. Because both Dworatzek and Audi System disclose similar structures and filter installation methods and that Audi System discloses an eccentric blocking element that need to be aligned with the filter housing during installation, a POSA would be motivated to add this advantageous alignment feature to the filter and housing of Audi System. A POSA would have a reasonable expectation of success in adding this feature to Dworatzek and/or incorporating the teachings of Dworatzek into Audi system as doing so involves no more than routine techniques well established in the mechanical arts.

	<i>See, e.g.,</i> Dworatzek at [0028]-[0029]: FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked. The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element. Dworatzek at Figs. 1, 5:
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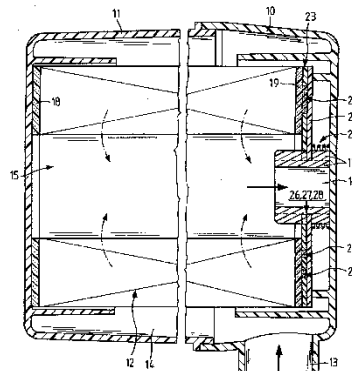


Fig.1

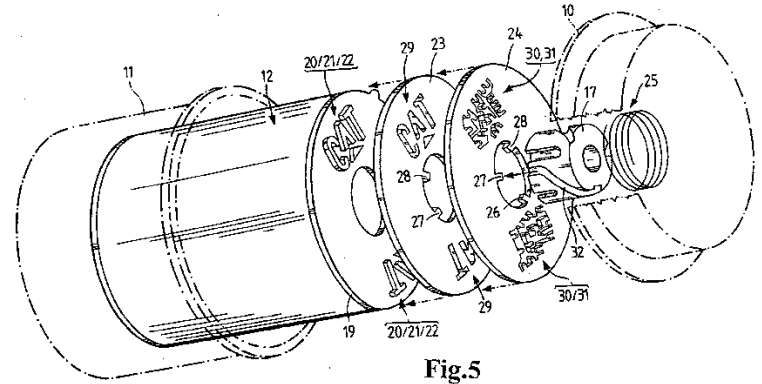


Fig.5

MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

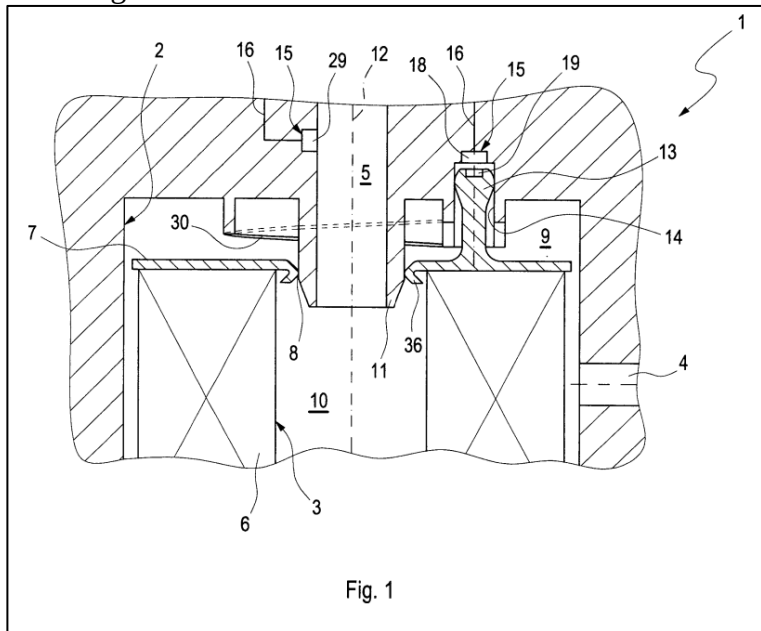
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



For example, Dworatzek in combination with Audi System discloses the inclined plane (Dworatzek 32, 33, 34) and the nose (Dworatzek 26, 27, 28) arranged to be moved in relation to each other in such a way that they slide along each other (see Dworatzek fig. 5, showing the inclined plane and the nose sliding along each other) and bring the blocking element (Grass 13) into engagement with the eccentric opening (Grass 14), by rotating the ring filter insert relative to the filter housing.

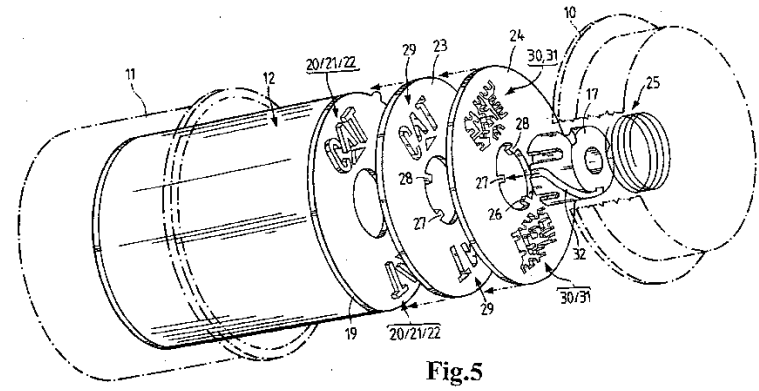
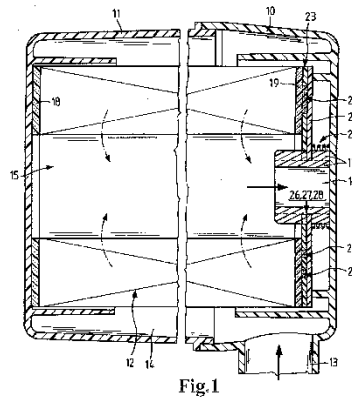
[15.e] the first positioning means being one of embodied and arranged on an inner circumference of the ring filter insert.

Dworatzek in combination with Audi System, and/or the background knowledge of a POSA, discloses the first positioning means being one of embodied and arranged on an inner circumference of the ring filter insert.

Based on Hengst's construction of claim terms in its infringement contentions as understood by Champion, this term is subject to 35 U.S.C. § 112(6). The corresponding structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to, the exemplary disclosures described below.

A POSA would have motivation to make this combination for numerous reasons. For example, Both Dworatzek and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Dworatzek. Further, it was well known in the art to use a positioning means to ensure proper alignment of components in a filter assembly and/or that only the proper filter insert is installed on a filter housing. *See, e.g.*, US 2006/0219621, [0003] (“Published German patent application no. DE 4402836, for example, describes an arrangement in which the correct use of Suitable replacement parts is ensured by the fact that the respective part for attachment can be attached to the unit only according to a lock-and-key principle.”), [0006] (“Another object of the invention is to provide a filter device which establishes a definitive correlation between the filter housing and an installed filter element.”), [0007] (“A further object of the invention is to provide a filter device which prevents installation of an incorrect filter element.”), [0028] (“If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24.”). Such a positioning means also ensures a user need not visually align or guess at proper alignment through trial and error, potentially damaging the blocking element or incorrectly installing it. Thus there was common sense—and express—motivation in the art to use a positioning means to ensure proper alignment of components such as an eccentric blocking element within the filter housing. The protrusions (*e.g.*, 26, 27, 28) and ramp (*e.g.*, 32) alignment system disclosed in Dworatzek offers the advantages of automatically aligning the filter insert (*e.g.*, 12) with the filter housing (*e.g.*, 10, 11) in a pre-determined way during filter installation, particularly when the filter insert is installed in the filter case along an axial direction. Because both Dworatzek and Audi System disclose similar structures and filter installation methods and that Audi System discloses an eccentric blocking element that need to be aligned with the filter housing during installation, a POSA would be motivated to add this advantageous alignment feature to the filter and housing of Audi System. A POSA would have a reasonable expectation of success in adding this feature to Dworatzek and/or incorporating the teachings of Dworatzek into Audi system as doing so involves no more than routine techniques well established in the mechanical arts.

	<i>See, e.g.,</i> Dworatzek at [0028]-[0029]: FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked. The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element. Dworatzek at Figs. 1, 5:
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MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:

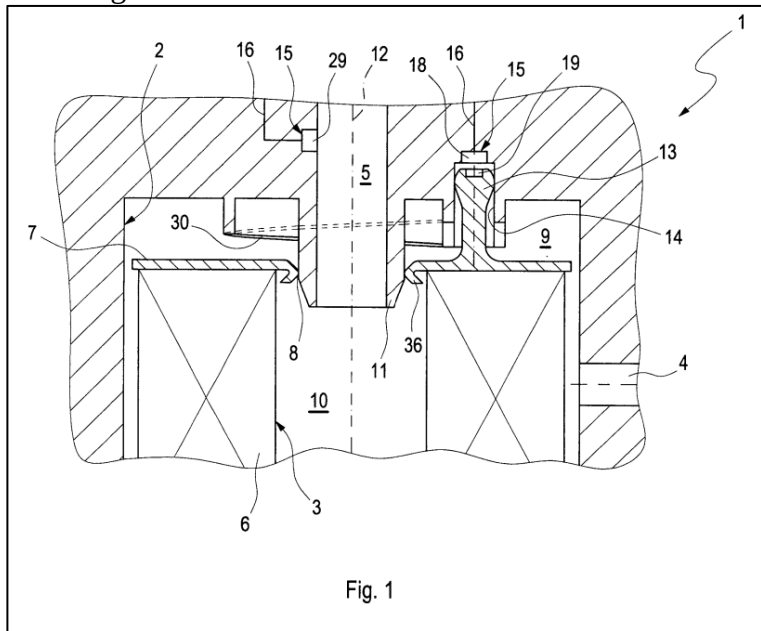


Fig. 1

As one example, Dworatzek in combination with Audi System discloses that the structure that performs the function of bringing the blocking element into engagement with the eccentric opening includes, but is not limited to: the first positioning means being a protruding nose (Dworatzek 26, 27, 28) and arranged on an inner circumference of the ring filter insert (Dworatzek 12).

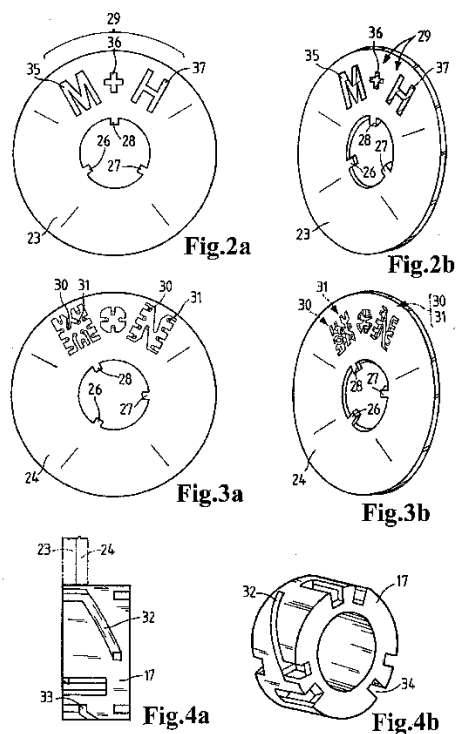
Claim 16

[16] The ring filter insert according to claim 15, wherein the inclined plane is formed by two partial planes which run towards each other in opposite directions and which in each case extend across half of an inner circumference of the ring filter insert.

The subject matter of claim 16 as a whole would have been obvious in light of Dworatzek and the general background knowledge of the POSA. The POSA would have understood that implementing the inclined planes of Dworatzek by forming two partial planes which run towards each other in opposite directions and which in each case extend across half of one of an inner circumference of the ring filter insert and an outer circumference of the filter housing part arranged inside the ring filter insert was a simple design option and choice for implementing the inclines planes.

Claim 17

[17] The ring filter insert according to claim 15, including a guide for the nose which runs in an axial direction and is connected to a lower end of the inclined plane.	Dworatzek discloses a guide for the nose which runs in an axial direction and is connected to a lower end of the inclined plane. <i>See, e.g.,</i> Dworatzek at [0028]-[0029]: FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked. The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element. At Figs. 2-4:
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For example, Dworatzek discloses a guide (see Fig.4) for the nose (26-28) which runs in an axial direction and is connected to a lower end of the inclined plane (32-34).

Claim 19

[19] The ring filter insert according to claim 15, wherein the inclined plane is formed by one of a radially protruding rib and step which forms a contact surface for the nose on one of an upper or lower side thereof.

Dworatzek discloses the inclined plane is formed by one of a radially protruding rib and step which forms a contact surface for the nose on one of an upper or lower side thereof.

See, e.g.,

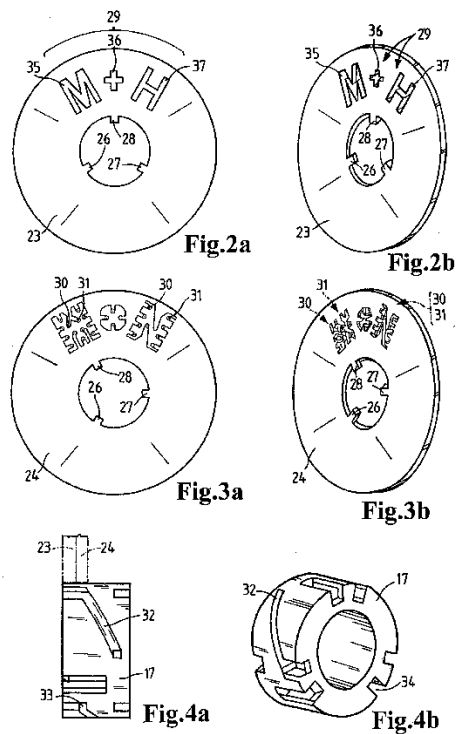
Dworatzek at [0028]-[0029]:

FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31

which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked.

The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element.

At Figs. 2-4:



As one example, Dworatzek discloses the inclined plane (32-34) is formed by a radially protruding step, which forms a contact surface (see Fig. 4) for the nose (26-28) on a lower side thereof.

Claim 23

[23] The ring filter insert according to claim 15, wherein the nose is formed integrally with the bottom front panel of the ring filter insert.

Dworatzek discloses the nose is formed integrally with the bottom front panel of the ring filter insert.

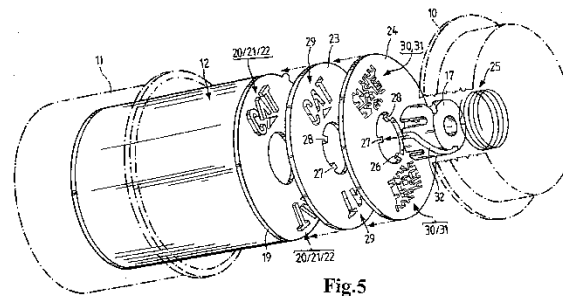
See, e.g.,

Dworatzek at [0028]-[0029]:

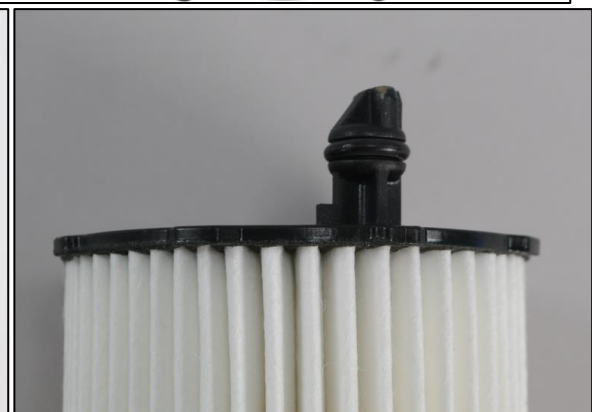
FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked.

The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element.

Dworatzek at Fig. 5:



	As one example, Dworatzek discloses the nose (26-28) is formed integrally with the ring filter insert (12, 23).
Claim 24	
[24] The ring filter insert according to claim 15, wherein the blocking element is one of a radially sealing valve element, an axially sealing valve element, and a radially sealing plug which is one of rigidly connected to the lower front panel and rigidly arranged on the lower front panel.	Dworatzek in combination with Audi System, and/or the background knowledge of a POSA, discloses the blocking element is one of a radially sealing valve element, an axially sealing valve element, and a radially sealing plug which is one of rigidly connected to the lower front panel and rigidly arranged on the lower front panel. A POSA would have motivation to make this combination for numerous reasons. For example, Both Dworatzek and Audi System disclose similar structures, components, and subject matter (<i>e.g.</i> filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Dworatzek. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the filter housing disclosed in Dworatzek, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (<i>e.g.</i>, 10, 11) during filter change, because the eccentric blocking element eliminates the need to manually pouring any remaining oil over the lip or connecting mechanisms of the filter housing. During an oil change, when the lower case (<i>e.g.</i>, 11) is removed with the filter insert (<i>e.g.</i>, 12) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching any opening from outside. A POSA would have a reasonable expectation of success in adding this feature to Dworatzek and/or incorporating the teachings of Dworatzek into Audi system as doing so involves no more than routine techniques well established in the mechanical arts. <i>See, e.g.,</i> MAHLE Audi Filter:



Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

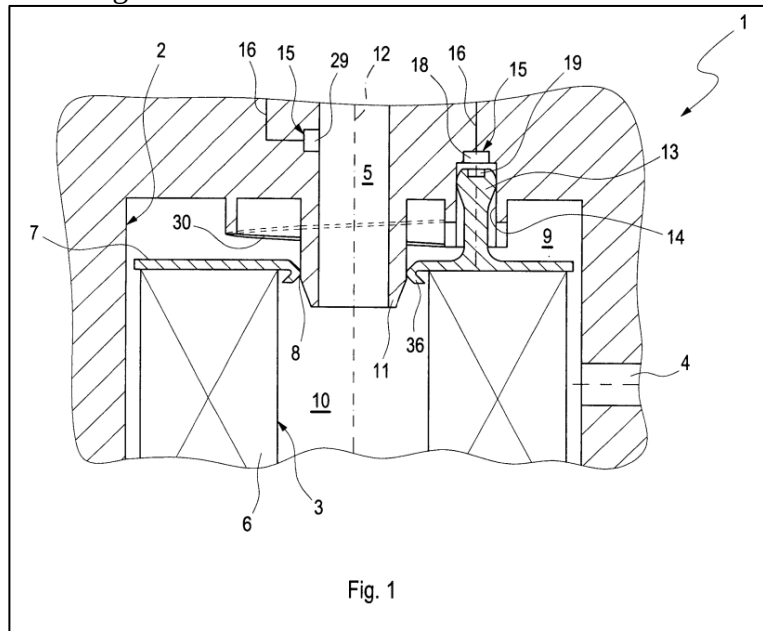
According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function.

To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 1:



As one example, Dworatzek in combination with Audi System discloses the blocking element (Grass 13) is a radially sealing plug which is rigidly arranged on the bottom front panel (Grass 7).

Claim 25

[25] The ring filter insert according to claim 15, wherein the blocking element is an axially sealing valve element which is elastically arranged on the bottom front panel.

Dworatzek in combination with Audi System, and/or the background knowledge of a POSA, discloses the blocking element is an axially sealing valve element which is elastically arranged on the bottom front panel.

A POSA would have motivation to make this combination for numerous reasons. For example, Both Dworatzek and Audi System disclose similar structures, components, and subject matter (e.g. filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the housing and thus a POSA would be motivated to add this advantageous feature to the filter and

housing of Dworatzek. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the filter housing disclosed in Dworatzek, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (*e.g.*, 10, 11) during filter change, because the eccentric blocking element eliminates the need to manually pouring any remaining oil over the lip or connecting mechanisms of the filter housing. During an oil change, when the lower case (*e.g.*, 11) is removed with the filter insert (*e.g.*, 12) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching any opening from outside. A POSA would have a reasonable expectation of success in adding this feature to Dworatzek and/or incorporating the teachings of Dworatzek into Audi system as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

MAHLE Audi Filter:

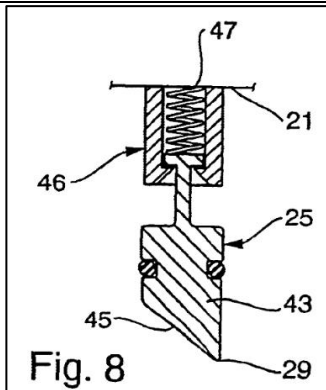




Baumann at :

In the special embodiment illustrated in FIG. 8, the pin 25 is supported so it is adjustable in the axial direction by means of a holder 46 on the lower end disk 21. The holder 46 contains a spring 47, which applies tension to the pin 25, pulling it away from the lower end disk 21, i.e., in the direction of the ramp 28.

Baumann at Fig. 8:



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0021]:

According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine.

The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an

end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11.

The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 .

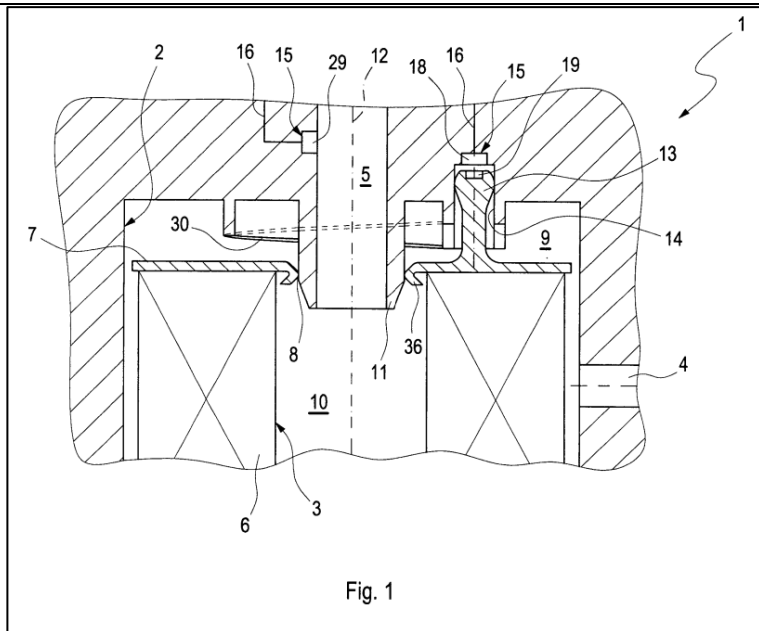
The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .

Grass at [0033]-[0036]:

According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified.

If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those

	filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function. To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle 14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off. According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 . Grass Fig. 1:
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For example, Dworatzek in combination with Audi System discloses the blocking element (Baumann 25) is an axially sealing valve element which is elastically arranged on the bottom front panel (Baumann 47).

Claim 28

[28] The ring filter insert according to claim 15, wherein the blocking element is formed from two parts, the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.

Dworatzek in combination with Audi System, and/or the background knowledge of a POSA, discloses the blocking element is formed from two parts, the two parts of the blocking element being engaged with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.

A POSA would have motivation to make this combination for numerous reasons. For example, Both Dworatzek and Audi System disclose similar structures, components, and subject matter (*e.g.* filter systems where the filter unit comprises a housing, with a cover (including covers attached and assembled to the filter assembly with conventional attachment mechanisms), and also all include filter elements contained within inner chambers of the overall filter assembly. Further, as disclosed in Audi System, including an eccentric blocking element has the benefit of allowing clogged or contaminated oil to be discharged when the filter insert is removed from the

housing and thus a POSA would be motivated to add this advantageous feature to the filter and housing of Dworatzek. A POSA would understand that, the eccentric blocking element disclosed in Audi System, when compared to the filter housing disclosed in Dworatzek, offers multiple advantages, including avoiding splashing of oil and contamination of the outer surface of the filter case (*e.g.*, 10, 11) during filter change, because the eccentric blocking element eliminates the need to manually pouring any remaining oil over the lip or connecting mechanisms of the filter housing. During an oil change, when the lower case (*e.g.*, 11) is removed with the filter insert (*e.g.*, 12) still inside, the operator can discharge the remaining oil inside the lower case by simply removing the filter insert—while never touching any opening from outside. A POSA would have a reasonable expectation of success in adding this feature to Dworatzek and/or incorporating the teachings of Dworatzek into Audi system as doing so involves no more than routine techniques well established in the mechanical arts.

See, e.g.,

MAHLE Audi Filter:





Audi Filter Insert:

Engine Oil Filter Element

Part Number: 079198405E

Supersession(s): 079-198-405-E; 079198405B; 79198405E



Grass at [0006]:

The invention is based on the general idea of equipping the filter device with a signal transmitter which can detect and signal the presence or absence of the spigot and thus of a filter element equipped with the spigot. This information can, for example, be transmitted to vehicle electronics, for example to indicate to a driver that the filter element is missing. It is also fundamentally possible for the vehicle electronics to prevent the internal combustion engine from starting if there is no filter element. The proposed design can thus effectively prevent damage to the internal combustion engine caused by contaminants that could be introduced into the internal combustion engine if the filter element is missing.

Grass at [0018]-[0023]:

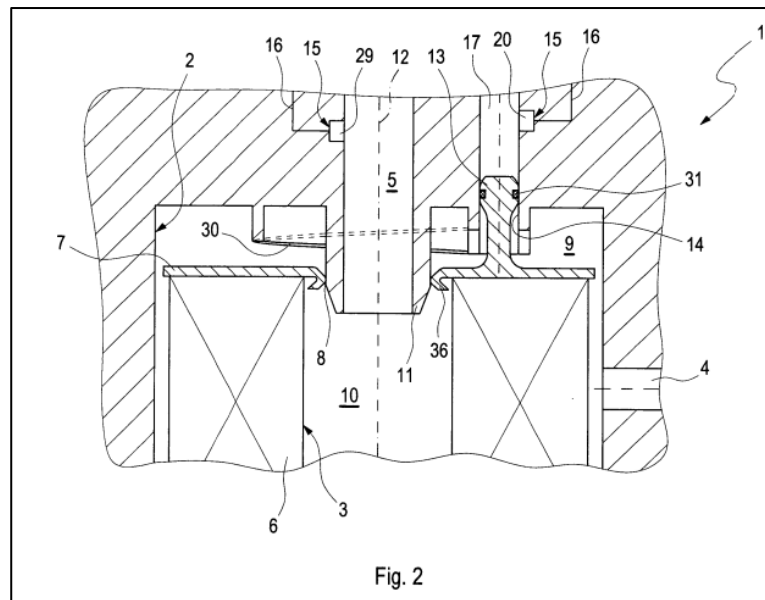
	According to FIGS. 1 and 2 , a filter device 1 comprises a filter housing 2 which is designed to accommodate a filter element 3. The filter housing 2 has an inlet 4 on the raw side and an outlet 5 on the clean side. The filter device 1 is used to filter a liquid of an internal combustion engine, which can be arranged in particular in a motor vehicle. In particular, the filter device 1 serves to filter the lubricating oil of the internal combustion engine. In principle, an embodiment is also conceivable in which the filter device 1 serves to filter fuel or any other liquid of the internal combustion engine. The filter element 3 is preferably designed as a ring filter element and accordingly has an annular or cylindrical filter body 6. The filter body 6 consists of a conventional filter material such as. B. filter paper or filter fleece. At an axial end shown in FIGS. 1 and 2 , the filter element 3 has an end disk 7 which is connected to the filter body 6 in a liquid-tight manner. The end disk 7 can be welded or glued to the filter body 6 or connected in any other suitable manner. For example, the filter material of the filter body 6 can be plasticized into the end plate 7 . The end disk 7 shown has a central opening 8 so that it is an open end disk 7 here. At its other axial end, the filter element 3 can have a further end disk, which can be open or closed. The filter element 3 separates a raw space 9 from a clean space 10 in the filter housing 2. The raw room 9 communicates with the inlet 4 , while the clean room 10 communicates with the outlet 5 . In the example, the clean room 10 is formed in the interior of the filter element 3 enclosed by the filter body 6 . In the example, the filter element 3 can thus be flown through radially from the outside to the inside. The filter housing 2 has a socket 11 onto which the open end plate 7 with its opening 8 can be plugged. The outlet 5 communicates with the interior of the filter element 3 , ie with the clean room 10 , through the socket 11 . A radial direction 36 is formed on the open end disk 7 and interacts with the socket 11. The filter element 3 has a pin 13 that protrudes axially and eccentrically with respect to a longitudinal center axis 12 of the filter element 3 . This pin 13 is preferably formed on the end plate 7 . For example, the pin 13 is formed integrally on the end plate 7 . Likewise, the pin 13 can be fully or partially attached to the end plate 7 . The housing 2 has a pin receptacle 14 . This is open to the raw room 9 . The filter housing 2 and filter element 3 are matched to one another in such a way that the pin 13 protrudes axially into the pin receptacle 14 or is inserted into it when the filter element 3 is correctly inserted into the filter housing 2 .
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	The filter device 1 also has at least one signal generator 15 on, which is designed and / or arranged so that thus the absence and / or the presence of the pin 13 in the pin holder 14 recognizable and possibly electrically signaled. The respective signal generator 15 can for example via a corresponding signal line 16 be connected to a controller not shown here. At the in 1 the embodiment shown is the pin receptacle 14 designed as a blind hole. In particular, this Blindloch or the pin receiving 14 in addition to the ability, the pin 13 record, so no more functionality. In contrast, shows 2 an embodiment in which the pin receiving 14 through an inlet region of a return or idle 17 is formed, with the crude space 9 communicated. The pin 13 here additionally fulfills the function, the idle or the return 17 when closing in the pin receptacle 14 , So in the inlet area of the return or idle 17 is plugged in. The pin 13 can do this with a corresponding radial seal 31 equipped, which is for example an O-ring. Grass at [0033]-[0036]: According to FIGS. 1 and 2 , the housing 2 can have a ramp 30 . This is designed in the form of a circular path and leads to the pin receptacle 14 . For this purpose, the ramp 30 falls helically towards the pin receptacle 14 . The pin 13 can slide along the ramp 30 when the filter element 3 is screwed in. With the aid of the ramp 30, the insertion of the pin 13 into the pin receptacle 14 is considerably simplified. If the filter housing 2 is equipped with such a ramp 30, a special embodiment explained in more detail in FIGS. 6 to 8 can also be implemented. In these special embodiments, the ramp 30 and the pin 13 are designed and matched to one another in such a way that they work together according to the key-lock principle. This lock and key principle has the effect that only those filter elements 3 can be properly used with the filter device 1 in which the pin 13 is specially adapted to the ramp 30 . Proper use, which is relevant here, means that the pin 13 automatically finds the pin receptacle 14 when it is attached or when the filter element 3 is rotated and penetrates into it. If the filter element 3 is not specially adapted to the filter device 1, the lock and key principle prevents the pin 13 that may be present from being able to automatically find the pin receptacle 14 when the filter element 3 is screwed on or screwed in. This is intended to ensure that only filter elements 3 that have been precisely adapted for the filter device 1 can be used, for example in order to be able to ensure a proper filtering function. To implement this lock and key principle, an insertion contour with guide bodies 32 can be provided according to FIGS. A pin 13 sliding along the ramp 30 can only reach the pin receptacle
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14 if it has a projection 33 adapted to this guide body 32 and protruding axially from the respective pin 13 . This projection 33 is, for example, a conical or pin-shaped or bar-shaped attachment that establishes contact between the pin 13 and the ramp 30 . This projection 33 is dimensioned axially in such a way that it can lift the pin 13 over the guide elements 32 . This means that the spigot 13 sliding over the projection 33 on the ramp 30 is spaced axially far enough from the guide bodies 32 that it can be aligned past the guide bodies 32 to the spigot receptacle 14 . According to FIGS. 6 to 8 , the projection 33 can contact the ramp 30 between the guide bodies 35 and thereby enable the pin 13 to slide off.

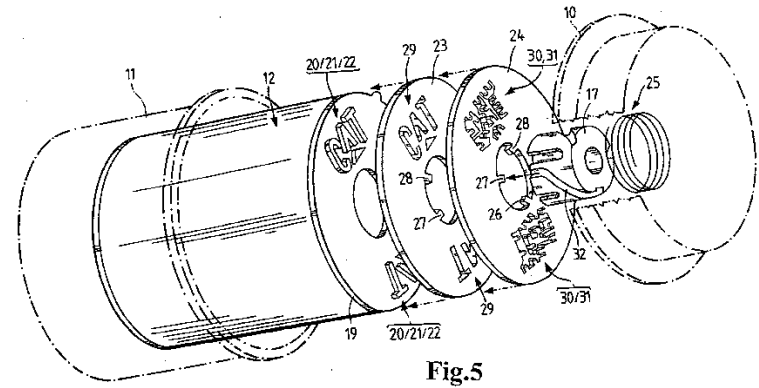
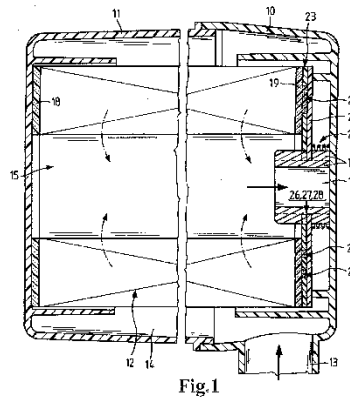
According to FIG. 6, the guide elements 32 are arranged in the area of the lower end 34 of the ramp. The pin receptacle 14 is arranged in the circumferential direction between the lower end of the ramp 34 and an upper end of the ramp 35 , which slopes down along the ramp 30 to the lower end of the ramp 34 .

Grass Fig. 2:



For example, Dworatzek in combination with Audi System discloses the blocking element (Grass 13) is formed from two parts (Grass 13, 31), the two parts of the blocking element being engaged

	with each other in a manner allowing a compensation of radial dimension tolerances and angle errors.
Claim 29	
[29] The liquid filter according to claim 1, wherein the protruding nose protrudes radially.	Dworatzek discloses the protruding nose protrudes radially. <i>See, e.g.,</i> Dworatzek at [0028]-[0029]: FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked. The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element. Dworatzek at Figs. 1, 5:



For example, Dworatzek discloses the protruding nose (26-28) protrudes radially.

Claim 30

[30] The ring filter insert according to claim 15, wherein the protruding nose protrudes radially.

Dworatzek discloses the protruding nose protrudes radially.

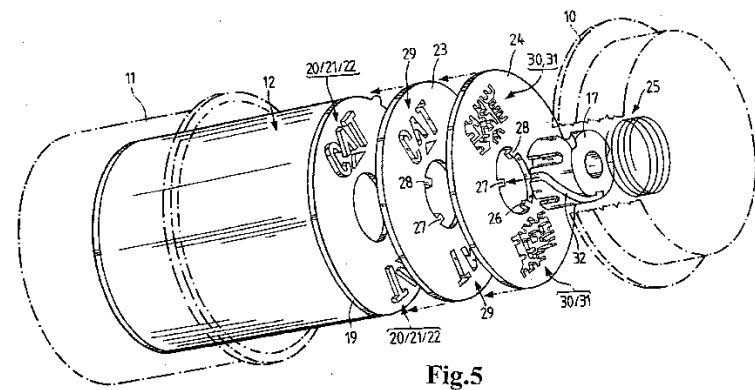
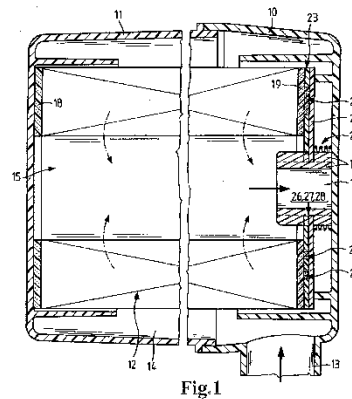
See, e.g.,

Dworatzek at [0028]-[0029]:

FIGS. 3 a and 3 b show the disk-shaped element 24, which also has inwardly directed projections 26, 27, 28. Furthermore, the element 24 has resiliently mounted pin-like appendages 30 and 31 which extend out of the plane of the disk 24, as well as a number of other projections which are also resiliently mounted and arranged in the axial direction. If the element 23 rests against the element 24, then the pin-like appendages 30, 31 engage in passages of the written characters of the intermediate element 23 when in the correct position and thereby prevent a relative rotational movement between the two disks 23 and 24. Only when the projecting appendages 30, 31 are pushed by the end disk 19, i.e., by the letter-shaped elevations or configurations 20 on the end disk 19, in the axial direction out of the letter-shaped passageways of the intermediate disk 23 is it possible for the two disks 23 and 24 to rotate relative to each other. This means that the end disk 19 represents the key, so to speak, with which the lock comprised of the disks 23 and 24 can be unlocked.

The central mandrel 17 which is shown in FIGS. 4 a and 4 b also plays an important role in this unlocking. This central mandrel has three grooves 32, 33, 34 which are arranged distributed around the circumference of the mandrel and serve to guide the projections 26, 27 and 28. If there is no filter element in the housing according to FIG. 1, then the two elements 23 and 24 are in the position indicated schematically in FIG. 4 a. The engagement of the end disk 19 in the two elements causes the element 24 to be moved into the obliquely extending groove areas and to be shifted to the ends of the groove, which can be seen at the right side in FIG. 4 a, owing to the unlocking effect due to the axial movement of the filter element.

Dworatzek at Figs. 1, 5:



For example, Dworatzek discloses the protruding nose (26-28) protrudes radially.